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 [illegible] and 35 and the license fee provision of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated [illegible] Item 26 and the appropriate fee enclosed.*

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

Kaiser Foundation Hospital
1697 Ala Moana Blvd.
Honolulu, HI 96815

TELEPHONE NO.: AREA CODE 808 , 949 - 5811

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

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Philip J. Manly
Nicola Rinaldi

TELEPHONE NO.: AREA CODE (808) 621 - 8892

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

a. ☐ NEW LICENSE
b. ☒ AMENDMENT TO LICENSE NO. 53-05379-01
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 sheet

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.)*

see attached sheet

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
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	5000
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		

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 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
Sr-90	sealed source Tracerlab Model RA-1	55	treatment of superficial eye diseases
Am-241	sealed source Searle LFOV camera	15	anatomical marker

8512030237 850919
REG5 LIC30
53-05379-01 PDR

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INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

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

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24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY		FILM		
	X	TLD	Radiation Detection Company	Monthly
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	Radiation Detection Company	Monthly
		OTHER (Specify)		
c. WRIST		FILM		
		TLD		
		OTHER (Specify)		

d. OTHER (Specify)

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

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

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

26. CERTIFICATE

(This item must be completed by applicant)

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

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

(1) LICENSE FEE CATEGORY: 7B

(2) LICENSE FEE ENCLOSED: $ 150.00

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)* Ronald J. Mikolajczyk

(1) NAME *(Type of Print)* Ronald J. Mikolajczyk

(2) TITLE Hospital Administrator

c. DATE APR 7 1982

RECEIVED APR 13 1982 U.S. NUCLEAR REGULATORY COMMISSION REGION 4

FORM NRC-313M (8-78)

11678

INDIVIDUAL USERS

Decha Intaraprasong, M.D.	All
Harry W Russell, M.D.	All
Chung Ta Hsin, M.D.	Groups I, II, III, in-vitro studies, xenon-133
Alfred G. Scottolini, M.D.	Groups I, II, III, in-vitro studies, xenon-133
Michihiko Hayashida, M.D.	Strontium-90 eye applicator
John B. Thompson, M.D.	Strontium-90 eye applicator
Roberta Leimaala Ikemoto (Apau), M.D.	Groups I, II, III, in-vitro studies, xenon-133
Tom Kimball, M.D.	All No.- I, II, III in-vitro studies
Mary Frances O'Neal, M.D.	All
Steven Miller, M.D.	Strontium-90 eye applicator

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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
Decha Intaraprasong, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Intaraprasong is currently authorized under this license (License No. 53-05379-01).		

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

APR. 28 1982

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
Harry W. Russell, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Russell is currently	authorized under this license (License No. 53-05379-01).	

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

APR 28 1982

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
Chung Ta Hsin, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Hsin is currently authorized under this license 53-05379-01).		(License No.

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

APR 28 1992

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. Scottolini, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Scottolini is currently authorized under this license (License No. 53-05379-01).		

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

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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
Michihiko Hayashida, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Hayashida is currently authorized under this license (License No. 53-05379-01).		

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

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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
John B. Thompson, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Thompson is currently authorized under this license (License No. 53-05379-01).		

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

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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
Roberta Leimaala Ikemoto (Apau), M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Dr. Ikemoto (Apau) is currently authorized under this license (License No. 53-05379-01).		

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

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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
Mary Frances O'Neal, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD (A)	CATEGORY (B)	MONTH AND YEAR CERTIFIED (C)
American Board of Radiology	Diagnostic Radiology	June 7, 1980

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	University of Texas, Medical Branch August 1978 to November 1978	30	70
b. RADIATION PROTECTION	"	15	15
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	5	15
d. RADIATION BIOLOGY	"	20	-
e. RADIOPHARMACEUTICAL CHEMISTRY	"	10	20

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Tc-99m	20 mCi	Univ. Texas Med. Branch	8/78 to 11/80	imaging
I-131	100 mCi	Univ. Texas Med. Branch	8/78 to 11/80	diag., therapy
Xe-133	20 mCi	Univ. Texas Med. Branch	8/78 to 11/80	imaging
Th-201	10 mCi	Univ. Texas Med. Branch	8/78 to 11/80	imaging
In-111	500 µCi	Univ. Texas Med. Branch	8/78 to 11/80	imaging
Ga-67	5 mCi	Louisiana State Univ.	7/79 to 4/81	imaging
I-125	200 µCi	Louisiana State Univ.	7/79 to 4/81	diagnosis

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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
Mary Frances O'Neal, M.D.

