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

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

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

New Britain General Hospital
100 Grand Street
New Britain, CT 06050

TELEPHONE NO.: AREA CODE (203) 224-5011

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

Same

**2. PERSON TO CONTACT REGARDING THIS APPLICATION**

Gerald J. Randall

TELEPHONE NO.: AREA CODE (203) 224-5520

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

a. ☐ NEW LICENSE
b. ☐ AMENDMENT TO LICENSE NO. _____
c. ☒ RENEWAL OF LICENSE NO. 06-02388-01

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

See attached (Item 8)

**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.)*

Gerald J. Randall, M.S.

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

| RADIOACTIVE MATERIAL LISTED IN: | ITEMS DESIRED "X" | MAXIMUM POSSESSION LIMITS (In millicuries) |
|---|---|---|
| 10 CFR 31.11 FOR IN VITRO STUDIES | X | 3 each |
| 10 CFR 35.100, SCHEDULE A, GROUP I | X | AS NEEDED |
| 10 CFR 35.100, SCHEDULE A, GROUP II | X | AS NEEDED |
| 10 CFR 35.100, SCHEDULE A, GROUP III | X | 2000 each |
| 10 CFR 35.100, SCHEDULE A, GROUP IV | X | AS NEEDED |
| 10 CFR 35.100, SCHEDULE A, GROUP V | X | AS NEEDED |
| 10 CFR 35.100, SCHEDULE A, GROUP VI | X | 1000 total |

| ADDITIONAL ITEMS: | MARK ITEMS DESIRED "X" | MAXIMUM POSSESSION LIMITS (In millicuries) |
|---|---|---|
| IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM | | |
| PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES | | |
| PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS. | | |
| GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS. | | |
| IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA | | |
| XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES. | X | 300 |

**6.b. RADIOACTIVE MATERIAL FOR USES NOT LISTED IN ITEM 6.a.** *(Sealed sources up to 100 µCi 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 |
|---|---|---|---|
| Uranium (depleted in uranium 235) | Cadmium Plated Metal | 137 kilograms | as shielding in linear accelerator |











JUL 28 1986

## INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

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

## 24. PERSONNEL MONITORING DEVICES

| TYPE (Check appropriate box) | | | SUPPLIER | EXCHANGE FREQUENCY |
|---|---|---|---|---|
| a. WHOLE BODY | | FILM | Siemens | Monthly |
| | | TLD | | |
| | | OTHER (Specify) | | |
| b. FINGER | | FILM | | |
| | | TLD | Siemens | Monthly |
| | | OTHER (Specify) | | |
| c. WRIST | | FILM | | |
| | | TLD | | |
| | | OTHER (Specify) | | |

d. OTHER (Specify)

August 1 - T
2316 70 $580
Renewal
8/2/85
Jacque
104160

## 25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

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

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

## 26. CERTIFICATE

*(This item must be completed by applicant)*

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

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

(1) LICENSE FEE CATEGORY: Human Use 7C

(2) LICENSE FEE ENCLOSED: $ 580

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)* by

(1) NAME *(Type or Print)* Stanley W. Shepard

(2) TITLE President & Chief Executive Officer

c. DATE 7/22/85

FORM NRC-313M (8-78)

## PRIVACY ACT STATEMENT

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

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

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

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

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

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

FORM NRC-313M
(8-78)

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

AUTHORIZED INDIVIDUAL USERS

THE FOLLOWING INDIVIDUALS ARE LISTED AS AUTHORIZED USERS ON THE PRESENT LICENSE:

STEVEN A. STIER, M.D.
THOMAS ROBINSON, M.D.
JEFFREY D. NEILL, M.D.
SOO HWAN PAI, M.D.

GERALD J. RANDALL, M.S., IS PRESENTLY LISTED ON THE LICENSE AS RADIATION SAFETY OFFICER. IN HIS ABSENCE, EITHER DR. STIER OR DR. ROBINSON WILL ASSUME HIS DUTIES.

ALFRED G. GLADSTONE, M.D. IS AN ADDITION TO OUR STAFF. FORMS NRC 313, SUPPLEMENT A & B ARE ATTACHED.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# RADIATION SAFETY COMMITTEE

## MEMBERSHIP

MEMBERSHIP SHALL INCLUDE:

PHYSICIANS SPECIALIZING IN NUCLEAR MEDICINE, INTERNAL MEDICINE, AND EITHER HEMATOLOGY OR PATHOLOGY, AT LEAST ONE OF WHOM WILL USE OR DIRECTLY SUPERVISE THE USE OF RADIOACTIVE MATERIALS FOR DIAGNOSIS OR TREATMENT OF HUMANS.

THE RADIATION SAFETY OFFICER.

A REPRESENTATIVE OF THE HOSPITAL'S ADMINISTRATION.

THE ACTUAL NAMES AND SPECIALTIES OF THE INDIVIDUALS WILL BE KEPT IN THE COMMITTEE RECORDS.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# RADIATION SAFETY COMMITTEE
# DUTIES AND RESPONSIBILITIES

## RESPONSIBILITY

1. ENSURE THAT ALL PERSONS WORKING IN OR NEAR RADIOACTIVE MATERIAL HAVE SUFFICIENT TRAINING AND EXPERIENCE TO PERFORM THEIR DUTIES SAFELY AND IN ACCORDANCE WITH NRC REGULATIONS AND CONDITIONS OF THE LICENSE.
2. ENSURE THAT ALL USE OF RADIOACTIVE MATERIAL IS CONDUCTED IN A SAFE MANNER AND IN ACCORDANCE WITH NRC REGULATIONS AND LICENSE CONDITIONS.

## DUTIES

1. BE FAMILIAR WITH NCR REGULATIONS, TERMS OF LICENSE, & INFORMATION SUBMITTED IN SUPPORT OF THE REQUEST FOR LICENSES AND AMENDMENTS.
2. REVIEW THE TRAINING & EXPERIENCE OF ALL INDIVIDUALS WHO USE RADIOACTIVE MATERIAL (INCLUDING PHYSICIANS, TECHNOLOGISTS, PHYSICISTS, AND PHARMACISTS) AND DETERMINE THAT THEIR QUALIFICATIONS ARE SUFFICIENT TO PERFORM THEIR DUTIES SAFELY AND ACCORDING TO NRC REGULATIONS AND LICENSE CONDITIONS.
3. ESTABLISH A PROGRAM TO ENSURE THAT ALL INDIVIDUALS WHOSE DUTIES MAY REQUIRE THEM TO WORK IN THE VICINITY OF RADIOACTIVE MATERIAL (e.g. NURSING, SECURITY, AND HOUSEKEEPING) ARE PROPERLY INSTRUCTED AS REQUIRED BY SECTION 19.12 OF 10 CFR PART 19.
4. REVIEW AND APPROVE ALL REQUESTS FOR USE OF RADIOACTIVE MATERIAL WITHIN THE INSTITUTION.
5. PRESCRIBE SPECIAL CONDITIONS WHICH MAY BE REQUIRED DURING A PROPOSED USE OF RADIAOACTIVE MATERIAL SUCH AS REQUIREMENT FOR BIOASSAYS, PHYSICAL EXAMS OF USERS, AND SPECIAL MONITORING.
6. REVIEW THE ENTIRE RADIATION SAFETY PROGRAM AT LEAST ANNUALLY TO DETERMINE THAT ALL ACTIVITIES ARE BEING CONDUCTED SAFELY AND IN ACCORDANCE WITH NRC REGULATIONS AND LICENSE CONDITIONS. THE REVIEW SHALL INCLUDE AN EXAMINATION OF ALL RECORDS, REPORTS FROM THE RADIATION SAFETY OFFICER, RESULTS OF NRC INSPECTIONS, WRITTEN SAFETY PROCEDURES, AND THE ADEQUACY OF THE INSTITUTION'S MANAGEMENT CONTROL SYSTEM.
7. RECOMMEND REMEDIAL ACTION TO CORRECT ANY DEFICIENCIES IDENTIFIED IN THE RADIATION SAFETY PROGRAM.
8. MAINTAIN WRITTEN RECORDS OF ALL COMMITTEE MEETINGS, ACTIONS, RECOMMENDATIONS, AND DECISIONS.
9. ENSURE THAT THE BYPRODUCT MATERIAL LICENSE IS AMENDED, WHEN NECESSARY, PRIOR TO ANY CHANGES IN FACILITIES, EQUIPMENT, POLICIES, PROCEDURES, AND PERSONNEL, AS SPECIFIED IN THE LICENSE.

## MEETING FREQUENCY

THE COMMITTEE SHALL MEET AS OFTEN AS NECESSARY TO CONDUCT ITS BUSNESS BUT NOT LESS THAN ONCE IN EACH CALENDAR QUARTER.

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

U.S. NUCLEAR REGULATORY COMMISSION

# TRAINING AND EXPERIENCE
# AUTHORIZED USER OR RADIATION SAFETY OFFICER

| 1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER | 2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE |
|---|---|
| Alfred G. Gladstone, M.D. | NY, CT, NJ |

## 3. CERTIFICATION

| SPECIALTY BOARD<br>A | CATEGORY<br>B | MONTH AND YEAR CERTIFIED<br>C |
|---|---|---|
| American Board of Radiology | Diagnostic Radiology | June 1983 |

## 4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

| FIELD OF TRAINING<br>A | LOCATION AND DATE(S) OF TRAINING<br>B | TYPE AND LENGTH OF TRAINING | |
|---|---|---|---|
| | | LECTURE/ LABORATORY COURSES (Hours)<br>C | SUPERVISED LABORATORY EXPERIENCE (Hours)<br>D |
| a. RADIATION PHYSICS AND INSTRUMENTATION | Columbia Presbyterian Medical Center<br>College of Physicians & Surgeons<br>622 West 168th Street<br>New York, NY 10032 | 120 | 14 |
| b. RADIATION PROTECTION | " | 60 | 5 |
| c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY | " | 60 | 3 |
| d. RADIATION BIOLOGY | " | 40 | — |
| e. RADIOPHARMACEUTICAL CHEMISTRY | " | 80 | 15 |

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

| ISOTOPE | MAXIMUM AMOUNT | WHERE EXPERIENCE WAS GAINED | DURATION OF EXPERIENCE | TYPE OF USE |
|---|---|---|---|---|
| $^{99}Mo$ | 1 Curie | Columbia Presyberian Medical Center<br>College of Physicians & Surgeons | 7/1/80 to 6/30/83<br>500 Hours | $^{99m}Tc$ Generato |
| $^{99m}Tc$ | 1 Curie | | | Diagnostic Kit |
| $^{131}I$ | 150mCi | | | Preparations- |
| $^{67}Ga$ | 10mCi | | | Therapy-Thyroi Ca |
| $^{201}Tl$ | 10mCi | " | | Tumor localiza |
| $^{123}I$ | 500mCi | " | | Cardiac Imagin |
| | | | | Thyroid Imagin |

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

U. S. NUCLEAR REGULATORY COMMISSION

# PRECEPTOR STATEMENT

*Supplement B must be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each.*

1. APPLICANT PHYSICIAN'S NAME AND ADDRESS

FULL NAME

Alfred G. Gladstone, M.D.

STREET ADDRESS

69 Foxridge Rd.

CITY | STATE | ZIP CODE

West Hartford, CT 06107

**KEY TO COLUMN C**

**PERSONAL PARTICIPATION SHOULD CONSIST OF:**

1-Supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation for prescribed dosage.

2-Collaboration in dose calibration and actual administration of dose to the patient including calculation of the radiation dose, related measurements and plotting of data.

3-Adequate period of training to enable physician to manage radioactive patients and follow patients through diagnosis and/or course of treatment.

## 2. CLINICAL TRAINING AND EXPERIENCE OF ABOVE NAMED PHYSICIAN

| ISOTOPE<br>A | CONDITIONS DIAGNOSED OR TREATED<br>B | NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION<br>C | COMMENTS<br>*(Additional information or comments may be submitted in duplicate on separate sheets.)*<br>D |
|---|---|---|---|
| I-131 or I-125 | DIAGNOSIS OF THYROID FUNCTION | 150 | |
| | DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME | 25 | |
| | LIVER FUNCTION STUDIES | | |
| | FAT ABSORPTION STUDIES | | |
| | KIDNEY FUNCTION STUDIES | 10 | |
| | IN VITRO STUDIES T3, T4 | 100 | |
| OTHER | 123I (NaI) Thyroid Funct. | 110 | |
| I-125 | DETECTION OF THROMBOSIS | | |
| I-131 | THYROID IMAGING | 150 | |
| P-32 | EYE TUMOR LOCALIZATION | | |
| Se-75 | PANCREAS IMAGING | | |
| Yb-169 | CISTERNOGRAPHY | | |
| Xe-133 | BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES | 100 | |
| OTHER | $^{81m}$Kr Gas Pulmonary | 100 | |
| Tc-99m | BRAIN IMAGING | | |
| | CARDIAC IMAGING Avid infarct | 25 | |
| | THYROID IMAGING | 10 | |
| | SALIVARY GLAND IMAGING | | |
| | BLOOD POOL IMAGING Cardiac | 75 | |
| | PLACENTA LOCALIZATION | | |
| | LIVER AND SPLEEN IMAGING | 300 | |
| | LUNG IMAGING | 400 | |
| | BONE IMAGING | 700 | |
| OTHER | | | |

