EXHIBIT A

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

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

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

Veterans Administration Hospital
200 Springs Rd.
Bedford, Ma. 01730

TELEPHONE NO.: AREA CODE( ) ____ ____

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

Frederik Rundlett, M.D.

TELEPHONE NO.: AREA CODE (617) 275-7500

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

a. ☐ NEW LICENSE
b. ☒ AMENDMENT TO LICENSE NO. 20-10184-01
c. ☐ RENEWAL OF LICENSE NO. ____

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

See attached

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.)*

Choompol Mahasaen, M.D.

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	10 mCi
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 mCi
10 CFR 35.100, SCHEDULE A, GROUP IV	NA	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V	NA	AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI	NA	

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

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

ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	MAXIMUM NUMBER OF MILLICURIES OF EACH FORM	DESCRIBE PURPOSE OF USE
Other, as specified in current license.			

MAY 15 1985

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: 1980

7. MEDICAL ISOTOPES COMMITTEE	
X	Names and Specialties Attached; and
X	Duties as in Appendix B; or *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
X	Supplements A & B Attached for Each Individual User; and
	Supplement A Attached for RSO.
9. INSTRUMENTATION *(Check One)*	
X	Appendix C Form Attached; or
	List by Name and Model Number
10. CALIBRATION OF INSTRUMENTS	
X	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*
	Equivalent Procedures Attached; and
	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*
X	Equivalent Procsdures 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)*	
X	Appendix H Procedures Followed; or
	Equivalent Procedures Attached
17. AREA SURVEY PROCEDURES *(Check One)*	
	Appendix I Procedures Followed; or
X	Equivalent Procedures Attached
18. WASTE DISPOSAL *(Check One)*	
X	Appendix J Form Attached; or
	Equivalent Information Attached
19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
NA	Appendix K Procedures Followed; or
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
NA	Detailed Information Attached; and
	Appendix L Procedures Followed; or *(Check One)*
	Equivalent Procedures Attached
21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
NA	Detailed Information Attached
22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
X	Detailed Information Attached
23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
X	Detailed Information Attached

FORM NRC-313M
(8-78)

24. PERSONNEL MONITORING DEVICES

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

d. OTHER (Specify)

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

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

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

26. CERTIFICATE

(This item must be completed by applicant)

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

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

(1) LICENSE FEE CATEGORY: NA

(2) LICENSE FEE ENCLOSED: $ _____

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)* R.E. Nohe

(1) NAME *(Type or Print)* R.E. Nohe

(2) TITLE Director

c. DATE 4/30/85

FORM NRC-313M (8-78)

7. RADIATION SAFETY COMMITTEE

We will adhere to Appendix B requirements.

MEMBERSHIP

Vincent Agnello, M.D.	Assoc. Director, Research Chairperson
Judith Waite, R.N.	Administration
Walter Collins, M.D.	Nuclear Medicine, Radiology
Dean Rodman, M.D.	Nuclear Medicine
Choompol Mahasaen, M.D.	Radiation Safety Officer
Victor N. Evdokimoff, ScM, CHP	Health Physics Consultant
Carol Toth, Ph.D.	Research
Fred Moolten, M.D.	Research
Robert Bottino, R.N.	Nursing

In addition, the institution may appoint other qualified individuals to also serve on the committee to address x-ray or other safety related issues.

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
Dean Rodman, M.D.	Mass.

3. CERTIFICATION

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

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING	
		LECTURE/ LABORATORY COURSES (Hours) C	SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION			
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		Mass. General Hosp. University Hosp. Boston, Ma.	1984 (1 yr.) 1984 to present	Nuclear Med. "

The American Board of Nuclear Medicine

Incorporated 1971

A conjoint Board organized with the sponsorship of the American Board of Internal Medicine, American Board of Pathology, American Board of Radiology and the Society of Nuclear Medicine

hereby certifies that

Dean Jay Rodman, M.D.

has met the requirements of this Board and is certified as qualified to practice as a specialist in all aspects of clinical and laboratory

Nuclear Medicine

including but not limited to Radioimmunoassay, Nuclear Imaging, in Vivo Measurements & Therapy with Unsealed Radionuclides

Robert E. O'Mara, M.D.

04941

9/8/84

This is a true copy of the original
MAY 2, 1985
Clara T. Bell, Notary Public

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
Walter Collins M.D.	Mass.

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Board Nuclear Medicine		1977

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING: LECTURE/ LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION			
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		Sancta Maria Hospital Boston City Hospital	5 years 1 year	Nuclear Med. Nuclear Med.