STREET ADDRESS
400 Hobron Ln. #1608

CITY | STATE | ZIP CODE
Honolulu, Hi. 96815

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 A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS (Additional information or comments may be submitted in duplicate on separate sheets.) D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION	24	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	0	
	LIVER FUNCTION STUDIES	0	
	FAT ABSORPTION STUDIES	0	
	KIDNEY FUNCTION STUDIES	2	
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS	0	
I-131	THYROID IMAGING	5	
P-32	EYE TUMOR LOCALIZATION	0	
Se-75	PANCREAS IMAGING	0	
Yb-169	CISTERNOGRAPHY	0	
Xe-127 XXXXXX XXX	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	31	
OTHER	Tl	201	
Tc-99m	BRAIN IMAGING	124	
	CARDIAC IMAGING	10	
	THYROID IMAGING	30	
	SALIVARY GLAND IMAGING	2	
	Renal Function Scintiphotos XXXXXXXXXXXXXXXX	17	
	PLACENTA LOCALIZATION	0	
	LIVER AND SPLEEN IMAGING	205	
	LUNG IMAGING	31	
	BONE IMAGING	210	
111-In	Tumor and Bone Marrow	24	

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PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES	0	need 3 patients
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	0	needs 3 patients
I-131	TREATMENT OF THYROID CARCINOMA	3	
	TREATMENT OF HYPERTHYROIDISM	10	
Au-198	INTRACAVITARY TREATMENT	0	
Co-60 or Cs-137	INTERSTITIAL TREATMENT	0	
	INTRACAVITARY TREATMENT	0	
I-125 or Ir-192	INTERSTITIAL TREATMENT	0	
Co-60 or Cs-137	TELETHERAPY TREATMENT	0	
Sr-90	TREATMENT OF EYE DISEASE	0	
	RADIOPHARMACEUTICAL PREPARATION	0	
Mo-99/ Tc-99m	GENERATOR	0	
Sn-113/ In-113m	GENERATOR	0	
Tc-99m	REAGENT KITS	0	
Other		0	

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

Aug. 1, 1978 to Nov. 30, 1978. 400 Hours. Should be 500 hrs. (see 3 pages forward)

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

a. NAME OF SUPERVISOR
Bettye A. Sayle, M.D.

b. NAME OF INSTITUTION
University of Texas Medical Branch

c. MAILING ADDRESS
University of Texas Medical Branch

d. CITY
Galveston, Texas 77550

5. MATERIALS LICENSE NUMBER(S)
8-1299-50

6. PRECEPTOR'S SIGNATURE
Bettye A Sayle MD

7. PRECEPTOR'S NAME *(Please type or print)*
Bettye A. Sayle, M.D.

8. DATE
7-22-81

FORM NRC 313M SUPPLEMENT B
(8-78)

APR. 20 1982

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
MARY FRANCES O'NEAL, MD

STREET ADDRESS
DEPT of RADIOLOGY
1697 Ala Moana Blvd.

CITY | STATE | ZIP CODE
Honolulu Hi 96815

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 A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION		
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING		
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING		
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		
OTHER			
Tc-99m	BRAIN IMAGING		
	CARDIAC IMAGING		
	THYROID IMAGING		
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING		
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING		
	LUNG IMAGING		
	BONE IMAGING		
OTHER			

APR. 2 8 1982

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA		
	TREATMENT OF HYPERTHYROIDISM		
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	5	
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS	5	
Other	Quality Control	7	

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

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

a. NAME OF SUPERVISOR
Trent T. PHAN, Ph.D.