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

| ISOTOPE<br>A | CONDITIONS DIAGNOSED OR TREATED<br>B | NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION<br>C | COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)*<br>D |
|---|---|---|---|
| P-32 *(Soluble)* | TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES | 8 | |
| P-32 *(Colloidal)* | INTRACAVITARY TREATMENT | | |
| I-131 | TREATMENT OF THYROID CARCINOMA | 6 | |
| | TREATMENT OF HYPERTHYROIDISM | 30 | |
| Au-198 | INTRACAVITARY TREATMENT | | |
| Co-60 or Cs-137 | INTERSTITIAL TREATMENT | | |
| | INTRACAVITARY TREATMENT | | |
| I-125 or Ir-192 | INTERSTITIAL TREATMENT | | |
| Co-60 or Cs-137 | TELETHERAPY TREATMENT | | |
| Sr-90 | TREATMENT OF EYE DISEASE | | |
| | RADIOPHARMACEUTICAL PREPARATION | | |
| Mo-99/ Tc-99m | GENERATOR | 25 | |
| Sn-113/ In-113m | GENERATOR | | |
| Tc-99m | REAGENT KITS | 275 | |
| Other | | | |
| 201Tl | Cardiac Imaging | 100 | |
| 67Ga | Tumor Localization | 30 | |
| 51Cr | Red Cell Mass & Survival | 15 | |
| 57Co<br>60 Co | Pernicious Anemia Studies | 75 | |

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

7/1/80 to 6/30/83 - 500 hours total

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

a. NAME OF SUPERVISOR
Philip O. Alderson, M.D.

b. NAME OF INSTITUTION
Columbia Presbyterian Med. Center

c. MAILING ADDRESS
622 West 168th Street

d. CITY
New York, New York, 10032

5. MATERIALS LICENSE NUMBER(S)
New York City # 630-1

6. PRECEPTOR'S SIGNATURE
Philip O Alderson MD

7. PRECEPTOR'S NAME *(Please type or print)*
Philip O. Alderson, M.D.

8. DATE
6/25/84

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

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# NUCLEAR MEDICINE RADIATION DETECTION INSTRUMENTATION

## SURVEY METERS

| QNTY | MANUFACTURER & MODEL | MODEL NUMBER | SERIAL NO. | MIN.RANGE (mR/Hr) | MAX.RANGE (mR/Hr) |
|---|---|---|---|---|---|
| 1 | VICTOREEN CUTIE-PIE | 740 F | 1993 | 0 TO 25 | 0 TO 25R/HR |
| 2 | VICTOREEN G.M. METERS | CDV 700 | 64331 & 28298 | 0-0.5 | 0-50 |

## DOSE CALIBRATORS

| QNTY | MANUFACTURER | MODEL NO. | SERIAL NO. |
|---|---|---|---|
| 1 | CAPINTEC, INC. | CRC-17 | 17063 |

## WELL COUNTERS/UPTAKE/RECTILINEAR SCANNER

| QNTY | MANUFACTURER | MODEL NO. | SERIAL NO. |
|---|---|---|---|
| 1 | PICKER SPECTROSCALAR III PHA WITH PICKER NUCLEAR WELL USED FOR WIPE TESTING | | N/A |
| 1 | A.D.C. NUCLEAR SPECTROSCALAR WITH ADC UPTAKE PROBE | 300 | 01792 |

## GAMMA CAMERAS

| QNTY | MANUFACTURER | MODEL NO. | SERIAL NO. |
|---|---|---|---|
| 1 | SEARLE PHOGAMMA | 38 CM. UFOV 37 PM | |
| 1 | SIEMENS | ZLC-370 39 CM. UFOV 37 PM 1/4 IN. THICK CRYSTAL | |
| 1 | TECHNICARE SIGMA | 420 25 CM. UFOV 37 PM WITH TECHNICARE MCS560 PORTABLE COMPUTER | |

## XENON MONITOR

| QNTY | MANUFACTURER | MODEL NO. | SERIAL NO. |
|---|---|---|---|
| 1 | NUCLEAR ASSOCIATES XENALERT | 36-751 | 7671 |

INTEGRITY CHECK (QUARTERLY)

THE INSTRUMENT IS INSPECTED QUARTERLY TO ASCERTAIN THE CORRECT PLACEMENT AND INTEGRITY OF THE LINER, THE PROPER ZERO SETTING, DC BALANCE, AND BACKGROUND SUBTRACT IF APPLICABLE. (REF MFGR'S INSTRUCTIONS)

CONSTANCY (EACH DAY OF USE)

INSTRUMENT REPRODUCIBILITY IS CHECKED EACH DAY OF USE WITH THE CS-137 AND BA-133 REFERENCE VIAL SOURCES.

PROCEDURE

1. THE BA-133 STANDARD IS ASSAYED AT THE BA-133 SETTING, AND THE NET ACTIVITY RECORDED.
2. THE CS-137 STANDARD IS ASSAYED AT THE CS-137 SETTING, AND AT EACH SETTING FOR THE COMMONLY USED RADIONUCLIDES, AND RECORDED.
3. THE READINGS OBTAINED IN 1. AND 2. ARE THEN COMPARED TO THE PREDICTED DECAY CORRECTED READINGS.
4. READINGS WHICH DIFFER BY MORE THAN 5% FROM THE PREDICTED VALUES INDICATE THE NEED FOR REPAIR OR ADJUSTMENT OF THE INSTRUMENT.
5. HIGHER THAN NORMAL BACKGROUND READINGS WILL BE INVESTIGATED TO DETERMINE THEIR ORIGIN AND TO ELIMINATE THEM IF POSSIBLE.

GEOMETRICAL VARIATION (AT INSTALLATION & AFTER REPAIR)

APPROX. 5 mCi OF TC-99m IN 1 ml IN A 30cc VIAL WILL BE USED.

PROCEDURE

1. THE VIAL IS ASSAYED AT THE APPROPRIATE INSTRUMENT SETTING, AND BACKGROUND SUBTRACTED TO OBTAIN THE NET ACTIVITY.
2. THE VOLUME IS THEN INCREASED IN THE VIAL IN STEPS TO VOLUMES OF 2,4,8,10,20, AND 25 ml BY ADDING THE APPROPRIATE AMOUNT OF WATER, GENTLY SHAKEN TO MIX, AND ASSAYED AS IN STEP 1.
3. THE MEAN READING IS THEN DETERMINED, AND THE RATIO OF EACH READING TO THE MEAN IS DETERMINED. ANY READING WITH A DIFFERENCE GREATER THAN 2% FROM THE MEAN WILL REQUIRE THE CONSTRUCTION AND USE OF A VOLUME CORRECTION GRAPH.

ACCURACY (AT INSTALLATION, AFTER REPAIR, AND ANNUALLY)

ACCURACY OF THE INSTRUMENT IS CHECKED USING REFERENCE VIAL STANDARDS OF CO-57 (1-10 mCi), BA-133 (100-300 uCi), AND CS-137 (100-300 uCi) WITH N.B.S. TRACEABLE CALIBRATIONS.

PROCEDURE

1. THREE READINGS ARE TAKEN FOR EACH REFERENCE STANDARD, BACKGROUND SUBTRACTED, TO OBTAIN THE AVERAGE NET ACTIVITY READING.
2. THE AVERAGE ACTIVITY OBTAINED SHOULD AGREE WITH THE CERTIFIED ACTIVITY WITHIN 5% AFTER DECAY CORRECTION. READINGS WHICH DO NOT AGREE WITHIN 5% WILL REQUIRE REPAIR OR ADJUSTMENT OF THE INSTRUMENT, OR THE USE OF A CALIBRATION FACTOR FOR ROUTINE USE.
3. THE CS-137 REFERENCE STANDARD IS PLACED IN THE INSTRUMENT, AND THE INSTRUMENT IS SET IN TURN TO THE VARIOUS RADIONUCLIDE SETTINGS NORMALLY USED, AND THE READINGS RECORDED. THESE READINGS ARE USED TO CHECK INSTRUMENT CALIBRATION CONSTANCY.

## LINEARITY (AT INSTALLATION, AFTER REPAIR & QUARTERLY)

LINEARITY IS CHECKED OVER THE ENTIRE RANGE OF ACTIVITIES EMPLOYED. THIS TEST USES A STERILE VIAL OF TC-99m WHOSE ACTIVITY EQUALS THE MAXIMUM ACTIVITY TO BE ASSAYED.(e.g. FIRST ELUTION OF NEW GENERATOR).

### PROCEDURE WHEN ON SITE GENERATOR IS AVAILABLE

1. USING THE FIRST ELUTION OF THE NEW GENERATOR (REFERRED TO AS THE GEN.VIAL), THE ACTIVITY IS ASSAYED AND RECORDED ALONG WITH THE TIME AND DATE.
2. A STERILE SYRINGE IS USED TO REMOVE APPROXIMATELY 10% OF THE VOLUME TO PLACE IT INTO AN IDENTICAL VIAL (REFERRED TO 10% VIAL). USING THE SAME SYRINGE, WATER IS ADDED TO THE 10% VIAL UNTIL THE VOLUME IS EQUAL TO THE GEN.VIAL, AND SHAKEN GENTLY TO MIX.
3. THE GEN.VIAL IS AGAIN ASSAYED AS IN 1.ABOVE, AND THE ACTIVITY, TIME, AND DATE RECORDED. (THIS VIAL MAY NOW BE USED FOR CLINCAL PURPOSES)
4. THE 10% VIAL IS ALSO ASSAYED AS IN 1. AND DATA RECORDED.
5. THE 10% VIAL IS THEN ASSAYED EACH AM AND PM THEREAFTER AS IN 1., RECORDING ALL DATA, UNTIL THE MEASURED ACTIVITY IS APPROX. 100 uCi.
6. ALL READINGS ARE THEN CORRECTED FOR DECAY TO THE TIME OF THE INITIAL 10% VIAL READING IN 4., USING THE VALUE OF 6.02 HOURS FOR THE HALF LIFE. THE LINEARITY IS THEN CHECKED AS FOLLOWS:
   A. THE SUM OF READINGS IN 3. AND 4. ARE DIVIDED BY THE READING IN 1. TO DETERMINE THE % DIFFERENCE. A DIFFERENCE GREATER THAN 5% INDICATE THE NEED FOR REPAIR OR ADJUSTMENT OF THE INSTRUMENT.
   B. EACH READING OBTAINED IN 5. IS DIVIDED BY THE READING IN 4. TO DETERMINE THE % DIFFERENCE. A DIFFERENCE GREATER THAN 5% IN ANY READING INDICATES THE NEED FOR REPAIR OR ADJUSTMENT OF THE INSTRUMENT.
7. IF INSTRUMENT CANNOT BE CORRECTED A CALIBRATION GRAPH WILL BE CONSTRUCTED FOR USE IN ROUTINE ASSAYS.

### PROCEDURE WHEN NO ON SITE GENERATOR IS USED

1. A BULK VIAL OF TC-99M IS USED. THE ACTIVITY IS EQUAL TO OR LARGER THAN THE MAXIMUM ACTIVITY ROUTINELY MEASURED IN THE DOSE CALIBRATOR.
2. THE ACTIVITY OF THE VIAL IS ASSAYED EACH AM & PM UNTIL THE ACTIVITY IS APPROXIMATELY 100 uCi. THE ACTIVITY, TIME AND DATE OF MEASUREMENTS ARE RECORDED.
3. ALL READINGS ARE CORRECTED FOR DECAY TO ONE OF THE READINGS CLOSEST TO A TYPICAL PATIENT DOSE, USING THE VALUE OF 6.02 HOURS HALF LIFE.
4. ALL CORRECTED READINGS SHOULD BE WITHIN 5% OF THE CHOSEN STANDARD (TYPICAL PATIENT) DOSE. ERRORS GREATER THAN 5% INDICATE NEED FOR INSTRUMENT REPAIR OR ADJUSTMENT.
5. IF THE INSTRUMENT CANNOT BE CORRECTED, A CALIBRATION GRAPH IS CONSTRUCTED FOR USE IN ROUTINE ASSAYS.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# SURVEY METER CALIBRATION PROCEDURES

SURVEY METERS ARE CALIBRATED ANNUALLY AND FOLLOWING REPAIR.

CALIBRATION IS PERFORMED BY:
NDL ORGANIZATION, INC. (FORMERLY NUCLEAR DIAGNOSTIC LABORATORIES)
1000 LOWER SOUTH STREET
PEEKSKILL, N.Y.
NEW YORK STATE CALIBRATION LICENSE NUMBER: 1959-1422

SURVEY METERS ARE SENT TO NDL SEQUENTIALLY, TO ASSURE THAT THERE WILL ALWAYS BE AT LEAST ONE FUNCTIONING SURVEY METER ON HAND AT ALL TIMES.

DAILY CONSTANCY CHECKS AND BATTERY CHECKS OF SURVEY METERS ARE MADE BEFORE AND AFTER EACH USE TO ASSURE PROPER OPERATION.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# PROCEDURES FOR WELL COUNTER CALIBRATION

WELL COUNTERS ARE CHECKED ROUTINELY FOR PROPER OPERATION ANNUALLY, DAILY, AND AFTER REPAIR OR ADJUSTMENT.

## ANNUAL CALIBRATION CHECKS

ANNUAL CALIBRATION TESTS ARE CONDUCTED TO DETERMINE INSTRUMENT CALIBRATION AND CHECK FOR CORRECT INSTRUMENT OPERATION.

### E-DIAL CALIBRATION

THE E-DIAL CALIBRATION IS CHECKED USING CO-57, BA-133, & CS-137 REFERENCE SOURCES AND SETTINGS RECORDED.

### TEST COUNT (3600 CPM)

THE TEST COUNT CIRCUITRY IS CHECKED WHERE APPLICABLE FOR ACCURACY.

### BACKGROUND

BACKGROUND READINGS ARE COUNTED AND RECORDED.

### COUNTING EFFICIENCY (uCi/dpm)

COUNTING EFFICIENCY IS DETERMINED FOR CO-57, BA-133, & CS-137 AT 20% WINDOWS AND OPEN WINDOW SETTINGS.