American College of Nuclear Physicians

Be it known to all to whom these presents may come
that the Board of Regents has elected

Walter V. Collins, M.D.

to Charter Membership in

The American College of Nuclear Physicians

Given this 9th day of June, 1974

Owen M. Powell, M.D.
President

AMERICAN COLLEGE OF NUCLEAR PHYSICIANS
ACNP
1974

H. J. Dworkin M.D.
Secretary

The American Board of Nuclear Medicine

Incorporated 1971

A conjoint Board organized with the sponsorship of the American Board of Internal Medicine, American Board of Pathology, American Board of Radiology and the Society of Nuclear Medicine hereby certifies that

Walter V. Collins, M.D.

has met the requirements of this Board and is certified as qualified to practice as a specialist in all aspects of clinical and laboratory

Nuclear Medicine

including but not limited to Radiobioassay, Nuclear Imaging, in Vivo Measurements of Therapy with unsealed Radionuclides.

Joseph F Ross MD
CHAIRMAN

S A Adelstein
SECRETARY

04024
NUMBER

10/27/76
DATE

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
Allen Green, M.D., Ph.D.	Mass.

3. CERTIFICATION

SPECIALTY BOARD (A)	CATEGORY (B)	MONTH AND YEAR CERTIFIED (C)
American Board Nuclear Medicine		1976

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING (A)	LOCATION AND DATE(S) OF TRAINING (B)	TYPE AND LENGTH OF TRAINING: LECTURE/LABORATORY COURSES (Hours) (C)	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) (D)
a. RADIATION PHYSICS AND INSTRUMENTATION			
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		University Hospital Boston, Ma.	1983-present	Nuclear Med.

The American Board of Nuclear Medicine

Incorporated 1971

A conjoint Board organized with the sponsorship of the American Board of Internal Medicine, American Board of Pathology, American Board of Radiology and the Society of Nuclear Medicine

hereby certifies that

Allan M. Green, M.D., Ph.D.

has met the requirements of this Board and is certified as qualified to practice as a specialist in all aspects of clinical and laboratory

Nuclear Medicine

including but not limited to Radioimmunoassay, Nuclear Imaging, in Vivo Measurements & Therapy with unsealed Radionuclides.

03988

10/27/76

This is a true copy of the original.

Clara T. Bell

Clara T. Bell, Notary Public, May 2, 1985

9.

APPENDIX C

INSTRUMENTATION

1. Survey meters

   a. Manufacturer's name: Ludlum (to be purchased

   Manufacturer's model number: 14C

   Number of instruments available: 1

   Minimum range: 0 mR/hr to .2 mR/hr

   Maximum range: 0 mR/hr to 2000 mR/hr

   b. Manufacturer's name: Ludlum

   Manufacturer's model number: 3, probes 44-3 and 44-7

   Number of instruments available: 2

   Minimum range: 0 mR/hr to .2 mR/hr

   Maximum range: 0 mR/hr to 200 mR/hr

2. Dose calibrator

   Manufacturer's name: Capintec or equivalent (to be purchased)

   Manufacturer's model number: CRC-10

   Number of instruments available: 1

3. Instruments used for diagnostic procedures

Type of Instrument	Manufacturer's Name	Model No.
Gamma Camera	Searle	Pho-Gamma IV

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

   Throughout the institution there are gamma spectrometers, liquid scintillation counters and a Gast radioiodine vacuum air sampler.

10 (1)

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 ±10 percent of the calculated or known values for each point checked. Readings within ±20 percent are considered acceptable if a calibration chart, graph, or response factor is prepared, attached to the instrument, and used to interpret readings to within ±10 percent. Also, when higher scales are not checked or calibrated, an appropriate precautionary note will be posted on the instrument.

3. Survey instruments will be calibrated

__X__ 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 Neil Gaeta CHP

(2) Location 35 Grove St., Medford, Ma. 02155

(3) Procedures and sources

__X__ have been approved by NRC and are on file in License No. 20-20743-01

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

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

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

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

10 (2) METHODS FOR CALIBRATION OF DOSE CALIBRATOR

All radiopharmaceuticals must be assayed for activity to an accuracy of 10%. The most common instrument for accomplishing this is an ionization-type dose calibrator. The instrument must be checked for accurate operation at the time of installation and periodically thereafter.

A. Test for the following:

1. Instrument linearity (at installation and quarterly thereafter
2. Geometrical variation (at installation)
3. Instrument accuracy (at installation and following a variation of greater than $\pm$5% in instrument constancy check results)
4. Instrument constancy--daily

B. After repair or adjustment of the dose calibrator, repeat all the appropriate tests listed above (dependent upon the nature of the repairs).