b. NAME OF INSTITUTION
Pacific Radiopharmacy Ltd

c. MAILING ADDRESS
347 North Kuakini St

d. CITY
Honolulu, HI 96817

5. MATERIALS LICENSE NUMBER(S)
USNRC 53-16991-01 MD

6. PRECEPTOR'S SIGNATURE
Decha Intaraprasong

7. PRECEPTOR'S NAME *(Please type or print)*
DECHA INTARAPRASONG, M.D.

8. DATE
Jan 12, 82

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

APR. 20 1982

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA	1	
	TREATMENT OF HYPERTHYROIDISM	5	
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		
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS	15	
Other			

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

June 15, 1981 to October 15, 1981

120 hours

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

a. NAME OF SUPERVISOR
D. Intaraprasong, M.D.

b. NAME OF INSTITUTION
Kaiser Foundation Hospital

c. MAILING ADDRESS
1697 Ala Moana Blvd, Honolulu, Hawaii

d. CITY
96815

5. MATERIALS LICENSE NUMBER(S)
53-05379-01

6. PRECEPTOR'S SIGNATURE
D. Intaraprasong, M.D.

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

8. DATE October 19, 1981

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

APR. 28 1982

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
Stephen D. Miller, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Ophthalmology	BRD certified	1979 Cert. oph. 79 Chief Oph. - Kaiser 80 acting Chief Surg - Kaiser

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	Stanford University 1969-1972	50	1000
b. RADIATION PROTECTION	Stanford University 1969-1972	50	1000
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Stanford University Palo Alto VA Hospital 1969-1972	50	1000
d. RADIATION BIOLOGY	Stanford University Palo Alto VA Hospital 1969-1972	50	1000
e. RADIOPHARMACEUTICAL CHEMISTRY	Stanford University Palo Alto VA Hospital 1969-1972	50	1000

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Tc-99m P-32		Palo Alto VA Hospital	2 years	I calibrated standards & sources; helped set up isotope lab as research facility &
Sr-90		University of Iowa Kaiser Foundation Hospital	3 years 2 years	clinical lab. Treatment of pterygium

APR 29 1982

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

STEPHEN D. MILLER M.D.

STREET ADDRESS

1697 ALA MOANA

CITY | STATE | ZIP CODE

HON HI 96815

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 A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION		
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING		
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING		
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		
OTHER			
Tc-99m	BRAIN IMAGING		
	CARDIAC IMAGING		
	THYROID IMAGING		
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING		
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING		
	LUNG IMAGING		
	BONE IMAGING		
OTHER			

APR. 20 1982

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA		
	TREATMENT OF HYPERTHYROIDISM		
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	12	
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR		
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS		
Other			

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

see other sheet

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

a. NAME OF SUPERVISOR
see other sheet

b. NAME OF INSTITUTION

c. MAILING ADDRESS

d. CITY

5. MATERIALS LICENSE NUMBER(S)

6. PRECEPTOR'S SIGNATURE
M Hayashida

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

8. DATE
3/31/82

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

OR for Groups I, II, III in-vitro studies

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
Tom Kimball, M.D.	Hawaii

3. CERTIFICATION

SPECIALTY BOARD (A)	CATEGORY (B)	MONTH AND YEAR CERTIFIED (C)
American Board of Radiology	diagnostic Radiology	June, 1980

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	Univ. of Oklahoma HSC Radiology Residency 7/1/76 to 6/30/80	30	80
b. RADIATION PROTECTION	"	5	35
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	10	15
d. RADIATION BIOLOGY	"	15	30
e. RADIOPHARMACEUTICAL CHEMISTRY	"	10	25

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Tc-99m	500 mCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic
Mo-99	500 mCi	Univ. of Oklahoma HSC	11/78 to 1/79	generator
I-131	200 mCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic-therapeutic
Ga-67	5 mCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic
Cr-51	300 µCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic
I-125	200 µCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic (invivo in vitro)
In-111	500 µCi	Univ. of Oklahoma HSC	11/78 to 1/79	diagnostic

APR 2 5 1982

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
Tom Kimball, M.D.
Kaiser Foundation Hospital
STREET ADDRESS
Dept. of Radiology
1697 Ala Moana Blvd.
CITY | STATE | ZIP CODE
Honolulu Hawaii 96815