### COUNTER SENSITIVITY

USING THE BACKGROUND AND COUNTING EFFICIENCIES ABOVE, THE MINIMUM DETECTABLE ACTIVITY IS CALCULATED FOR EACH OF THE ABOVE ISOTOPES.

### PULSE HEIGHT RESOLUTION

THE PULSE HEIGHT RESOLUTION IS DETERMINED USING THE CS-137 AND RECORDED.

### CHI-SQUARE TEST

CHI SQUARE TESTING IS PERFORMED AND REPORTED.

## DAILY CHECKS (EACH DAY OF USE)

DAILY CHECKS ARE PERFORMED TO INSURE INSTRUMENT CONSTANCY. RESULTS WHICH ARE NOT WITHIN ACCEPTABLE LIMITS INDICATE THE NEED FOR RE-CALIBRATION, REPAIR OR ADJUSTMENT.

### E-DIAL CALIBRATION

PERFORMED FOR CS-137 SOURCE AND RECORDED.

### BACKGROUND COUNT RATE

UNUSUALLY HIGH BACKGROUND RATES WILL BE INVESTIGATED TO ASCERTAIN THE SOURCE AND ELIMINATE IT IF POSSIBLE.

### TEST COUNT (3600 CPM)

TEST COUNT CIRCUITRY COUNTS WILL BE TAKEN WHERE APPLICABLE.

### CONSTANCY CHECK

THE CS-137 REFERENCE ROD SOURCE WILL BE COUNTED TO DETERMINE THE NET CPM AND COMPARED WITH THE PREDICTED DECAY CORRECTED VALUE TO DETERMINE INSTRUMENT CONSTANCY FROM THE ANNUAL CALIBRATION.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

FACILITIES AND EQUIPMENT

THE NUCLEAR MEDICINE SUITE IS LOCATED IN THE BASEMENT LEVEL OF THE MAIN HOSPITAL BUILDING . IT CONSISTS OF THREE ROOMS AS FOLLOWS (SEE DIAGRAM):

PREPARATION ROOM -- USED FOR PREPARATION, STORAGE, AND ASSAYING OF RADIOISOTOPES.

WORK AREA -- TECHNICIANS' DESKS AREA.

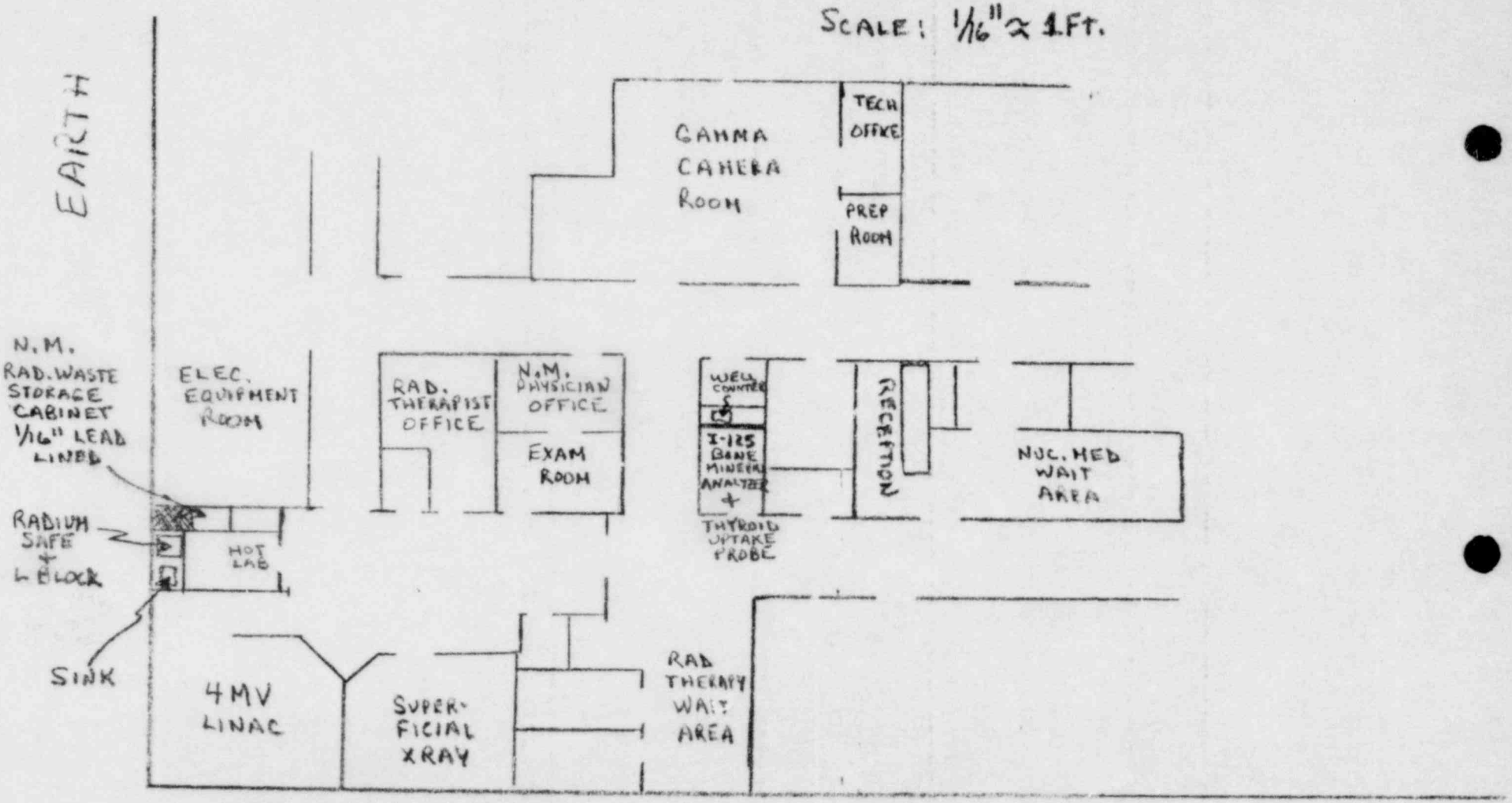
SCANNING ROOM -- HOUSES TWO STATIONARY AND ONE PORTABLE GAMMA CAMERA. THE PATIENT INJECTION AREA IS ALSO LOCATED IN THIS ROOM.

IN ADDITION THERE IS A HOT LAB LOCATED DOWN THE HALL IN THE RADIATION THERAPY DEPARTMENT WHICH IS USED FOR DECAY STORAGE OR RADIOACTIVE MATERIAL. THIS HOT LAB IS ALSO USED FOR STORAGE AND PREPARATION OF SEALED BRACYTHERAPY SOURCES.

THE LABORATORY IS AMPLY SUPPLIED WITH NECESSARY SHIELDING DEVICES FOR STORAGE, PREPARATION, AND TRANSPORT OF RADIOACTIVE MATERIALS USED. IN ADDITION TO THE ITEMS SPECIFIED ON THE DIAGRAM, IT IS EQUIPPED WITH NUMEROUS SYRINGE AND VIAL SHIELDS, LONG HANDLE DEVICES FOR HANDLING, DISPOSABLE RUBBER GLOVES, LAB COATS, BENCH LINERS, AND ASSORTED LEAD SHIELDING.

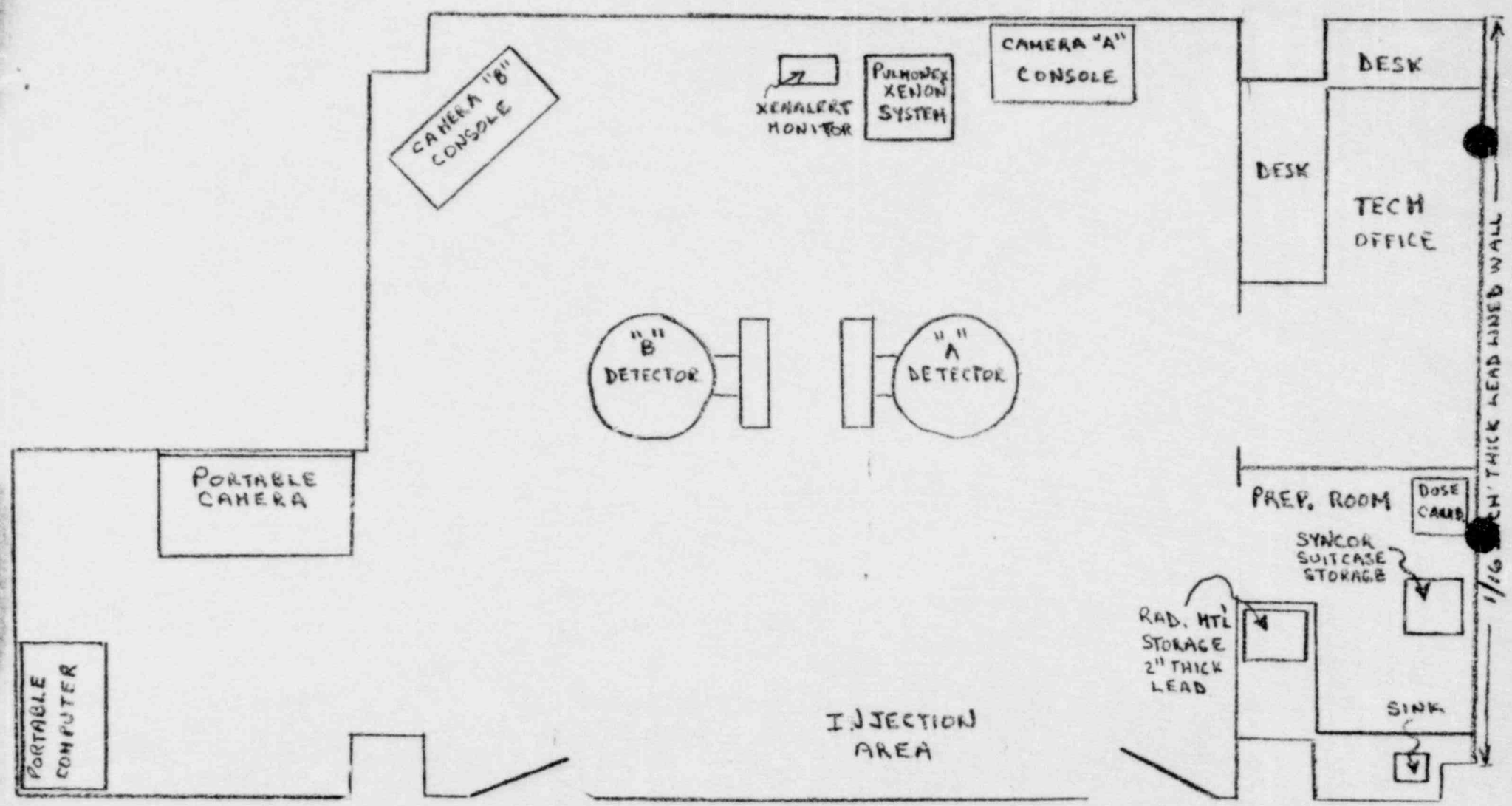
RADIOPHARMACEUTICALS ARE PREDOMINANTLY SUPPLIED BY A RADIO-PHARMACY (SYNCOR) IN THE FORM OF INDIVIDUAL DOSES PRELOADED IN INDI-VIDUAL SYRINGES. THIS REDUCES THE AMOUNT OF HANDLING INVOLVED, AND THEREFORE REDUCES PERSONNEL EXPOSURE. LEAD APRONS ARE ALSO UTILIZED WHEN IT IS NECESSARY TO HOLD UNCOOPERATIVE PATIENTS.

NEW BRITAIN GEN'L HOSP
BASEMENT LEVEL
7/1/85
SCALE: 1/16" = 1 FT.



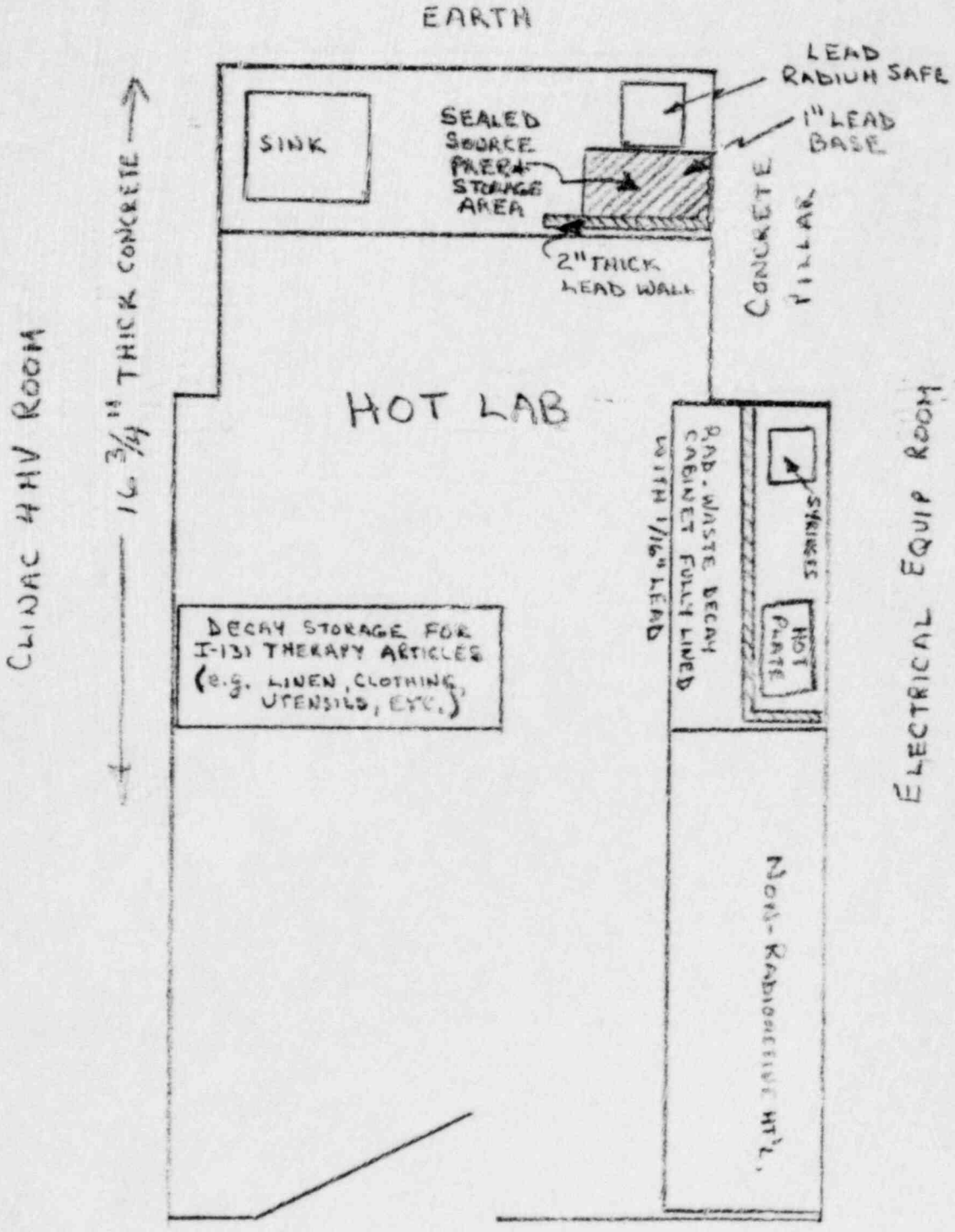

ITEM 11
7/1/85

NEW BRITAIN GENERAL HOSPITAL
NUCLEAR MEDICINE 7/1/85
BASIC LAYOUT
SCALE: 1/4" = 1 Ft.