C. Inspect the instrument on a quarterly basis to ascertain that the measurement chamber liner is in place and that instrument zero is properly set (see manufacturer's instructions).

D. Test of Instrument Linearity

The linearity of a dose calibrator should be ascertained over the entire range of activities imployed. This test will utilize a vial of Tc-99m whose activity is equivalent to the maximum anticipated activity to be assayed (e.g., the first elution from a new generator).

1. Assay the Tc-99m vial in the dose calibrator and subtract background level to obtain net activity in millicuries.
2. Repeat step 1 at time intervals suitable to test the useful range of the dose calibrator, such as 6,24,30 and 48 hours.
3. Calculate the predicted activities at the various times measured.
4. The activities calculated should be within $\pm$5% of the measured values if the instrument is linear and functioning properly. Errors grater than $\pm$5% indicate the need for repair or adjustment of the instrument.
5. If instrument linearity cannot be corrected it will be necessary in routine assays to either assay an aliquot of the eluate that can be accurately measured or to relate measured activities to calculated activities.

10 (2) METHODS FOR CALIBRATION OF DOSE CALIBRATOR

E. Test for Geometrical Variation

We will request certified data from the manufacturer of our dose calibrator for test on geometrical variation for commonly used isotopes and geometries. Correction factors will not be applied to the manufacturer's data unless the results exceed ± 3%. If certified data from the manufacturer cannot be obtained, we will perform the following procedure at installation:

To measure variation with volume of liquid, a 30-cc vial containing 2 mCi of Tc-99m or other appropriate radionuclide in a volume of 1 ml will be used.

1. Assay vial at the appropriate instrument setting, and subtract background level to obtain net activity.
2. Increase the volume of liquid in the vial in steps to 2,4,8,10,20, and 25 ml by adding the appropriate amount of saline or water. After each addition, gently shake vial to mix contents and assay as in step 1. (Follow good radiation safety practices to avoid contamination and to minimize radiation exposure)
3. Select one volume as a standard (such as the volume of reference standard used in performing the test for instrument accuracy), and calculate the ratio of measured activities for each volume to the reference volume activity. This represents the volume correction factor (CF).

   Example: If activities of 2.04, 2.02, and 2.00 mCi are measured for 4,8, and 10 ml volumes and 10 ml is the reference volume selected,

$$\text{4ml Volume CF} = \frac{2.00}{2.04} = 0.98$$

4. Plot the correction factors against the volume on linear graph paper. Use this graph to select the proper volume correction factors for routine assay of that radionuclide.
5. The true activity of a sample is calculated as follows: True Activity= Measured Activity X Correction Factor where the correction factor used is for the same volume and geometrical configuration as the sample measured.
6. Similarly, the same activity of Tc-99m in a syringe may be compared with that of 10 ml in a 30-cc vial, and a correction factor may be calculated.

10 (2) METHODS FOR CALIBRATION OF DOSE CALIBRATOR

7. It should be noted that differences of 200 percent in dose calibrator readings between glass and plastic syringes have been observed for lower-energy radionuclides such as I-125, which should be assayed in a dose calibrator only if the reliability of such an assay can be established. Glass tubes and syringes may also vary enough in thickness to cause significant errors in assaying I-125. Hence, adequate correction factors must be established.

   An alternative to providing syringe calibration factors is simply assay the stock vial before and after filling the syringe. The activity in the syringe is then the difference in the two readings (with a volume correction if significant).

F. Test for Instrument Accuracy

The dose calibrator will be certified calibrated by the manufacturer at the time of installation with NBS traceable standards. Typical standards used with activity ranges are 500 µCi Cs-137, 300 µCi Co-60, and 2.5 mCi Co-57.

Nuclear medicine records upon installation by NBS traceable Cs-137 standard its reading for Cs-137 and other radionuclide settings. These values may later be used to check instrument calibration at each setting. Calibration checks that do not agree with ± 5% of installation values indicate the instrument should be repaired or adjusted.

As an alternative for our method of dose calibrator instrument accuracy determination at installation, we may hire Neil Caeta,CHP to verify the instrument's accuracy. His procedures for this are on file with the NRC under license no. 20-20743-01. Our daily constancy checks as described below would then be used for comparison purposes with his results and/or the manufacturers' for accuracy determination of their NBS traceable standards.