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 A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS (Additional information or comments may be submitted in duplicate on separate sheets.) D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION	35	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	4	
	LIVER FUNCTION STUDIES	0	
	FAT ABSORPTION STUDIES	0	
	KIDNEY FUNCTION STUDIES	29	
	IN VITRO STUDIES	2502	
OTHER			
I-125	DETECTION OF THROMBOSIS	0	
I-131	THYROID IMAGING	35	
P-32	EYE TUMOR LOCALIZATION	0	
Se-75	PANCREAS IMAGING	0	
Yb-169	CISTERNOGRAPHY	2	
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	0	
OTHER			
Tc-99m	BRAIN IMAGING	37	
	CARDIAC IMAGING	35	
	THYROID IMAGING	15	
	SALIVARY GLAND IMAGING	2	
	BLOOD POOL IMAGING	37	
	PLACENTA LOCALIZATION	0	
	LIVER AND SPLEEN IMAGING	140	
	LUNG IMAGING	46	
	BONE IMAGING	79	
OTHER			

APR. 28 1982

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES	1	should be 3 for Group IV
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	0	should be 3 " "
I-131	TREATMENT OF THYROID CARCINOMA	5	
	TREATMENT OF HYPERTHYROIDISM	9	should be 10. for Group IV + V
Au-198	INTRACAVITARY TREATMENT	0	Should be 3 for Group V (?)
Co-60 or Cs-137	INTERSTITIAL TREATMENT	0	
	INTRACAVITARY TREATMENT	0	
I-125 or Ir-192	INTERSTITIAL TREATMENT	0	
Co-60 or Cs-137	TELETHERAPY TREATMENT	0	
Sr-90	TREATMENT OF EYE DISEASE	0	
	RADIOPHARMACEUTICAL PREPARATION		
Mo-99/ Tc-99m	GENERATOR	2Ci	
Sn-113/ In-113m	GENERATOR	10mCi	
Tc-99m	REAGENT KITS	5 types	
Other			

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

November 1, 1978 through January 31, 1979
3 months 540 hours

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

a. NAME OF SUPERVISOR
Carl W. Smith, M.D.

b. NAME OF INSTITUTION
Oklahoma Memorial Hospital & Clinics

c. MAILING ADDRESS
P.O. Box 26307

d. CITY
Okla. City, OK 73126

5. MATERIALS LICENSE NUMBER(S)
35-16329-02

6. PRECEPTOR'S SIGNATURE
Carl W Smith M.D

7. PRECEPTOR'S NAME *(Please type or print)*
Carl W. Smith, M.D.

8. DATE
November 17, 1980

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

APR. 28 1982

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

THOMAS EUGENE KIMBALL

STREET ADDRESS

Kaiser Foundation Hospital
1697 Ala Moana Boulevard

CITY | STATE | ZIP CODE

Honolulu Hawaii 96815

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 A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION		
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING		
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING		
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		
OTHER			
Tc-99m	BRAIN IMAGING		
	CARDIAC IMAGING		
	THYROID IMAGING		
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING		
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING		
	LUNG IMAGING		
	BONE IMAGING		
OTHER			

APR 28 1982

PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 *(Soluble)*	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES		
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA		
	TREATMENT OF HYPERTHYROIDISM		
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	5	
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS	5	
Other			

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

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

a. NAME OF SUPERVISOR
Trent T. Phan, Ph.D.

b. NAME OF INSTITUTION
Pacific Radiopharmacy Ltd

c. MAILING ADDRESS
347 North Kuakini Street

d. CITY
Honolulu, Hawaii 96817

5. MATERIALS LICENSE NUMBER(S)
53-05379-01

6. PRECEPTOR'S SIGNATURE
Decha Intaraprasong, M.D

7. PRECEPTOR'S NAME *(Please type or print)*
DECHA INTARAPRASONG, M.D

8. DATE
12/28/81

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

APR 28 1982

Form AEC-313a
(2-73)
Page 3

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE—MEDICAL

SUPPLEMENT A—PRECEPTOR STATEMENT

This page is to be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document experience, obtain a separate statement from each. Page 2 may be used for comments and additional information.