ITEM 11
5811/4
7/1/85

NEW BRITAIN GEN'L HOSP.
HOT LAB IN
RAD. THERAPY DEPT.
7/1/85
Scale : ½" ≈ 1 Ft.




ITEM 11
7/1/85

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

PROCEDURES FOR ORDERING AND RECEIPT OF RADIOACTIVE MATERIAL
(NUCLEAR MEDICINE LABORATORY)

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. WRITTEN RECORDS THAT IDENTIFY THE ISOTOPE, COMPOUND, ACTIVITY LEVELS, AND SUPPLIER, ETC., WILL BE USED AND MAINTAINED.

3. WHEN THE THE NUCLEAR MEDICINE DEPT IS OPENED, ALL PACKAGES ARE DELIVERED DIRECTLY TO THE DEPARTMENT. AT ALL OTHER TIMES, CARRIERS ARE INSTRUCTED TO DELIVER ALL RADIOACTIVE PACKAGES TO THE EMERGENCY ROOM. SHIPMENTS ARE ONLY RECEIVED BY THE SECURITY GUARD ON DUTY. HE THEN DELIVERS THE PACKAGE AS OULINED IN THE ATTACHED MEMO.

MEMO TO: SECURITY GUARDS DATE: 6/16/80
FROM: JOSEPH J. LETITIA, DIRECTOR SAFETY AND SECURITY
SUBJECT: RECEIPT OF PACKAGES CONTAINING RADIOACTIVE MATERIAL.

ANY PACKAGES CONTAINING RADIOACTIVE MATERIAL THAT ARRIVE BETWEEN 4:30 P.M. AND 7:00 A.M. OR ON WEEKENDS OR HOLIDAYS SHALL BE SIGNED FOR BY THE SECURITY GUARD ON DUTY AND THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED:

IF IT IS ADDRESSED TO DR. S. PAI OR THE LABORATORY, THEN IT SHOULD BE TAKEN DIRECTLY THERE AS THERE IS USUALLY SOMEONE ON DUTY TWENTY-FOUR HOURS A DAY.

ANY OTHER PACKAGES CONTAINING RADIOACTIVE MATERIAL SHALL BE TAKEN IMMEDIATELY TO THE NUCLEAR MEDICINE DEPT.(ISOTOPE LAB). UNLOCK THE DOOR, PLACE THE PACKAGE ON TOP OF THE COUNTER IMMEDIATELY TO THE RIGHT OF THE DOOR, AND RELOCK THE DOOR.

IF THE PACKAGE IS WET OR APPEARS TO BE DAMAGED, IMMEDIATELY CONTACT THE HOSPITAL 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.

RADIATION SAFETY OFFICER: GERALD J. RANDALL, M.S.
OFFICE PHONE: EXT. 5520 HOME PHONE: 673-1643

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

PERSONNEL TRAINING PROGRAM

THE CONTINUING EDUCATION FOR NUCLEAR MEDICINE TECHNOLOGISTS INCLUDE THE FOLLOWING:

1. DAILY ON THE JOB CLINICAL CORRELATION OF NUCLEAR IMAGING PROCEDURES AND THYROID WORKUPS VIA A CLOSE WORKING RELATIONSHIP WITH THE NUCLEAR MEDICINE PHYSICIAN.

2. WEEKLY ON THE JOB CORRELATION AND PRACTICAL INSTRUCTION REGARDING INSTRUMENTATION AND RADIATION SAFETY CARRIED OUT BY THE PHYSICIST (RSO).

3. ATTENDANCE AT MONTHLY NUCLEAR MEDICINE GRAND ROUNDS AT THE UNIVERSITY OF CONNECTICUT IS ENCOURAGED.

4. PARTICIPATION IN AT LEAST ONE FORMAL REGIONAL NUCLEAR MEDICINE SEMINAR OR REFRESHER COURSE WILL BE OFFERED EACH YEAR.

ALL HOSPITAL PERSONNEL ARE GIVEN INSTRUCTIONS IN RADIATION SAFETY AS PART OF THE "NEW EMPLOYEE ORIENTAION" PROGRAM OF THE HOSPITAL. THIS CONSISTS OF VIEWING A COMMERCIAL FILM COVERING THE MAJOR TOPICS OF RADIATION SAFETY IN A HOSPITAL, FOLLOWED BY A LECTURE GIVEN BY THE PHYSICIST CONCERNING PARTICULARS PERTAINING TO THIS HOSPITAL. EACH EMPLOYEE ALSO RECEIVES WRITTEN RADIATION SAFETY INSTRUCTIONS ON AN ANNUAL BASIS. EMPLOYEES MAY ALSO ELECT TO ATTEND THE RADIATION SAFETY INSTRUCTIONS OUTLINED ABOVE ON AN ANNUAL BASIS.

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LICENSE NO. 06-02388-01

PROCEDURES FOR OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL
(NUCLEAR MEDICINE LABORATORY)

1. PUT ON GLOVES TO PREVENT HAND CONTAMINATION.

2. VISUALLY INSPECT PACKAGE FOR ANY SIGN OF DAMAGE (e.g. WETNESS OR CRUSHED). IF DAMAGE IS NOTED, STOP PROCEDURE AND NOTIFY RADIATION SAFETY OFFICER.

3. MEASURE EXPOSURE RATE AT 3 FEET FROM PACKAGE SURFACE AND RECORD. IF GREATER THAN 10mR/hr, STOP PROCEDURE AND NOTIFY RADIATION SAFETY OFFICER.

4. MEASURE SURFACE EXPOSURE RATE AND RECORD. IF GREATER THAN 200 mR/hr, STOP PROCEDURE AND NOTIFY RADIATION SAFETY OFFICER.

5. OPEN THE OUTER PACKAGE (FOLLOWING THE MANUFACTURER'S DIRECTIONS IF SUPPLIED) AND REMOVE PACKING SLIP.

6. OPEN INNER PACKAGE AND VERIFY THAT CONTENTS AGREE WITH THOSE ON PACKING SLIP. COMPARE REQUISITION, PACKING SLIP AND LABEL ON BOTTLE.

7. CHECK FINAL SOURCE CONTAINER FOR BREAKAGE OF SEALS OR VIALS, LOSS OF LIQUID, OR DISCOLORATION OF PACKAGING MATERIAL.

8. VERIFY THAT SHIPMENT DOES NOT EXCEED POSSESSION LIMIT.

9. WIPE THE EXTERNAL SURFACE OF FINAL SOURCE CONTAINER AND COUNT. IF REMOVABLE ACTIVITY EXCEEDS 0.01uCi/100sq.cm., STOP PROCEDURE AND NOTIFY RADIATION SAFETY OFFICER.

10. MONITOR THE PACKING MATERIAL AND PACKAGES FOR CONTAMINATION BEFORE DISCARDING.
    IF CONTAMINATED, TREAT AS RADIOACTIVE WASTE.
    IF NOT CONTAMINATED, OBLITERATE RADIATION LABELS BEFORE DISCARDING IN REGULAR TRASH.

11. MAINTAIN RECORDS OF THE RESULTS OF CHECKING EACH PACKAGE.

IT IS THE RESPONSIBILITY OF THOSE WORKING WITH RADIOACTIVE MATERIAL TO PROTECT THEMSELVES AND OTHERS FROM RADIATION HAZARDS ARISING FROM THEIR WORK. BAD EXAMPLES AND CARELESS WORKING HABITS MAY UNNECESSARILY EXPOSE ASSOCIATES OR CONTAMINATE FACILITIES AND CANNOT BE TOLERATED. THE FOLLOWING REGULATIONS SHALL BE OBSERVED:

THE LABORATORY DIRECTOR IS RESPONSIBLE FOR ORDERING STOCK SHIPMENTS OF RADIONUCLIDES AND ASSURING THAT ALL ORDERS ARE IN COMPLIANCE WITH LICENSE LIMITATIONS AS REGARD TO NUCLIDE, COMPOUND, MAXIMUM ACTIVITY, AND USE.

ONLY AUTHORIZED PERSONNEL OVER THE AGE OF 18 YEARS OLD WILL BE ALLOWED TO HANDLE RADIOACTIVE MATERIAL. AUTHORIZATION MUST BE OBTAINED FROM THE LABORATORY DIRECTOR AND THE RADIATION SAFETY OFFICER (RSO).

EATING, DRINKING, SMOKING, AND THE APPLICATION OF COSMETICS ARE PROHIBITED IN AREAS WHERE RADIOACTIVE MATERIALS ARE BEING HANDLED. FOOD AND DRINK SHOULD NOT BE STORED IN THE SAME PLACE (E.G. REFRIGERATOR) WITH RADIOACTIVE MATERIALS.

WORKING WITH RADIOACTIVE MATERIALS WHEN OPEN WOUNDS ARE PRESENT ON EXPOSED SURFACES OF THE BODY IS PROHIBITED UNLESS WOUNDS ARE PROPERLY DRESSED AND PROTECTED.

DISPOSABLE RUBBER GLOVES AND LAB COATS WILL BE WORN WHENEVER WORKING WITH RADIOACTIVE MATERIAL, AND SHALL BE REMOVED BEFORE LEAVING THE LABORATORY.

PIPETTING OR ANY SIMILAR OPERATION BY MOUTH IS PROHIBITED. SYRINGE SHIELDS, DISPOSABLE ABSORBENT PADS, REMOTE HANDLING DEVICES, AND TRAYS SHALL BE UTILIZED WHEN POSSIBLE.

HANDS, FEET, AND CLOTHING SHALL BE MONITORED ROUTINELY FOR CONTAMINATION. HANDS SHOULD BE WASHED ROUTINELY AFTER HANDLING RADIOACTIVE MATERIALS, ESPECIALLY BEFORE EATING.

FILM BADGES FOR MONITORING TOTAL BODY EXPOSURE WILL BE WORN IN RESTRICTED AREAS. IN ADDITION, PERSONNEL WORKING WITH RADIOACTIVE MATERIAL WILL WEAR RING TYPE BADGES. BADGES WILL BE EXCHANGED MONTHLY FOR PROCESSING.
PERSONNEL WORKING ONLY IN THE IN-VITRO LABORATORY WITH MICROCURIE QUANTITIES OF MATERIALS WILL NORMALLY BE EXPOSED TO LEVELS WELL UNDER 10% OF THE PERMISSIBLE OCCUPATIONAL LIMITS OF 10 CFR PART 20. THEREFORE, FILM BADGE MONITORING OF THESE INDIVIDUALS MAY BE CONDUCTED FOR A TEST PERIOD WHEN A NEW PROGRAM IS BEGUN OR WHEN NEW PROCEDURES ARE INITIATED WHICH MAY INCREASE EXPOSURE. IF MONITORED EXPOSURES ARE LESS THAN 5% OF THE PERMISSIBLE LIMITS, FILM BADGE MONITORING MAY BE ELIMINATED.

GENERALLY, THE INDIVIDUAL PROCEDURES WITH RADIOACTIVE MATERIAL ARE WELL ESTABLISHED BY THE SUPPLIER. NEW PROCEDURES SHOULD BE TESTED, WITHOUT THE RADIONUCLIDE AT FIRST IF POSSIBLE, PRIOR TO NORMAL USE. THE RSO MUST BE CONSULTED BEFORE THE USE OF VOLATILE, GASEOUS, OR DUST-FORMING MATERIAL IS INITIATED.

RECEIPT OF STOCK SHIPMENTS SHALL BE IN ACCORDANCE WITH ESTABLISHED PROCEDURES.(SEE PROCEDURES FOR OPENING PACKAGES, AND PROCEDURES FOR RECEIPT OF PACKAGES)

RADIONUCLIDES SHALL BE HANDLED AND STORED IN THE SPECIALLY DESIGNATED LOCATIONS. VESSELS CONTAINING RADIOACTIVE MATERIALS SHALL BE LABELLED AS TO COMPOUND, RADIONUCLIDE, ACTIVITY, AND DATE OF CALIBRATION AND SHALL BE ADEQUATELY SHIELDED WHILE IN USE AND STORAGE. AREAS WHERE THESE MATERIALS ARE ROUTINELY USED OR STORED SHALL BE LABELED WITH A "CAUTION (OR DANGER) -- RADIOACTIVE MATERIAL" LABEL, AND WILL BE KEPT LOCKED WHEN UNATTENDED.