G. Test for Instrument Constancy (Daily)

1. Daily or before each use of the instrument measure and record the apparent activity of at least one long-lived standard radionuclide such as Co-57 or Cs-137 at all the commonly used radionuclide settings (when the unit was first calibratedagainst NBS-traceable standards). Choose a source with activity in the 100 µCi to 200µCi range Cs-137 or 3-5 mCi Co-57. This test is performed daily.

10 (2) METHODS FOR CALIBRATION OF DOSE CALIBRATOR

2. Measure background level at same instrument settings or check that automatic background subtraction is operating properly when blanks are inserted in the calibrator.
3. Calculate the apparent net activity subtracting out background level.
4. Compare with apparent activities obtained with the same source on installation (correcting for decay).
5. Variations greater than ±5% between these two sets of apparent activities indicate the need for instrument repair or adjustment.
6. Investigate higher than normal background levels to determine their origin and to eliminate them if possible by decontamination, relocation etc.

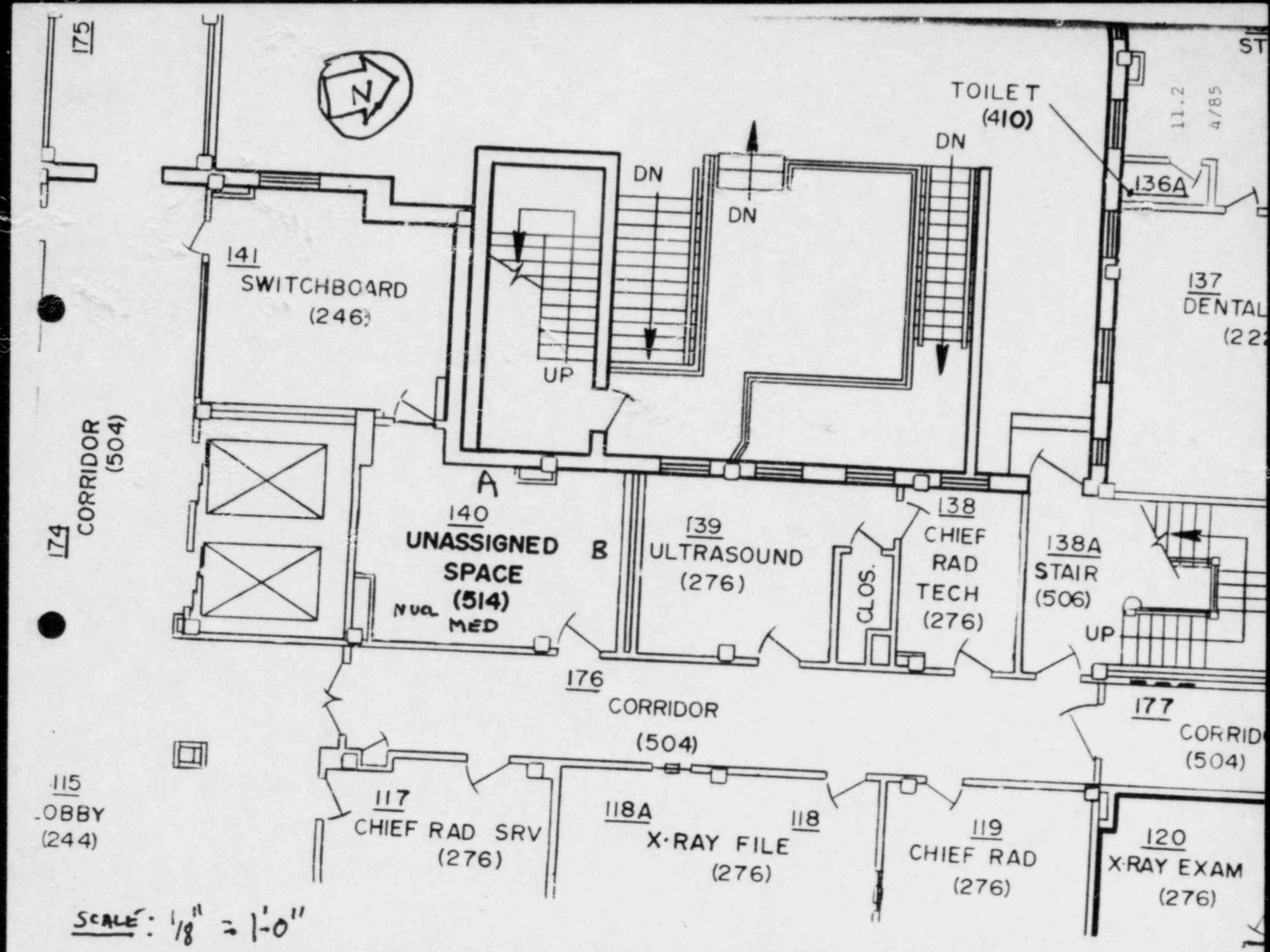
11. FACILITIES AND EQUIPMENT

A. Facilities

The Nuclear Medicine Department will be located in room 140 in Building No. 2. In the attached blueprint, it is designated as "Unassigned Space No. 514." This room is adequate to receive, measure and prepare radiopharmaceuticals to image patients and store radioactive waste for decay. The floor and benchtops will be non-porus for ease of decontamination. If the need arises to expand the department, we plan to move the department to an area within the hospital with more space. At that time, we will amend the license to reflect the change.

The Nuclear Medicine facility contains 228 square feet. The facility contains a rear door to the telephone switchboard which is permanently locked so that no one could inadvertently enter the room from the switchboard. To comply with 10 CFR 20 exposure limits we plan to place the radiophamaceutical preparation and waste area against Wall B which is a double wall adjacent to the ultrasound room. The preapration area will be located at least six feet from the corridor. The gamma camera is expected to be placed near Wall A which is adjacent to an outside stairway. The technologist will be seated at the console during patient imaging at least three (3) feet if not more, from the radioactive patient to insure exposure ALALRA.