10. NAME AND ADDRESS OF APPLICANT PHYSICIAN (*Include ZIP Code*)

THOMAS E. KIMBALL, M.D.
1697 Ala Moana Blvd.
Honolulu, Hawaii, 96815

11. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 10 ABOVE

(A) ISOTOPE	(B) CONDITIONS DIAGNOSED OR TREATED	(C) No. Cases Observed (See 1 in key below)	(D) No. Cases Involving Personal Participation (See 2 in key below)
I-131 or I-125	Diagnosis of thyroid function		
	Determination of blood and blood plasma volume		
	Liver function studies		
	Fat absorption studies		
	Kidney function studies		
	In vitro studies		
Cr-51	Gastrointestinal protein loss studies		
	Determination of red blood cell volume and studies of red blood cell survival		
Fe-59	Iron turn over studies		
Co-58or Co-60	Intestinal absorption studies		
K-42	Potassium space determinations		
I-131	Thyroid imaging		
	Brain tumor localization and cardiac imaging		
	Cisternography		
	Lung imaging		
	Liver imaging		
	Kidney imaging		
	Placenta localization		
Cr-51	Placenta localization		
	Spleen imaging		
Au-198	Liver imaging		
Hg-197	Brain imaging		
	Kidney imaging		
Hg-203	Brain imaging		
Sr-85	Bone imaging		
Tc-99m	Brain imaging		
	Thyroid imaging		
	Salivary gland imaging		
	Blood pool imaging		

APR. 20 1982

RADIATION SAFETY OFFICERS

ON-SITE RADIATION SAFETY OFFICERS

Nuclear Medicine: Frances Watanabe
Chief Nuclear Medicine Technologist

Laboratory: Thelma Oshiro
Medical Technologist

ALTERNATE RADIATION SAFETY OFFICER(S)

Philip J. Manly
Certified Health Physicist

Nicola Rinaldi
Health Physicist

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
Frances Watanabe, CNMT Nuclear Medicine Department RSO	

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Registry of Radiologic Technologists	Nuclear Medicine Technology	Dec. 1968
Nuclear Medicine Technology Certification Board	Nuclear Medicine Technology	Nov. 1979

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	University of Hawaii 9-78 Radiation Protection & Control Tripler Army Medical Center 11-74	4-hr lecture 4-hr lecture	
b. RADIATION PROTECTION	"	"	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	"	
d. RADIATION BIOLOGY	"	"	
e. RADIOPHARMACEUTICAL CHEMISTRY	Kaiser Foundation Hospital 1961-1967 Part-time 1967-present Full-time		on-the-job experience

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Mo-99	500 mCi	Kaiser Foundation Hospital	From 1962 to present	eluting generato
Tc-99m	250 mCi			imaging
I-131	170 mCi			imaging, therapy
Xe-133	20 mCi			imaging
Tl-201	5 mCi			imaging
Ga-67	5 mCi			imaging
I-125	50 µCi			in-vitro studies
Am-241	12 mCi	Cs-137 200 µCi reference calibr. source		anatomical marke
Cr-51	200 µCi	In-113 500 mCi imaging		in-vitro studies
		Yb-169 500 mCi imaging		

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
Thelma Oshiro, Laboratory, RSO	n/a

3. CERTIFICATION

SPECIALTY BOARD (A)	CATEGORY (B)	MONTH AND YEAR CERTIFIED (C)
American Society of Clinical Pathologists	Medical Technology	Aug. 1968

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	Honolulu, Hawaii Center for Disease Control 1 week course RIA 12/77	1 hr	
b. RADIATION PROTECTION	"	1 hr	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	In-service at Kaiser Medical Center, Feb.'81 and Dec. 1, '81	2 hr	
d. RADIATION BIOLOGY	In-service "	2 hr	
e. RADIOPHARMACEUTICAL CHEMISTRY	Center for Disease Control RIA; 1 week protocol presentation RIAs	4 hr	

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
I-125	40 µCi	Kaiser Foundation Hosp.	12/76-present	in-vitro RIAs
Co-57	10 µCi	"	12/76-present	in-vitro RIAs

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
Philip J. Manly, Alternate, RSO	n/a

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Board of Health Physics	Health Physics	October, 1976
Records of training and experience are available under NRC license No. 53-16847-01.		

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

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
Nicola Rinaldi, Alternate, RSO	n/a

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Records of training and experience are available under NRC License No. 53-16847-01 and 53-00017-23.		