MOVEMENT OF RADIOACTIVE MATERIAL WITHIN THE HOSPITAL, IF REQUIRED, SHALL BE ACCOMPLISHED USING PROPERLY SHIELDED CONTAINERS.

CONTAMINATED WASTE AND UTENSILS SHALL BE DISPOSED OF IN THE CONTAINERS PROVIDED. ALL FORMS OF DISPOSAL MUST BE APPROVED BY THE RSO AND CONFORM TO APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS (SEE PROCEDURES FOR RADIOACTIVE WASTE DISPOSAL). IF LIQUID WASTE DISPOSAL INTO THE SANITARY SEWER SYSTEM IS APPROVED, A SINK WILL BE DESIGNATED AND LABELED "HOT SINK -- TO BE SURVEYED BEFORE PLUMBING WORK".

RADIATION SAFETY SURVEYS MUST BE CONDUCTED ROUTINELY AND WHENEVER A SUSPECTED HAZARD EXISTS. RESULTS SHALL BE RECORDED, AND ALL READINGS IN EXCESS OF PERMITTED LIMITS WILL BE BROUGHT TO THE ATTENTION OF THE RSO. (SEE SURVEY PROCEDURES)

"GOOD HOUSEKEEPING" SHALL BE MAINTAINED AT ALL TIMES. SPILLAGE SHOULD BE PREVENTED, BUT IN THE EVENT OF SUCH AN ACCIDENT, THE PRESCRIBED EMERGENCY PROCEDURES SHOULD BE FOLLOWED. (SEE EMERGENCY PROCEDURES FOR RADIOACTIVE SPILLS)

ALL PATIENT DOSES SHALL BE ASSAYED IN THE DOSE CALIBRATOR PRIOR TO ADMINISTRATION. DO NOT USE ANY DOSE THAT DIFFERS FROM THE PRESCRIBED DOSE BY MORE THAN 10%.

TC-99m MUST BE TESTED FOR MO-99 BREAKTHROUGH PRIOR TO ADMINISTRATION TO PATIENTS. MAXIMUM CONTAMINATION SHALL NOT EXCEED 1 uCi PER mCi OF TC-99m, OR MORE THAN A TOTAL OF 5 uCi OF MO-99 PER PATIENT DOSE. (SEE PROCEDURES FOR MOLYBDENUM BREAKTHROUGH TESTING)

ANY QUESTIONS INVOLVING SAFETY SHOULD BE DIRECTED TO THE RSO.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# PROCEDURES FOR MOLYBDENUM BREAKTHROUGH TESTING FOR MO-99/TC-99m GENERATORS

## SCOPE

THE USE OF ON SITE MO-99/TC-99m GENERATORS REQUIRES TESTING TO INSURE THE PURITY OF THE TC-99m ELUATE. TC-99m RADIOPHARMACEUTICALS OBTAINED AS UNIT DOSES OR BULK DOSES WILL BE TESTED BY THE RADIOPHARMACEUTICAL SUPPLIER.

## FREQUENCY

TESTING MUST BE PERFORMED IMMEDIATELY FOLLOWING EACH ELUTION OF TC-99M FROM A MO-99/TC-99M GENERATOR, PRIOR TO PATIENT ADMINISTRATION.

## PROCEDURE

TEST SHALL BE IN ACCORDANCE WITH PROCEDURES SET FORTH BY THE MANUFACTURER OF THE DOSE CALIBRATOR OR TEST KIT.

## MAXIMUM ALLOWABLE CONTAMINATION

MEASURED CONCENTRATIONS OF MO-99 IN TC-99m SHALL NOT EXCEED 1 uCi PER mCi (0.1%), AND SHOULD BE OF THE ORDER OF 0.1 UCI PER mCi (0.01%) OR LESS.
EACH PATIENT DOSE MAY NOT EXCEED 1 uCi OF MO-99 PER mCi OF TC-99m, OR MORE THAN A TOTAL OF 5 uCi OF MO-99 AT THE TIME OF ADMINISTRATION.

## LOGGING

MEASURED CONCENTRATIONS WILL BE RECORDED AND RECORDS MAINTAINED FOR A MINIMUM OF 3 YEARS.

## REPORTING

ANY MEASURED CONCENTRATION EXCEEDING THE ABOVE LIMITS WILL BE REPORTED TO THE RADIATION SAFETY OFFICER. USE OF THE ELUTED TC-99m AND THE GENERATOR WILL BE IMMEDIATELY DISCONTINUED.

NEW BRITA[redacted]ENERAL HOSPITAL -- NEW B[redacted]TAIN, CT.
LICENSE NO. 06-02388-01

# EMERGENCY PROCEDURES FOR RADIOACTIVE SPILLS

## MINOR SPILLS (uCi AMOUNTS)

NOTIFY: NOTIFY THE PERSONS IN THE AREA THAT A SPILL HAS OCCURRED.

PREVENT THE SPREAD: COVER THE SPILL WITH ABSORBENT PAPER.

CLEAN UP: USE DISPOSABLE GLOVES AND REMOTE HANDLING TONGS. CAREFULLY FOLD THE ABSORBENT PAPER AND PAD. INSERT INTO A PLASTIC BAG AND DISPOSE OF IN THE RADIOACTIVE WASTE CONTAINER. INCLUDE ALL OTHER CONTAMINATED MATERIALS SUCH AS DISPOSABLE GLOVES.

SURVEY: WITH A G-M SURVEY METER, CHECK THE AREA AROUND THE SPILL, YOUR HANDS AND CLOTHING FOR CONTAMINATION.

REPORT: REPORT INCIDENT TO R.S.O. & PHYSICIAN IN CHARGE.

## MAJOR SPILLS:

CLEAR THE AREA: NOTIFY ALL PERSONS NOT INVOLVED IN THE SPILL TO VACATE THE ROOM.

PREVENT THE SPREAD: COVER THE SPILL WITH ABSORBENT PADS, BUT DO NOT ATTEMPT TO CLEAN IT UP. CONFINE THE MOVEMENT OF ALL PERSONNEL POTENTIALLY CONTAMINATED TO PREVENT THE SPREAD.

SHIELD THE SOURCE: IF POSSIBLE, THE SPILL SHOULD BE SHIELDED, BUT ONLY IF IT CAN BE DONE WITHOUT FURTHER CONTAMINATION OR WITHOUT SIGNIFICANTLY INCREASING YOUR RADIATION EXPOSURE.

CLOSE THE ROOM: LEAVE THE ROOM AND LOCK THE DOOR(S) TO PREVENT ENTRY.

CALL FOR HELP: NOTIFY THE R.S.O. & PHYSICIAN IN CHARGE IMMEDIATELY.

PERSONNEL DECONTAMINATION: CONTAMINATED CLOTHING SHOULD BE REMOVED AND STORED FOR FURTHER EVALUATION BY THE RADIATION SAFETY OFFICER. IF THE SPILL IS ON THE SKIN, FLUSH THOROUGHLY AND THEN WASH WITH MILD SOAP AND LUKEWARM WATER.

RADIATION SAFETY OFFICER: GERALD J. RANDALL, M.S.
OFFICE PHONE: EXT 5520 HOME PHONE: 673-1643

M-14

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NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# RADIATION SAFETY PROCEDURES IN CASE OF DEATH OF A RADIOACTIVE PATIENT

IN CASE A PATIENT CONTAINING THERAPY QUANTITIES OF RADIOACTIVE MATERIAL DIES, THE RADIATION SAFETY OFFICER MUST BE CONTACTED BEFORE DISPOSITION OF THE BODY.

IF THE BODY CONTAINS RADIUM OR CESIUM SOURCES, THESE WILL BE REMOVED BY THE RADIATION THERAPIST AS SOON AFTER DEATH OCCURS AS POSSIBLE. AFTER THE SOURCES HAVE BEEN REMOVED, THE BODY WILL NO LONGER PRESENT A RADIATION HAZARD AND MAY BE PROCESSED IN THE USUAL MANNER.

IF AN AUTOPSY IS TO BE PERFORMED ON A BODY CONTAINING THERAPY QUANTITIES OF A RADIONUCLIDE, THIS WILL ONLY BE CARRIED OUT AFTER CONSULTATION WITH THE RADIATION SAFETY OFFICER. IF NO AUTOPSY IS TO BE PERFORMED, THE RADIATION SAFETY OFFICER WILL FILL OUT A RADIOACTIVITY REPORT WHICH WILL BE ATTACHED TO THE DEATH CERTIFICATE BEFORE THE BODY IS RELEASED TO THE FUNERAL DIRECTOR.

THESE PROCEDURES DO NOT APPLY TO PATIENTS WHO HAVE RECEIVED A DIAGNOSTIC DOSE OF A RADIONUCLIDE SINCE THE QUANTITY AND HALF-LIFE OF THESE MATERIALS PRESENT NO SIGNIGICANT HAZARD.

ANY QUESTIONS SHOULD BE DIRECTED TO THE RADIATION SAFETY OFFICER.

R.S.O.: GERALD J. RANDALL, M.S. OFFICE: EXT 5520
HOME: 673-1643

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# AREA SURVEY PROCEDURES FOR LABS USING GAMMA EMITTING ISOTOPES

EACH LABORATORY UTILIZING RADIOACTIVE MATERIAL IS REQUIRED TO CONDUCT ROUTINE SURVEYS OF THE AREA. THE FOLLOWING REPRESENT THE MINIMUM SURVEY REQUIREMENTS AND SHOULD BE SUPPLEMENTED WITH ADDITIONAL SURVEYS IF A SPILL HAS OCCURRED OR A RADIATION HAZARD IS SUSPECTED:

| SURVEY TYPE | NUC. MED. * MINIMUM FREQUENCY | IN VITRO LAB. MINIMUM FREQUENCY | RECORD |
|---|---|---|---|
| RADIATION LEVELS | DAILY | N/A | YES |
| CONTAMINATION | WEEKLY | MONTHLY | YES |

* NUC. MED. INCLUDES ALL INJECTION, ELUTION, AND PREPARATION AREAS.

## RECORDS OF SURVEYS

RESULTS SHALL BE RECORDED AND MAINTAINED ALONG WITH THE FOLLOWING:

A DRAWING OF THE FACILITY SHOWING FEATURES SUCH AS THE "HOT SINK", STORAGE AREAS, ACTIVE WASTE AREAS, ETC. FOR REFERENCE TO REPORT FORM.

LOCATION, DATE, TYPE OF EQUIPMENT USED, AND SURVEYOR'S INITIALS.

FOR WIPE TESTS, THE PULSE HEIGHT ANALYZER SETTINGS AND THE RADIOACTIVE STANDARD, ACTIVITY, AND DATE SHOULD BE NOTED.

IF AN UNACCEPTABLE LEVEL IS MEASURED, THE INITIAL READINGS, CORRECTIVE ACTIONS TAKEN, AND SUBSEQUENT READINGS WILL BE RECORDED.

## SURVEY PROCEDURES AND MAXIMUM LIMITS

RADIATION LEVELS ---- AREA MONITORING IS CONDUCTED WITH A CALIBRATED SURVEY METER SUFFICIENTLY SENSITIVE TO DETECT 0.05 MR/HR. A MAXIMUM LIMIT OF 0.06 MR/HR. IN NON-CONTROLLED AREAS AND 2.5 MR/HR. IN CONTROLLED AREAS IS ALLOWED, BUT SHOULD BE KEPT AS LOW AS PRACTICAL.

CONTAMINATION ---- A SERIES OF WIPES IS TAKEN IN AREAS WHERE ACTIVITY IS HANDLED, WITH EACH WIPE ENCOMPASSING APPROXIMATELY 10 X 10 CM. A GAMMA-SCINTILLATION WELL COUNTER IS USED, WITH THE ANALYZER THRESHHOLD SET BELOW THE LOWEST GAMMA ENERGY USED IN THE LABORATORY, AND THE UPPER LEVEL SET AT MAXIMUM. THE FOLLOWING MEASUREMENTS ARE THEN PERFORMED AND RECORDED:

TAKE A 1 MIN. BACKGROUND COUNT & RECORD BKGD COUNTS PER MIN. (CPM).

TAKE A 1 MIN. COUNT ON A LONG-LIVED STANDARD AND RECORD NET CPM (GROSS CPM - BKGD CPM). THIS IS A CONSTANCY CHECK ON THE COUNTER.

TAKE A 1 MIN. COUNT ON ALL SAMPLES AND RECORD NET CPM.

AREAS WITH A REMOVABLE ACTIVITY OF 0.001 uCi/100sq cm. OR MORE WILL REQUIRE DECONTAMINATION, AND REPEAT TESTING.

## NOTIFICATION

ANY LEVELS WHICH ROUTINELY EXCEED THE PERMITTED LIMITS SHOULD BE BROUGHT TO THE ATTENTION OF THE RADIATION SAFETY OFFICER (RSO).

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# RADIOACTIVE WASTE DISPOSAL

ALL RADIOACTIVE WASTE DISPOSAL PROCEDURES MUST BE APPROVED BY THE RADIATION SAFETY OFFICER. THE FOLLOWING STANDARD PROCEDURES ARE PRESENTLY USED:

1. RADIOACTIVE MATERIAL SUPPLIED BY SYNCOR INTERNATIONAL CORP. (RADIOPHARMACY), WHICH REMAINS AFTER USE IS RETURNED TO SYNCOR PER THEIR INSTRUCTIONS.