We estimate the maximum work load at 200 mCi Tc-99m per week. Assuming an unshielded source ,there would be an integrated dose equivalent of 16 millirems at three (3) feet. We therefore feel there is no need to shield the floor or ceiling. As mentioned, there is sufficient thickness in Walls A and B to keep exposure levels ALARA. In addition, patient will be injected in this facility and not in the corridor since these patients can cause the corridor to exceed 2 mR/hr. Since no gaseous or volatile radiopharmaceuticals will be used, there will not be a need for ventilation controls such as a hood under negative pressure. In terms of ventilation of the Nuclear Medicine facility, the room air is balanced at 450 cubic feet per minute. There is no re-circulation of this air since the facility exhaust air exits directly through a duct to the roof. We also do not anticipate the need for a hot sink since we are dealing with short-lived radiopharmaceuticals that will decay out to background levels. There is a designated hot sink in the clinical lab in this building should this contingency arise.


175
N
TOILET
(410)
DN
DN
DN
136A
11.2
4/85
ST
141
SWITCHBOARD
(246)
137
DENTAL
(22
UP
174
CORRIDOR
(504)
A
140
UNASSIGNED
SPACE
(514)
NVA
MED
B
139
ULTRASOUND
(276)
CLOS.
138
CHIEF
RAD
TECH
(276)
138A
STAIR
(506)
UP
176
CORRIDOR
(504)
177
CORRID
(504)
115
OBBY
(244)
117
CHIEF RAD SRV
(276)
118A
X-RAY FILE
(276)
118
119
CHIEF RAD
(276)
120
X-RAY EXAM
(276)
SCALE: 1/8" = 1'-0"

11. FACILITIES AND EQUIPMENT

B. Equipment

We will maintain exposure and contamination levels ALARA through the planned purchase of the following equipment:

1) Lead glass L Block to prepare or draw radiopharmaceuticals.
2) Waste receptacles to allow decay of radiopharmaceuticals for 10 half-lives. We will either purchase commercially available shielded waste receptacles or construct lead shielded enclosures such as 3 inch lead bricks around the waste.
3) Refrigerator for storage of radiopharmaceuticals with provisions for local shielding.
4) Syringe shields, remote handling tools such as forceps or tongs for preparation of doses, lead elution vials etc.
5) "Radioactive" signs and labels to be affixed as required in 10 CFR 20

C. Shielding

Adequate shielding must be used to ensure exposures ALARA. Since we are dealing primarily with Tc-99m, we will need at least 1 mmPb for most shielding purposes. Auxillary shielding will be employed for waste storage, maintaining a low background for the dose calibrator etc. If a molybdenum 99 generator would be needed,it will require additional shielding since the HVL of Mo-99 is twice that of Tc-99m. We would purchase lead coddles to surround the generator as well as auxillary shielding in an adequately distant area in the room to maintain exposures ALARA.

12. PERSONNEL TRAINING PROGRAM

There is currently an ongoing training program for radiation workers who use radioisotopes at the Bedford VA Hospital. We plan to continue this program for nuclear medicine personnel when it becomes licensed.