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

RADIATION SAFETY COMMITTEE

1. The Radiation Safety Committee has been established as the administrative body responsible for the safe use of radioisotopes within Kaiser Foundation Hospital.

2. The members of the Radiation Safety Committee and their specialties are:

member	specialty
Peter Clapp, M.D.	chairman
Decha Intaraprasong, M.D.	nuclear medicine
Alfred Scottolini, M.D.	nuclear medicine and in-vitro testing
Michihiko Hayashida, M.D.	opthalmology
Frances Watanabe, N.M.T.	RSO
Thelma Oshiro, Med. Tech.	RSO
Philip J. Manly or Nicola Rinaldi	health physicist
Richard Ross	radiology manager
G. Kitagawa, R.N.	nursing

3. Committee responsibilities are as follows:

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

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

4. Committee duties are as follows:

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

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

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

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

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

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

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

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

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

5. Committee administrative procedures are as follows:

a. Schedule meetings at least quarterly to review safety aspects of the radiation protection program and to consider special cases or problems.

b. Maintain records of committee meetings, actions, recommendations, and decisions.

c. Receive semi-annual reports from the alternate Radiation Safety Officer on:

1) The radiation safety training program.
2) His reviews of records maintained.
3) Any special problems discovered and recommendations of corrective action to be taken.

d. Approve and implement corrective action as necessary to assure radiation safety

INSTRUMENTATION

1. SURVEY METERS

   a. Manufacturer's name: Picker Corporation
   Manufacturer's model number: 655-186
   Number of instruments available: 1
   Minimum range: 0.05 to 0.2 mR/hr
   Maximum range: 500 to 2000 mR/hr

   b. Manufacturer's name: Victoreen Instrument Division
   Manufacturer's model number: 493
   Number of instruments available: 1
   Minimum range: 0 to 300 cpm and 0 to 0.5 mR/hr
   Maximum range: 0 to 30,000 cpm and 0 to 50 mR/hr
   Detector: G.M. pancake, 1.4 mg/cm^2 window

   c. Manufacturer's name: Victoreen Instrument Division
   Manufacturer's model number: 425
   Number of instruments available: 1
   Minimum range: 0 to 500 cpm
   Maximum range: 0 to 500,000 cpm
   Detector: low energy scintillator for I-125

2. DOSE CALIBRATOR

   Manufacturer's name: Squibb
   Manufacturer's model number: CRC-6A
   Number of instruments available: 1

3. DIAGNOSTIC INSTRUMENTS

Type of instrument	Manufacturer's Name	Model No.
Scintillation camera	Searle (Siemens)	Scintiview
Thyroid uptake counters and gamma well detector	Picker Corporation	Ser. 14414
Automatic gamma counters for in-vitro tests	Abbott	Auto-Logic
	Picker Corporation	Compac-120 #001115

CALIBRATION OF INSTRUMENTS

1. SCINTILLATION CAMERA

The scintillation camera will be checked each day before use with a flood source of cobalt-57 or technetium-99m. A weekly flood source test using a line bar or orthogonal hole phantom will be performed. The photopeak will be centered in the window and the uniformity and linearity of the detector will be checked with the scintigraph of the orthogonal hole phantom.

2. DOSE CALIBRATOR

The dose calibrator will be checked daily for instrument constancy with a source of Cs-137. The Cs-137 will be used to check the automatic windows for Tc-99m and I-131. Variations in output greater than 5%, when corrected for decay of the cesium, will be investigated immediately.

Prior to initial use, the dose calibrator will be checked for geometric variation. A 30 ml vial containing about 1 ml of Tc-99m (.75 mCi) will be assayed. Saline will be added to the vial to yield 2, 4, 8, 10, 20, and 25 ml total volume, and the vial will be assayed after each step. A conversion factor for each volume, referenced to 2.0 ml, will be calculated. If conversion factors result in a correction of more than 2% of the assayed activity, they shall be used for all routine assays of activity.

A correction factor for syringes shall also be calculated. About 5-10 mCi shall be drawn into the syringe from an assayed vial. The activity in the syringe shall be calculated by assaying the vial before and after loading of the syringe. The syringe shall be assayed and a conversion factor calculated.