2. IF MO-99/TC-99M GENERATORS ARE USED, THEY WILL EITHER BE RETURNED TO THE MANUFACTURER, OR HELD FOR DECAY.(SEE PROCEDURES FOR ORDINARY WASTE DISPOSAL)

3. A SMALL AMOUNT OF LIQUID WASTE USED IN THE IN VITRO LAB. WILL BE DISPOSED INTO THE SANITARY SEWER IN ACCORDANCE WITH 20.303 OF 10 CFR PART 20.

4. THE I-125 BONE MINERAL ANALYZER SEALED SOURCE WILL BE RETURNED TO THE MANUFACTURER AS PER THIER INSTRUCTIONS.

5. ALL IRIDIUM SEEDS WILL BE RETURNED TO THE MANUFACTURER AS PER THEIR INSTRUCTIONS AFTER REMOVAL OF THE SOURCES FROM THE PATIENT.

6. ALL OTHER SOLID WASTE WILL BE DISPOSED OF BY ONE OF THE FOLLOWING:
   A. HELD FOR DECAY (SEE PROCEDURE FOR ORDINARY WASTE DISPOSAL)
   B. RETURNED TO MANUFACTURER OR SUPPLIER PER THEIR INSTRUCTIONS.
   C. TRANSFERRED TO COMMERCIAL WASTE DISPOSAL SERVICE:
      N.D.L. ORGANIZATION, PEEKSKILL, NY 10560
      PHONE: 914-737-7330 N.R.C. LIC# 31-12000-1

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

# PROCEDURES FOR "ORDINARY WASTE DISPOSAL"(OWD) OF RADIOACTIVE WASTE FOR THE NUCLEAR MEDICINE LABORATORY

## I. GENERAL

ALL FORMS OF DISPOSAL MUST BE APPROVED BY THE RAD. SAFETY OFFICER (RSO) & CONFORM TO APPROPRIATE LOCAL, STATE, AND FEDERAL REGULATIONS.

RADIOACTIVE MATERIAL MUST BE HELD FOR DECAY UNTIL RADIATION LEVELS, AS MEASURED WITH A LOW-LEVEL CALIBRATED G-M SURVEY METER AND WITH ALL SHIELDING REMOVED, HAVE REACHED BACKGROUND. THIS DECAY PERIOD IS USUALLY A MINIMUM OF 10 HALF LIVES BEFORE DISPOSAL AS OWD.

ALL RADIATION LABELS MUST BE REMOVED OR DEFACED AND PACKAGING MATERIAL MUST BE SURVEYED TO INSURE NO CONTAMINATION BEFORE DISPOSAL.

ANY QUESTIONS SHOULD BE DIRECTED TO THE RSO.

## II. STORAGE OF WASTE MATERIAL

ALL RADIOACTIVE WASTE MATERIAL WILL BE STORED IN THE DESIGNATED SHIELDED ENCLOSURES.

RADIOACTIVE WASTE MATERIAL AND CONTAMINATED SYRINGES WILL BE SEGREGATED INTO TC-99M AND NON TC-99M CONTAINERS. THE CONTAINERS WILL BE LINED WITH POLY BAGS AND LABELED WITH AN IDENTIFYING SERIAL NUMBER.

THE DATE THE CONTAINER IS SEALED FOR FURTHER DECAY WILL ALSO BE PLACED ON THE CONTAINER AT THAT TIME.

MOLY-99 GENERATORS TO BE DISPOSED AS OWD, WILL BE STORED INTACT FOR AT LEAST 10 HALF LIVES (APPROX. 4 WEEKS) BEFORE BEING BROKEN DOWN. THE COLUMNS CAN THEN BE PLACED IN THE NON TC-99M CONTAINER.

ISOTOPES WITH HALF LIVES GREATER THAN 8 DAYS SHOULD BE STORED SEPARATELY IN INDIVIDUAL CONTAINERS.

RUBBER GLOVES, ALCOHOL SWABS, ABSORBENT BENCH TOP LINERS, ETC., WILL BE PLACED IN THE POLY-LINED STEP ON TRASH CONTAINERS PROVIDED. THESE CONTAINERS WILL BE LABELED WITH A "RADIOACTIVE MATERIAL -- DO NOT REMOVE" LABEL. WHEN THE BAG IS FULL, IT WILL BE TAPED CLOSED AND SURVEYED WITH A G-M SURVEY METER. IF NO READINGS ABOVE BACKGROUND ARE MEASURED, IT MAY BE DISPOSED OF AS OWD, OTHERWISE IT WILL BE PLACED IN STORAGE FOR FURTHER DECAY.

## III. RECORDS FOR DISPOSAL

RECORDS OF DISPOSAL WILL INCLUDE THE FOLLOWING INFORMATION:

THE DATE PLACED IN STORAGE FOR DECAY AND THE CONTAINER SERIAL NUMBER IF APPLICABLE(MOLY-99 GENERATORS OR ISOTOPES WITH HALF LIVES GREATER THAN 8 DAYS CAN BE STORED SEPARATELY)

APPROXIMATE TOTAL ACTIVITY AND VOLUME (OR NUMBER OF SOURCES FOR CAPSULES, SEEDS, COLUMNS, ETC.) AT THE TIME PLACED IN STORAGE.

DATE DISPOSED AS OWD AND SURVEY METER READING (BACKGROUND).

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
PROCEDURES FOR HANDLING SEALED RADIOACTIVE THERAPY SOURCES

1. BRACHYTHERAPY SOURCES SHALL NEVER BE TOUCHED WITH THE HANDS. (CS-137 MICRAD SOURCES ARE DESIGNED TO BE HANDLED AT THE COLOR CODED END. THE OPPOSITE END WHERE THE ACTIVE SOURCE IS LOCATED SHOULD NEVER BE TOUCHED WITH THE HANDS.)

2. LONG HANDLED FORCEPS OR SPECIAL HANDLING DEVICES WHICH PROVIDE AS MUCH DISTANCE AS PRACTICAL BETWEEN THE OPERATOR'S HANDS AND THE SOURCE SHALL BE USED.

3. THE OPERATOR WILL PREPARE OR LOAD SOURCES FROM BEHIND PROTECTIVE SHIELDING DEVICES.

4. ALL PERSONNEL INVOLVED WITH THE HANDLING OF SOURCES WILL WEAR FINGER DOSIMETERS IN ADDITION TO THE WHOLE BODY BADGES.

5. AFTERLOADING TECHNIQUES WILL BE EMPLOYED WHENEVER FEASIBLE.

6. TRANSPORTATION OF SOURCES WITHIN THE HOSPITAL CAN ONLY BE PERFORMED WITH THE TRANSPORTATION CONTAINERS PROVIDED FOR THIS PURPOSE.

7. NO SOURCES SHALL BE LEFT UNATTENDED ANYWHERE IN THE HOSPITAL, UNLESS LOCKED IN THE SHIELDED STORAGE AREA.

8. A LOG BOOK WILL BE MAINTAINED TO RECORD WHERE AND WHEN SOURCES LEAVE THE STORAGE AREA.

9. WHENEVER RADIOACTIVE SOURCES ARE REMOVED FROM STORAGE, RECORD IN THE LOG BOOK THE TYPE, NUMBER, AND ACTIVITY OF THE SOURCES; TIME & DATE OF REMOVAL; EXPECTED TIME AND DATE OF RETURN; AND SIGNATURE OF INDIVIDUAL RESPONSIBLE.

10. ONLY QUALIFIED PERSONNEL WILL BE AUTHORIZED TO USE BRACHYTHERAPY SOURCES.

11. FOR APPLICATION OF SOURCES TO PATIENTS, "PROCEDURES FOR USE OF GROUP VI SEALED SOURCES FOR TREATMENT OF PATIENTS" WILL BE FOLLOWED. DURING TRANSFER OF SOURCES TO AND FROM THE PATIENT, ALL PERSONNEL NOT REQUIRED SHOULD LEAVE THE ROOM.

12. WHEN THE SOURCES ARE RETURNED TO THE STORAGE AREA, AN ENTRY MUST BE MADE IN THE LOG. THE NUMBER OF SOURCES AND ACTIVITIES MUST BE CHECKED WITH THE REMOVAL ENTRY TO ASSURE THAT ALL SOURCES ARE ACCOUNTED FOR.

13. SEALED BRACHYTHERAPY SOURCES IN USE WILL BE CHECKED FOR LEAKAGE IN A MANNER SUFFICIENTLY SENSITIVE TO DETECT 0.005 uCi. OF REMOVABLE ACTIVITY AT LEAST EVERY SIX MONTHS AND WHENEVER LEAKAGE IS SUSPECTED. SOURCES FOUND TO BE LEAKING WILL BE REPORTED TO THE R.S.O. IMMEDIATELY.



M-18

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
LICENSE NO. 06-02388-01

PROCEDURES FOR USE OF GROUPS VI SEALED SOURCES
FOR TREATMENT OF PATIENTS

DUE TO THE VARIABLE ATTENUATION OF THE 35KEV X-RAYS OF IODINE-125 IN THE PATIENT, THE EXPOSURE RATE MAY BE LOW ENOUGH TO PRECLUDE THESE PRECAUTIONS. THEREFORE, IF THE RATE AT ONE METER FROM THE PATIENT DOES NOT EXCEED 0.2 mR/hr, THESE RESTRICTIONS WILL NOT APPLY.

1. ALL PATIENTS TREATED WITH SEALED BRACHYTHERAPY SOURCES WILL BE PLACED IN A CORNER PRIVATE ROOM WITH A TOILET.

2. RADIOACTIVE PRECAUTION TAGS SHALL BE ATTACHED TO THE BED,DOOR, AND THE PATIENT'S WRIST BAND AND CHART IN ACCORDANCE WITH SECTION 20.203, 10 CFR PART 20 . REMOVAL OF TAGS SHALL ONLY BE AUTHORIZED BY THE RESPONSIBLE DEPARTMENT (I.E. RADIATION THERAPY OR NUCLEAR MEDICINE), AND THE PATIENT MAY NOT BE DISCHARGED UNTIL THE TAGS ARE REMOVED.

3. THE BED WILL BE ARRANGED SO AS TO MINIMIZE THE EXPOSURE RATE IN THE HALL AND ANY ADJACENT ROOM.

4. RADIATION MEASUREMENTS IN AND SURROUNDING THE PATIENT'S ROOM WILL BE RECORDED ON THE "RADIATION SURVEY RECORD" FORM (SEE ATTACHED). VISITORS WILL NORMALLY BE RESTRICTED AS FOLLOWS, UNLESS THE MEASUREMENTS INDICATE ADDITIONAL RESTRICTIONS ARE REQUIRED:
   A. NO PREGNANT VISITORS OR CHILDREN UNDER 18 YEARS OLD ALLOWED.
   B. VISITORS MUST REMAIN AT LEAST 6 FEET FROM THE PATIENT.
   C. EACH VISITOR MAY REMAIN NO LONGER THAN 30 MINUTES PER DAY.

5. RADIATION LEVELS IN ALL AREAS SURROUNDING THE PATIENT'S ROOM WILL BE MAINTAINED LESS THAN LIMITS SPECIFIED IN SECTION 20.105(B), 10 CFR PART 20.(i.e. THESE LEVELS SHALL NOT EXCEED EITHER A RATE OF 2 mR/hr OR A CUMULATIVE OF 100 mR IN ANY WEEK).

6. THE FORM, "NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH BRACHYTHERAPY SEALED SOURCES", WILL BE COMPLETED IMMEDIATELY AFTER ADMINISTRATION OF THE TREATMENT DOSE. A COPY WILL BE POSTED IN THE PATIENT'S CHART.

7. THE FORM, "RADIATION SURVEY RECORD" WILL BE COMPLETED AT THE DESIGNATED TIMES. THIS COPY WILL BE KEPT IN THE NUCLEAR MEDICINE DEPARTMENT.

8. NURSES CARING FOR THESE PATIENTS WILL BE ASSIGNED FILM OR TLD BADGES.

9. NO PATIENT WITH REMOVABLE RADIOACTIVE SOURCES WILL BE ALLOWED TO LEAVE THE HOSPITAL. PATIENTS WITH PERMANENT IMPLANTS WILL NOT BE ALLOWED TO LEAVE THE HOSPITAL WITHOUT AUTHORIZATION OF THE RADIATION THERAPIST OR THE RADIATION SAFETY OFFICER OR THEIR DESIGNATE.

10. AT THE CONCLUSION OF TREATMENT, A SURVEY WILL BE PERFORMED AS PER 35.14(B)(5)(vii) OF 10CFR PART 35 TO ENSURE THAT ALL SOURCES OTHER THAN PERMANENT IMPLANTS HAVE BEEN REMOVED FROM THE PATIENT AND THAT NO SOURCES REMAIN IN THE PATIENT'S ROOM OR IN ANY AREA OCCUPIED BY THE PATIENT. AT THE SAME TIME, ALL RADIATION SIGNS WILL BE REMOVED AND ALL FILM AND TLD BADGES ASSIGNED TO NURSES WILL BE COLLECTED. IF THE PATIENT IS TO BE DISCHARGED, THE FINAL SURVEY WILL ALSO INCLUDE A NOTATION ON THE PATIENT'S CHART THAT THE ACTIVITY REMAINING IN THE PATIENT MEETS CONDITIONS FOR RELEASE FROM THE HOSPITAL.

NEW BRITAIN GENERAL HOSPITAL -- NEW BRITAIN, CT.
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PROCEDURES FOR USE OF GROUPS IV AND V (IODINE-131)
FOR TREATMENT OF PATIENTS
PAGE 1

1. ALL PATIENTS RECEIVING A DOSE OF 30 mCi IODINE-131 OR MORE MUST BE HOSPITALIZED UNTIL THE ACTIVITY REMAINING IN THE PATIENT IS BELOW 30 mCi AND PREFERABLY BELOW 8 mCi.