Specifically:

A. All new nuclear medicine workers will be required to report to the Radiation Protection Office to be informed of the following:

1. Conditions of the NRC license
2. Institutional regulations such as:

a) safe handling of radioactive materials
b) potential hazards associated with their use of radioactivity
c) your rights and responsiblities as a radiation worker
d) purchase and receipt of radioactive materials
e) record keeping
f) personnel dosimeter requirements
g) radioactive waste disposal
h) survey protocols
i) appropriate response to emergency or unsafe conditions
j) posted instructions
k) regulatory guide 8.13
l) ALARA

3. Pertinent NRC regulations.

B. Periodic educational sessions will be conducted during the year for previously trained radiation workers.

1. To be kept current of any significant changes in the NRC license or their duties as radiation workers.
2. As refresher training, to reinforce safe working habits, the ALARA concept, institutional, and NRC regulations as they pertain to radiation workers.
3. As a forum for discussion of any concerns by radiation workers regarding radiation safety.

These periodic training sessions may be by informal discussions with an individual authorized lab or all labs, formal didatic lectures or audiovisual presentations supplemented by written literature. The amount of time needed for radiation safety education will be commensurate with the extent of the radiation hazard associated

12. PERSONNEL TRAINING PROGRAM (cont'd)

with a particular authorized user. We estimate a minimum of two (2) hours for this form of our training program.

C. Ancillary personnel such as nursing, housekeeping, etc. need to be informed of radiation hazards as they pertain to their duties. We therefore have issued written instructions to their supervisors detailing what radiation safety precautions are necessary. An example would be not to repair a hot sink until cleared by the RPO. One-on-one discussions, as a need arises with any concerned ancillary personnel about radiation safety precautions will be conducted.

13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

We have modified slightly our normal ordering and receiving control procedures for nuclear medicine from the protocol that currently exists for delivery of research isotopes to our facility.

Purchasing:

1. Initiator and/or indicated user must sign the VA form 07-2237 as the authorized licensed requisitioner. The 2237 must contain the following information: isotope, chemical form, activity etc. This also applies to FDA approved Schedule III non-radioactive kits.
2. The RPO will verify possession limits before approval can be given any requisition for radiopharmaceuticals. He will also notify in writing a commercial supplier of radiopharmaceuticals what radioisotopes and amounts nuclear medicine personnel are approved for.
3. Nuclear medicine personnel will be deligated the responsability for phoning in radioisotope orders that have been approved by prior agreement with the RPO.

Receiving:

1. Arrangements will be made with the supply service and Radiation Protection Office to receive all nuclear medicine radiopharmaceuticals in the Nuclear Medicine facility during normal working hours.
2. The Radiation Protection Officer has delegated to designated Nuclear Medicine personnel, responsibility to inspect radiopharmaceuticals and complete necessary paperwork as required by the NRC license. The complete Radioactive Shipment Receipt Record will be sent to the RPO where it will be filed.
3. Off-hour deliveries (after 4:00 PM)will be received by the medical Administrative Officer (MAS) of the Day under agreement with the RPO. Off-hour packages will be expeditiously delivered by the MAS to a designated area of the Nuclear Medicine facility and the door locked. Bar III packages will be delivered by transport cart or wheelchair to insure exposure ALARA.

14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

We will conform to Appendix F for safely opening radioactive packages for Nuclear Medicine.

15. GENERAL RULES FOR SAFE USE OF RADIOACTIVE MATERIAL

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

2. Wear disposable gloves at all times while handling radioactive materials. If the gloves would interfere with the necessary tactile sensation of feeling for a vein in a nuclear medicine patient, which could compromise the patient's well being, gloves need not be worn. Another example would be the rare situation where an individual is allergic to gloves. If gloves are not worn in these two exceptions, hands must be checked after the procedure.

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

4. Always use syringe shields for routine preparation of patient doses and administration to patients, except in circumstances such as pediatric cases when their use would compromise the patient's well-being. In these exceptional cases, use other protective methods such as remote delivery of dose (e.g., through use of a butterfly valve.

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

b. Do not store food, drink, or personal effects with radioactive material.

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

6b. For therapeutic doses, also check the patient's name the radionuclide, the chemical form, and the activity vs the order written by the physician who will perform the procedure.

7. Wear personnel monitoring devices (film badge or TLD) at all times while in areas where radioactive materials are used or stored. These devices should be worn at chest or waist level. Personnel monitoring devices when not being worn to monitor occupational exposures should be stored in a designated low background area.

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

9. Dispose of radioactive waste only in specially designated and properly shielded receptacles.

15. GENERAL RULES FOR SAFE USE OF RADIACTIVE MATERIAL (cont'd)

10. Never pipette by mouth.

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

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

13. Always transport radioactive material in shielded containers.

16. EMERGENCY PROCEDURES

We will follow the instructions in Appendix H.

17. NUCLEAR MEDICINE AREA SURVEY PROCEDURES

1. All elution, preparation, and injection areas will be surveyed daily, if radiopharmaceuticals are used that day, with an appropriately low-range survey meter and decontaminated if necessary. Records need not be kept of these surveys.

2. The weekly surveys in Nuclear Medicine will consist of:

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

    b. A series of wipe tests to measure contamination levels. The method for performing wipe tests will be sufficiently sensitive to detect 200 dpm per 100 cm^2 for the contaminant involved. Wipes of elution and preparation areas or other "high background" areas will be removed to a low background area for measurement.

3. A permanent record will be kept of all weekly survey results, including negative results. The record will include:

    a. Location, date and identification of equipment used , including the serial number and pertinent counting efficiencies.

    b. Name of person conducting the survey.

    c. Area surveyed, identifying relevant features such as active storage areas, active waste areas, etc.

    d. Measured exposure rates, keyed to location on the drawing (point our rates that require corrective action).

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

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

4. Area will be cleaned if the contamination level exceeds 200 dpm/100 cm^2.

APPENDIX J

18. **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)

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

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

_____ Other (specify): _____

_____

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

__X__ Returned to the manufacturer for disposal.

__X__ Held for decay* until radiation levels, as measured 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.**

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

_____ Other (specify): _____

_____

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

__X__ 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.

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

_____ Other (specify): _____

_____

4. The commercial waste disposal service used will be

Adco Services Inc. Tinley Park, Ill.
(Name) (City, State)

NRC/Agreement State License No. 12-112861

---

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

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

22. RADIOACTIVE ANIMALS PROCEDURE

We do not anticipate conducting radiopharmaceutical research in animals. We do however inject animals with H-3 as part of our ongoing medical research program. These procedures have already been approved and are on file with the NRC for the Bedford VA Hospital.

23. ITEM 6B PROCEDURES

In terms of Nuclear Medicine, there are no other special procedures necessary. We do have air sampling and bioassay requirements for iodinations with I-125 as well as leak testing for the Ni-63 electron capture unit. These procedures have already been approved and are on file with the NRC as part of our research byproduct material license.

APPENDIX O

MODEL PROGRAM FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES AT MEDICAL INSTITUTIONS ALARA

Bedford Veterans Administration Hospital

(Licensee's Name)

4/30/85

(Date)

1. **Management Commitment**

   a. We, the management of this (medical facility, hospital, etc.), 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)[1] 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 judgment, 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 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)[2]**

   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

      (The judicious delegation of RSC authority is essential to the enforcement of an ALARA program.)

      (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.

[1] Private practice physician licenses do not include an RSC.

[2] The RSO on private practice physician licenses will assume the responsibilities of the RSC under Section 2.

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]

(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 supervision who are

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[3]The NRC has emphasized that the Investigational Levels in this program are not new dose limits but, as noted in ICRP Report 26, "Recommendations of the International Commission on Radiological Protection," serve as check points above which the results are considered sufficiently important to justify further investigations.

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 (or private practice) 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 O-1 below. These levels apply to the exposure of individual workers.

Table O-1

	Investigational Levels (mrems per calendar quarter)	
	Level I	*Level II*
1. Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads	125	375
2. Hands and forearms; feet and ankles	1875	5625
3. Skin of whole body*	750	2250

*Not normally applicable to nuclear medicine operations except those using significant quantities of beta-emitting isotopes.

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 O-1:

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

   Except when deemed appropriate by the RSO, no further action will be taken in those cases where an individual's exposure is less than Table O-1 values for the 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 O-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**[4]

I hereby certify that this institution (or private practice) has implemented the ALARA Program set forth above.

R.E. Nohe

Signature

R.E. Nohe

Name (print or type)

Director

Title

Institution (or Private Practice) Name and Address

[4]The person who is authorized to make commitments for the dministration of the institution (e.g., hospital administrator) or, n the case of a private practice, the licensed physician.

Edith Nourse Rogers
Memorial Veterans Hospital
200 Springs Road
Bedford MA 01730

Veterans Administration

January 14, 1985

In Reply Refer To: 518/113

Material Licensing Branch
U.S. Nuclear Regulatory Committee
Washington, D.C. 20555

Thru: Nuclear Medicine Service (115)
V.A. Central Office
Washington, D.C. 20420

SUBJ: Amendment to N.R.C. License No. 20-10184-01

1. We would like to amend our Material's License to include as an authorized user the following individual:

   Frederick L. Moolten, M.D.