2. ALL PATIENTS WHO MUST BE HOSPITALIZED, MUST BE SCHEDULED BY THE NUCLEAR MEDICINE DEPARTMENT AND ADMITTING.

3. IODINE-131 WILL BE ADMINISTERED IN CAPSULE FORM ONLY, BY THE RESPONSIBLE LICENSED PHYSICIAN IN THE PATIENT'S ROOM.

4. ALL PATIENTS TREATED WITH RADIOACTIVE MATERIAL WILL BE PLACED IN A CORNER PRIVATE ROOM WITH A TOILET.

5. FOR PATIENTS WITH IODINE-131, THE LARGE SURFACES IN THE ROOM AND TOILET AREAS THAT ARE MORE LIKELY TO BE CONTAMINATED WILL BE COVERED WITH ABSORBENT PADS OR PROTECTIVE MATERIAL AS APPROPRIATE TO THE AMOUNTS OF CONTAMINATION TO BE EXPECTED. ATTENTION SHOULD BE GIVEN TO OBJECTS LIKELY TO BE TOUCHED BY THE PATIENT, E.G., TELEPHONES, DOORKNOBS AND OTHER ITEMS THAT WOULD BE DIFFICULT TO DECONTAMINATE. PLASTIC BAGS OR WRAPPINGS THAT ARE DISPOSABLE SHOULD BE USED ON SMALLER ITEMS.

6. RADIOACTIVE PRECAUTION TAGS SHALL BE ATTACHED TO THE BED,DOOR, AND THE PATIENT'S WRIST BAND AND CHART IN ACCORDANCE WITH SECTION 20.203, 10 CFR PART 20 (SEE ATTACHED). REMOVAL OF TAGS SHALL ONLY BE AUTHORIZED BY THE RESPONSIBLE DEPARTMENT (I.E. RADIATION THERAPY OR NUCLEAR MEDICINE).

7. THE BED WILL BE ARRANGED SO AS TO MINIMIZE THE EXPOSURE RATE IN THE HALL AND ANY ADJACENT ROOM.

8. RADIATION MEASUREMENTS IN AND SURROUNDING THE PATIENT'S ROOM WILL BE RECORDED ON THE "RADIATION SURVEY RECORD" FORM (SEE ATTACHED). RADIATION LEVELS IN ALL AREAS SURROUNDING THE PATIENT'S ROOM WILL BE MAINTAINED LESS THAN LIMITS SPECIFIED IN SECTION 20.105(B), 10 CFR PART 20.(i.e. THESE LEVELS SHALL NOT EXCEED EITHER A RATE OF 2 mR/hr OR A CUMULATIVE OF 100 mR IN ANY WEEK).

9. THE FORM, "NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH GROUP IV AND V (IODINE-131)", WILL BE COMPLETED IMMEDIATELY AFTER ADMINISTRATION OF THE TREATMENT DOSE. A COPY WILL BE POSTED IN THE PATIENT'S CHART.

10. VISITORS WILL NORMALLY BE RESTRICTED AS FOLLOWS, UNLESS THE MEASUREMENTS INDICATE ADDITIONAL RESTRICTIONS ARE REQUIRED:
    A. NO PREGNANT VISITORS OR CHILDREN UNDER 18 YEARS OLD ALLOWED.
    B. VISITORS MUST REMAIN AT LEAST 6 FEET FROM THE PATIENT.
    C. EACH VISITOR MAY REMAIN NO LONGER THAN 30 MINUTES PER DAY.

11. THE FORM, "RADIATION SURVEY RECORD" WILL BE COMPLETED AT THE DESIGNATED TIMES. THIS WILL BE KEPT IN THE NUCLEAR MEDICINE DEPT.

12. NURSES CARING FOR THESE PATIENTS WILL BE ASSIGNED FILM OR TLD BADGES.

13. THESE RADIATION PRECAUTIONS WILL NO LONGER BE REQUIRED FOR ANY OF THE FOLLOWING REASONS:
    A. PATIENT DISCHARGE
       NO PATIENT CONTAINING IODINE-131 MAY DISCHARGED UNLESS THE REMAINING ACTIVITY IS LESS THAN 30 mCi (APPROX. 7 mR/hr AT 1 METER), AND PREFERABLY LESS THAN 8 mCi (APPROX. 2 mR/hr AT 1 METER).
    B. IF THE PATIENT REMAINS HOSPITALIZED AND THE EXPOSURE RATE AT 1 METER IS 0.5 mR/hr OR LESS.

14. WHEN RADIATION PRECAUTIONS ARE NO LONGER REQUIRED:
    A. ALL PLASTIC BAGS AND COVERS WILL BE REMOVED TO THE NUCLEAR MEDICINE DEPT FOR MONITORING AND/OR DECAY WHERE NECESSARY.
    B. THE ROOM MUST BE SURVEYED TO ASSURE NO RADIATION LEVELS ABOVE BACKGROUND EXIST IN THE ROOM.
    C. THE RADIATION PRECAUTIONS TAGS AND NURSING INSTRUCTIONS ARE REMOVED.
    D. THE NURSING STATION IS NOTIFIED THAT RADIATION PRECAUTIONS ARE NO LONGER IN EFFECT.

## INSTRUCTIONS TO PATIENT UPON RELEASE FROM HOSPITAL

THE PATIENT MAY NOT BE RELEASED UNLESS THE REMAINING ACTIVITY IS LESS THAN 30 mCi AND PREFERABLY LESS THAN 8 mCi.

A. IF THE REMAINING ACTIVITY IS LESS THAN 8 mCi:
   FEMALE PATIENTS SHOULD BE INSTRUCTED TO AVOID BECOMING PREGNANT FOR AT LEAST 2 MONTHS AFTER THE ACTIVITY HAS REACHED BACKGROUND.

B. IF THE REMAINING ACTIVITY IS BETWEEN 8 AND 30 mCi:
   PREGNANT WOMEN, CHILDREN, AND PERSONS UNDER 45 YEARS OF AGE SHALL NOT BE ALLOWED IN THE SAME ROOM, NOR AT A DISTANCE OF LESS THAN 9 FEET FROM THE PATIENT FOR MORE THAN 15 MINUTES PER DAY. PERSONS OLDER THAN 45 YEARS OF AGE SHOULD REMAIN AT A DISTANCE OF AT LEAST 3 FEET FROM THE PATIENT EXCEPT FOR BRIEF PERIODS OF CLOSER CONTACT SUCH AS SHAKING HANDS OR KISSING.
   THESE PRECAUTIONS WILL NO LONGER BE REQUIRED WHEN THE REMAINING ACTIVITY IS LESS THAN 8 mCi. HOWEVER FEMALE PATIENTS SHOULD BE INSTRUCTED TO AVOID BECOMING PREGNANT FOR AT LEAST 2 MONTHS AFTER THE ACTIVITY HAS REACHED BACKGROUND.

# NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH PHOSPHOROUS-32, GOLD-198, OR IODINE-131

PATIENT NAME ..... DATE.....
ROOM NO. ..... PHYSICIAN'S NAME.....
RADIOISOTOPE ADMINISTERED ..... DOSE RECEIVED.....
DATE & TIME ADMINISTERED ..... METHOD OF ADMIN.....

EXPOSURE RATES IN mR/hr.

| DATE | 3 FEET FROM PATIENT | 10 FEET FROM PATIENT |
|---|---|---|
| ..... | ..... | ..... |
| ..... | ..... | ..... |
| ..... | ..... | ..... |
| ..... | ..... | ..... |

COMPLY WITH ALL CHECKED ITEMS

..... 1. VISITING TIME PERMITTED -- 30 MINUTES PER DAY.

..... 2. VISITORS MUST REMAIN 6 FEET FROM PATIENT.

..... 3. PATIENT MAY NOT LEAVE ROOM.

..... 4. VISITORS UNDER 18 OR PREGNANT VISITORS NOT PERMITTED.

..... 5. PERSONNEL MUST WEAR FILM OR TLD BADGES.

.....6. NO PREGNANT PERSONNEL ALLOWED.

..... 7. SUPPLEMENTARY POCKET CHAMBERS TO BE WORN.

..... 8. DOOR, BED, CHART AND PATIENT'S WRIST TAGGED.

..... 9. DISPOSABLE GLOVES MUST BE WORN WHILE ATTENDING PATIENT.

..... 10. PATIENT MUST USE DISPOSABLE UTENSILS.

..... 11. ALL ITEMS MUST REMAIN IN ROOM UNTIL CLEARED BY R.S.O.

..... 12. SMOKING IS NOT PERMITTED.

..... 13. ROOM IS NOT TO BE RELEASED UNTIL CLEARED BY R.S.O.

..... 14. OTHER INSTRUCTIONS .....

.....

.....

IN CASE OF EMERGENCY CONTACT RADIATION THERAPY OR NUCLEAR MEDICINE DEPARTMENT, AND/OR THE RADIATION SAFETY OFFICER (R.S.O.).

R.S.O. ..... PHONE .....

RADIATION SURVEY RECORD -- RADIATION THERAPY PATIENT ROOM SURVEY
GROUP IV & V (IODINE-131, GOLD-198, PHOSPHOROUS-32)

PATIENT NAME ..... NUMBER .....
ISOTOPE ..... DOSE ..... TIME & DATE ADMIN .....
ROOM NUMBER .....

PATIENT MONITORING (EXPOSURE RATE IN mR/hr. AT 1 METER FROM PATIENT)

NOTE: PATIENT INSTRUCTED NOT TO URINATE FROM TIME OF ADMINISTRATION UNTIL THE MEASUREMENT MADE AT 1 HOUR POST ADMINISTRATION.

| | |
|---|---|
| INITIAL EXPOSURE RATE | ..... |
| 1 HOUR POST ADMINISTRATION | ..... |
| 1 DAY POST ADMINISTRATION | ..... |
| 2 DAYS POST ADMINISTRATION | ..... |
| 3 DAYS POST ADMINISTRATION | ..... |
| 4 DAYS POST ADMINISTRATION | ..... |
| 5 DAYS POST ADMINISTRATION | ..... |
| ..... | ..... |

DATE OF DISCHARGE ..... EXPOSURE RATE AT 1 METER .....
ESTIMATED ACTIVITY REMAINING AT TIME OF DISCHARGE (mCi) .....

AREA SURVEY (PERFORMED IMMEDIATELY POST ADMINISTRATION)

| | | |
|---|---|---|
| CORRIDOR OUTSIDE PATIENT'S ROOM | ..... | mR/hr MAXIMUM |
| ADJACENT ROOM | ..... | mR/hr MAXIMUM |
| OTHER ..... | ..... | mR/hr MAXIMUM |
| ..... | ..... | mR/hr MAXIMUM |
| ..... | ..... | mR/hr MAXIMUM |

ROOM SURVEYED AND CLEARED FROM RADIOACTIVE PRECAUTIONS CATEGORY

SURVEY TIME & DATE .....

MAXIMUM EXPOSURE RATES IN ROOM (mR/hr)

| | |
|---|---|
| BATHROOM | ..... |
| TELEPHONE | ..... |
| BED | ..... |
| TABLE | ..... |
| OTHER ..... | ..... |
| ..... | ..... |

LINEN BAGS, UTENSIL BAGS, ETC REMOVED AS REQUIRED? .....

COMMENTS .....
.....
.....

SIGNATURE .....

"OFFICIAL RECORD COPY" ML1J

# NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH BRACHYTHERAPY SEALED SOURCES
## (RADIUM, CESIUM-137, IODINE-125 SEEDS, IRIDIUM-192 SEEDS)

PATIENT NAME ..... DATE.....
ROOM NO. ..... PHYSICIAN'S NAME.....
RADIOISOTOPE ADMINISTERED ..... ACT. RECEIVED.....
DATE & TIME ADMINISTERED ..... METHOD OF ADMIN.....
DATE & TIME SOURCES TO BE REMOVED IF APPLICABLE .....

EXPOSURE RATES IN mR/hr.

| DATE | 3 FEET FROM PATIENT | 10 FEET FROM PATIENT |
|---|---|---|
| ..... | ..... | ..... |
| ..... | ..... | ..... |

COMPLY WITH ALL CHECKED ITEMS

..... 1. VISITING TIME PERMITTED -- 30 MINUTES PER DAY.

..... 2. VISITORS MUST REMAIN 6 FEET FROM PATIENT.

..... 3. PATIENT MAY NOT LEAVE ROOM.

..... 4. VISITORS UNDER 18 OR PREGNANT VISITORS NOT PERMITTED.

..... 5. PERSONNEL MUST WEAR FILM OR TLD BADGES.

.....6. NO PREGNANT PERSONNEL ALLOWED.

..... 7. SUPPLEMENTARY POCKET CHAMBERS TO BE WORN.

..... 8. DOOR, BED, CHART AND PATIENT'S WRIST TAGGED.

..... 9. DISPOSABLE GLOVES MUST BE WORN WHILE ATTENDING PATIENT.

..... 10. PATIENT MUST USE DISPOSABLE UTENSILS.

..... 11. PLACE LAUNDRY IN LINE BAG & SAVE UNTIL CLEARED BY R.S.O.

..... 12. ALL ITEMS MUST REMAIN IN ROOM UNTIL CLEARED BY R.S.O.

..... 13. CONTACT THE RADIATION THERAPY DEPT OR R.S.O. WHEN TEMPORARY SOURCES (i.e. RADIUM, CESIUM OR IRIDIUM SEEDS) ARE REMOVED TO PERFORM A SURVEY TO BE SURE ALL SOURCES ARE REMOVED FROM THE PATIENT, TO DO A PHYSICAL SOURCE COUNT, & TO BE SURE NO SOURCES REMAIN IN THE ROOM.