2. Dr. Moolten is an experienced user who is authorized by the Radioisotope Committee at Boston University Medical Center since early 1970, and currently a user of radioisotopes. Dr. Moolten's training and experience are listed on attached Form NRC-313M-Supplement A.

3. It has been brought to my attention upon reviewing our License that on Item 6b, pertaining to our possession limit, Tritium is stated as 100 millicuries rather than 250 millicuries, as stated on our prior license.

4. Please amend our License to increase our possession of Tritium to read 250 millicuries. No other change is necessary.

5. Should any additional question arise, please contact Dr. Choompol Mahasaen, Radiation Safety Officer, Laboratory Service at (617) 275-7500 ext. 231.

6. Thank you for your assistance.

"OFFICIAL RECORD COPY"

ML12

FEE EXEMPT

for R.K. Little
R.E. NOHE
Hospital Director

Attachment

85 JAN 25 P3:05

JAMES J. SMITH, M. D. (115)
Director, Nuclear Medicine Service
VA Central Office
Washington, D.C. 20420

18605

~~8502140190~~ 850207
NMS LIC30
20-10184-01 PDR

1/23/85

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
FREDERICK L. MOOLTEN, M.D.	Massachusetts

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING: LECTURE/ LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Harvard Medical School (1961)	2	0
	Mass. General Hospital(1964-1969)	0	10
	Boston University School of Medicine (1984)	2	4
b. RADIATION PROTECTION	Harvard Medical School (1961)	2	0
	Mass. General Hospital(1964-1969)	0	10
	Boston University School of Medicine (1984)	2	20
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Harvard Medical School (1961)	2	0
	Mass. General Hospital(1964-1969)	0	10
	Boston University School of Medicine (1984)	2	20
d. RADIATION BIOLOGY	Harvard Medical School (1961)	2	0
	Boston University School of Medicine (1984)	2	4
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
^{14}C	100 uCi	Mass. General Hospital	20 years	Medical Research (Laboratory Experimentation)
^{3}H	100 mCi	Boston University School of Medicine *		
^{131}I	1 mCi	Mass. General Hospital (1964)	6 weeks	
^{125}I	200 uCi	Boston University School of Medicine	1 year	
^{32}P	500 uCi	Boston University School of Medicine	4 months	

*I am currently an authorized user of Radioisotopes by Radioisotope Committee at Boston University Medical Center, since 1970's.

Edith Nourse Rogers
Memorial Veterans Hospital
200 Springs Road
Bedford, MA 01730

Veterans
Administration

October 4, 1984

NRC

Dr. James J. Smith
Nuclear Medicine Service (115)
VA Central Office
810 Vermont Avenue, N.W.
Washington, D.C. 20420

'84 NOV 15 P3:47

SUBJ: License No. 20-10184-01

This letter is to inform you that:

1. Dr. George Stidworthy, Ph.D., has left our facility effective September 30, 1984.

2. Dr. Choompol Mahasaen, M.D., has been assigned as our new Radiation Safety Officer. Dr. Mahasaen is currently authorized to use all isotopes on our license.

3. Our facility has contacted the ADCO Service, Inc., 17650 DuVan Drive, Tinley Park, IL 60477, which has U.S. Nuclear Regulatory Commission License No. 12-11286-1 for disposal of our radioactive waste material.

R.E. Nohe

R.E. NOHE
Hospital Director

James J. Smith M.D.

JAMES J. SMITH, M. D. (115)
Director, Nuclear Medicine Service
VA Central Office
Washington, D.C. 20420

8412040240 841123
NMS LIC30
20-10184-01 PDR

FEE EXEMPT

In Reply Refer To: 518/113

"OFFICIAL RECORD COPY"

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03000 1927

Edith Nourse Rogers
Memorial Veterans Hospital
200 Springs Road
Bedford, MA 01730

Veterans Administration

October 4, 1984

NRC

Dr. James J. Smith
Nuclear Medicine Service (115)
VA Central Office
810 Vermont Avenue, N.W.
Washington, D.C. 20420

'84 NOV 15 P3:47

SUBJ: License No. 20-10184-01

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R.E. Nohe

R.E. NOHE
Hospital Director

James J. Smith M.D.

JAMES J. SMITH, M. D. (115)
Director, Nuclear Medicine Service
VA Central Office
Washington, D.C. 20420

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NMS LIC30
20-10184-01 PDR

PER EXEMPT

In Reply Refer To: 518/113

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