..... 14. CONTACT THE RADIATION THERAPY DEPT. OR R.S.O. WHEN THE PATIENT IS DISCHARGED TO SURVEY THE ROOM PRIOR TO ITS ASSIGNMENT TO ANOTHER PATIENT.

..... 15. OTHER INSTRUCTIONS .....

IN CASE OF EMERGENCY CONTACT RADIATION THERAPY DEPT. AND/OR R.S.O.

R.S.O.: ..... PHONE: .....

RADIATION SURVEY RECORD -- RADIATION THERAPY PATIENT ROOM SURVEY
GROUP VI BRACHYTHERAPY SEALED SOURCES
(RADIUM-226, CESIUM-137, IODINE-125 SEEDS, IRIDIUM-192 SEEDS)

PATIENT NAME ..... NUMBER .....
ISOTOPE ..... NUMBER OF SOURCES ..... TOTAL ACT .....
TIME & DATE OF ADMINISTRATION ..... ROOM NUMBER .....

PATIENT MONITORING (EXPOSURE RATE IN mR/hr. AT 1 METER FROM PATIENT)

INITIAL EXPOSURE RATE .....
DISCHARGE EXPOSURE RATE (IF APPLICABLE) .....
..... .....

AREA SURVEY (PERFORMED IMMEDIATELY POST ADMINISTRATION)

CORRIDOR OUTSIDE PATIENT'S ROOM ..... mR/hr MAXIMUM
ADJACENT ROOM ..... mR/hr MAXIMUM
OTHER ..... ..... mR/hr MAXIMUM
..... ..... mR/hr MAXIMUM
..... ..... mR/hr MAXIMUM

ROOM SURVEYED AND CLEARED FROM RADIOACTIVE PRECAUTIONS CATEGORY

SURVEY TIME & DATE .....

NO READINGS ABOVE BACKGROUND INDICATING NO SOURCES
LEFT IN PATIENT'S ROOM OR BATHROOM? .....

LINEN BAGS, SURGICAL DRESSINGS CHECKED AS REQUIRED? .....

FOR REMOVABLE IMPLANTS, DO THE NUMBER OF SOURCES
RETURNED TO STORAGE AGREE WITH NUMBER IMPLANTED? .....

COMMENTS .....
.....
.....
.....

SIGNATURE .....

Atomlab

# INSTRUCTION MANUAL

## PULMONEX XENON SYSTEM

130-500

### 3-STEP SIMPLICITY OF OPERATION

1. Start: Set timer. Patient adjusts to breathing on system. Add oxygen. Set "Airflow" control. Switch handle to 2.

2. Single Breath-Equilibrium: Patient is breathing on closed loop. Inject Xenon at mouthpiece. Patient breathes until equilibrium (about 2 minutes). More oxygen may be added during 2, if necessary. Switch to 3.

3. Washout: Patient breathes room air through unit, exhales into trap. Study is complete.

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To thoroughly familiarize yourself with the equipment and methodology, it is suggested that you run through the procedure several times; first without any patient, then with a colleague as a "patient" without actually using xenon. When you are completely familiar with the routine, you can start doing xenon studies on a patient with confidence.

## FOLLOW THESE SIMPLE STEPS CAREFULLY:

**A. Setting Up Your Pulmonex**

1. Open the top rear door. Inspect the interior. All hoses should be connected to their respective ports. Bags should be lying flat. The elbows on the bags should be in their wall brackets. Hoses should not be kinked.
2. Open the lower front door. All hoses should be connected to their respective ports.
3. Remove the empty plastic cartridge that hangs in the lower compartment. Fill the cartridge about 1/4 to 1/3 full with the blue drierite (139-101) and return the cartridge. This serves as a moisture trap for the air going into the charcoal cartridge. Close the lower compartment. Replace the drierite when it changes color (from blue to pink). *Failure to change the drierite will significantly shorten the life of the charcoal cartridge.*
4. Remove the empty plastic cartridge that is within the top compartment. Fill 1/4 to 1/3 full with white granule soda-lime (Model #130-019). Reconnect to the hoses. This soda-lime serves as a carbon dioxide trap. Close the top rear door. Change the soda-lime between each patient. *Failure to change the soda-lime will cause the patient to rebreathe too much carbon dioxide thus causing hyperventilation.*
5. Bring the unit to the area of operation. Make sure the timer is on "0" and plug into a nearby electrical outlet.
6. At the rear of the unit, there are two white hose connections, side by side. Attach the breathing tubes/Y Fitting/bacteria filter/mouthpiece assembly to the hose connections. The plastic plug and warning label on the Y fitting must be facing up.

> **Note:** Keep the breathing tubes as short as possible. If a patient is supine bring the system to the bedside. Never add a length of tubing to the patient side of the Y fitting. If you need more tubing length replace both breathing tubes. The distance from the Y to the patient must be as short as possible.

It is advisable to use hose clamps to tightly fasten the breathing hoses to the hose connections. As a safety precaution you can connect a hose from your room vent to the exhaust port on the Pulmonex. This exhaust port is located on the patient side of the Pulmonex just below the overhang.

> **Caution:** Some patients are sensitive to oxygen. Consult a physician before using oxygen. If the physician prefers, substitute room air for oxygen.

7. To add oxygen connect and clamp a 1/4" oxygen hose from your oxygen supply to the oxygen inlet port on the Pulmonex front panel. Turn the oxygen valve to 5 psi or 6-8 liters/minute and leave it on. If possible, use a pediatric regulator on the oxygen tank.

> **Note:** Use a flow regulator, not a flow meter. Flow rates can be high (up to 50 liters/min.) but pressure must be low, 5 psi.

**B. Performing a Study.**

8. Using a source, position the patient in front of the scintillation camera. See that both the lungs are within the crystal area.
9. Set the camera for Xe-133. Record all data on tape.
10. Place the Pulmonex as close to the patient as possible and set the handle to the "Start" position. The number "1" will appear under the handle.
11. Set the "Air Flow" control to 30 (an arbitrary figure that can be changed to accommodate the patient's breathing pattern).
12. Press the button on the front panel to add oxygen to the "To Patient" bag. Only add a small amount of oxygen, about 1/4 full. (The bag will only move slightly, do not fill it up.) More oxygen can be added later if the patient requires. In many cases, it is possible not to add any oxygen and perform the entire study on ambient air. In all cases, the oxygen is only to enrich the air in the circuit.

    To do a study with ambient air, before connecting the patient to the system, turn the Pulmonex on and go to position #2. When the "To Patient" bag is 1/4 full, switch the handle back to position #1. Now the system is ready to use.
13. Set the timer to 9 minutes (an arbitrary figure that can be changed at any time depending on the study procedure you prefer).
14. Place the mouthpiece in the patient's mouth. Clamp the patient's nose closed. A face mask may be used, if preferred. Place a vertex cape (#055-101) on the patient.
15. Have the patient breathe briefly on "Start" to become accustomed to breathing with a mouthpiece. The "from patient" bag will move slightly as the patient exhales.
16. Switch the handle to "Single Breath, Equilibium, #2". With a NEN Gun or syringe filled with xenon, puncture the mouthpiece's rubber with the needle and add the xenon as you have the patient take a deep inspiration. Have the patient hold his breath for as long as possible and then continue to breathe normally. Increase the "Air Flow" control to about 70, (an arbitrary figure that can be changed to accommodate the patient's breathing pattern).

    Advise the patient to breathe slowly and normally. Observe both breathing bags moving through the front panel windows. Add oxygen if the patient requires it. An alternative to puncturing the mouthpiece is to use the luer adapter plug provided with the system.

A common problem is the xenon not getting into the patient for single breath. If this happens, try again with these changes:

A. Lower the "Air Flow" control to 20 or 10 five seconds before xenon administration.

B. Puncture the mouthpiece closer to the patient.

C. Have the patient take a deeper breath.

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17. When the patient reaches equilibrium (1 or 2 minutes, the counting rate on the camera stabilizes), switch to "Washout, #3". Take washout data on the camera (typical framing: first picture, 15 seconds; second, 30 seconds; third, 60 seconds). Have the patient breathe normally slowly.

18. Carefully watch the "from patient" bag. If it starts blowing up, the patient is breathing too fast. Advise him to normalize his breathing and increase the "Air Flow" speed. If the bag continues to expand up towards the glass, the patient will feel back pressure and resistance. To relieve this effect, open the lower cabinet. In the center there is a motor control. Turn it clockwise until the breathing bag deflates. Return the control to about 1/2 of its range when the study is complete. The use of this motor control will be a rare occurence. Do not adjust it unless it is absolutely necessary. If it is used, be sure to return it to its original position. To be effective, the increase in motor speed must be done before the bag is full so watch the "From Patient" bag carefully during washout.

19. When the washout is complete, remove the patient and let the system run for a few more seconds or until both bags are empty.

**To prolong the life expectancy of your charcoal cartridge, do the following:**

1. When the patient has completed the washout, do not leave the system running for more than 10 seconds.
2. Check the lower blower motor. It should be set on 50-60 and not increased unless a specific patient needs the extra evacuation power.
3. Make sure the drierite is replaced before it changes color.
4. Do not leave the Pulmonex in Position #3 when not in use.
5. Monitor the trap effluent at regular intervals and keep a formal record.
6. Spread studies out. If you perform all your studies in one day, xenon may break through.

**Additional routine for maintenance program:**

1. Remove the two breathing tubes on the back of the unit. Take one short tube about 8" and connect the two ports on the back of the unit together so that there is a C configuration made by the single tube. Place the handle in position #2 and press the oxygen button filling the unit with oxygen. Both bags should be blown up tight against the glass windows. They should remain tight for about two minutes. If they do not blow up tight or sag, you may have a leak somewhere in the system. Call us if this happens.
2. On the front panel, the handle has a silver disk located in the center. Pry up the disk using a fingernail, knife or scalpel. Underneath the disk you will see that the top of the master valve stem has a small black line painted from the center outward to the edge of the valve stem. Turn the handle from position #1 to position #2 and then to position #3. As the handle turns, the black mark will turn along with the handle and point to the same position that the handle points to. If the black mark and the handle point to different positions, call us.

## TEST PROCEDURE FOR MONITORING TRAP EXHAUST

Trap exhaust is monitored by using the gamma camera without a collimator. The following simple technique is used:

1. Remove the collimator from the camera.
2. With a 5 percent window, calibrate for Xe-133.
3. Fill a large plastic bag with a known volume of air (typically, 50 liters).
4. Inject a known quantity of Xe-133 (such as 100uCi) into the bag. The concentration will be $2 \times 10^{-3}$ uCi/cm$^3$).
5. Place the bag in front of the crystal and count for a known period of time. The c/m obtained is a measure of the efficiency.
6. Collect the exhaust of a typical study in another bag of the same volume (50 liters) and count as defined in Step #5.
7. Ratio the count rates to the standard taken to determine exhaust concentration.

   For example:

   If $2 \times 10^{-3}$ uCi/cm$^3$ yielded 600,000 c/m above background, and collected effluent from the patient study was 150 c/m above background, then:

$$\text{Ratio} = \frac{1.5 \times 10^2 \text{ c/m}}{6 \times 10^5} = 2.5 \times 10^{-4}$$

   Exhaust Concentration

$$= R\ (2 \times 10^{-3}\ \text{uCi/cm}^3)$$

$$= (2.5 \times 10^{-4})\ (2 \times 10^{-3})$$

$$= 5 \times 10^{-7}\ \text{uCi/cm}^3\ *$$

*MPC Xe-133 controlled area should not exceed $1 \times 10^{-5}$ uCi/cm$^3$.

> Only perform the trap test when a patient is being tested on the system.

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## ACCESSORIES FOR XENON DELIVERY SYSTEMS

| Cat. No. | Description | For Use With | | Price |
|---|---|---|---|---|
| | | 130-330 Economy Xenon System | 130-500 Pulmonex Xenon System | |
| 130-550 | Mouthpiece without Hose (Disposable) | | ✓ | $ 1.75 ea. |
| 130-700 | Disposable Bacteria Filter | ✓ | ✓ | 2.95 ea. |
| 130-545 | 8" Hose | ✓ | ✓ | .50 ea. |
| 139-680 | Corrugated Tubing (100'/case), can be cut each 6" | ✓ | ✓ | 16.00 cs. |
| 130-555 | Trap Cartridge for Drierite or Soda Lime | ✓ | ✓ | 2.00 ea. |
| 130-603 | Rubber Breathing Bag, 5 liter | ✓ | ✓ | 20.00 ea. |
| 139-101 | Drierite, Indicating Moisture Absorber | ✓ | ✓ | 6.00 lb. |
| 130-019 | Soda Lime, $CO_2$ Absorber | ✓ | ✓ | 2.50 lb. |
| 130-691 | Hose to Mouthpiece "T" Adapter | ✓ | ✓ | 1.50 ea. |
| 139-102 | "Y" Manifold with One-Way Valve | | ✓ | 7.00 ea. |
| 139-195 | "T" Adapter with One-Way Valve | ✓ | | 7.00 ea. |
| 139-305 | Oxygen Tank Mount | ✓ | ✓ | 40.00 ea. |
| 139-676 | Adult Face Mask Retainer | ✓ | ✓ | 13.50 ea. |
| 139-690 | Pediatric Face Mask Retainer | ✓ | ✓ | 13.50 ea. |
| 139-036 | Disposable Face Mask - small | ✓ | ✓ | 2.45 ea. |
| 139-037 | Disposable Face Mask - medium | ✓ | ✓ | 2.45 ea. |
| 139-038 | Disposable Face Mask - large | ✓ | ✓ | 2.45 ea. |
| 130-939 | Nose Clamps | ✓ | ✓ | 7.50 ea. |
| 139-945 | Replacement Nose Clamp Sponges | ✓ | ✓ | 7.00 dz. |

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