Prior to initial use and quarterly thereafter, the instrument shall be checked for linearity. Checks for linearity shall be made by assaying a vial of Tc-99m of activity at the maximum activity normally used, then reassaying the same vial at 6, 24, 30, and 48 hours after the initial assay. Instances where the measured activity is more than 5% different from the calibrated activity shall be investigated.

Prior to initial use and annually thereafter, the instrument shall be checked for accuracy by Gamma Corporation. The calibration procedure used is on file under License No. 53-16847-01 (procedures attached). Gamma Corporation is among those private consultants approved by the NRC to provide radiation protection services to NRC licensees.

3. PORTABLE SURVEY INSTRUMENTS

The portable survey instruments shall be checked weekly for constancy with the built-in check source and calibrated annually by Gamma Corporation. If a variation of greater than ±20% is observed during the weekly constancy checks, the instrument shall be recalibrated. The calibration procedure used is on file under License No. 53-16847-01.

4. LABORATORY INSTRUMENTS

The laboratory instruments shall be checked daily or at the beginning of each sample measurement (whichever is less) against a reference check source. Instances where the measured count rate falls outside the 95% confidence interval determined for the check source shall be investigated. In addition, background checks shall be made before each run or daily, whichever is less. Instances where the measured background count rate is above the 95% confidence interval will be investigated.

Prior to use and monthly thereafter, the efficiency of the automatic gamma counter for I-125 shall be determined. The calibration source shall have calibration traceable to the National Bureau of Standards.

After instrument calibration is completed, a series of twenty counts of background and check source shall be performed and the 95% interval for daily checks calculated.

5. RECORD OF CALIBRATIONS

Log books will be maintained on instrument calibrations listed in 1, 2, and 4 above. Calibration forms supplied by Gamma Corporation will be kept on file for at least two years for calibrations listed in 3 above.

CALIBRATION PROCEDURE FOR DOSE CALIBRATORS

1. MAINTENANCE

1.1. Fill out the calibration sheet with the identifying information for the instrument being calibrated.

1.2. Open the instrument case and check for broken or loose parts, corrosion or othe damage. List any damage found. Damage must be corrected before calibration is performed.

2. CALIBRATION

NOTE: Personnel dosimetry shall be worn while performing calibration. Always handle calibration sources with remote handling devices. Keep sources in shielded containers when not being used.

2.1. Make sure instrument is on and has stabilized.

2.2. Set the isotope selector for Co-57. If the instrument has a manual setting position, use it and adjust it for Co-57.

2.3. Check that the instrument reads zero with no isotope in it. Adjust the zero adjust if necessary.

2.4. Insert the Co-57 calibration source. Allow the instrument to come to a final reading, then record the reading.

2.5. Perform a decay correction to the calibration source and record the actual activity. If the activity indicated by the dose calibrator is greater than 5% different from the actual activity, adjustment of the dose calibrator must be performed.

2.6. When the dose calibrator is accurately calibrated to Co-57 (within 5%), check the accuracy of calibration to Ba-133 and Cs-137 as outlined in steps 2.3 to 2.5 above.

2.7. After calibration has been checked for all three isotopes, adjust the calibration settings for any preset isotopes, as follows:

2.7.1. Dial the reading on the manual dial that corresponds to the preset isotope (e.g. Tc-99m).

2.7.2. Insert the calibration source with isotope energy closest to the preset isotope (e.g. insert Co-57 for checking Tc-99m).

2.7.3. Read the activity indicated on the manual setting. This activity does not have to be the actual activity of the isotope. Switch to the preset isotope position and adjust the calibration control for the preset isotope to obtain the same activity reading.

2.7.4. Repeat the procedure for each of the other preset isotope positions.

2.8. Enter the calibration frequency on the calibration sheet. The normal calibration frequency is one year. Fill out the calibration sticker and attach it to the instrument.

2.9. Sign the calibration sheet and date it. Leave one copy with the instrument owner. Also leave copies of the linearity check sheets and explain the procedure for performing a linearity check.

3. SOURCES

NUCLIDE	ACTIVITY	CALIBRATION ACCURACY
cobalt-57	1.08 mCi	±4.3%
barium-133	271 µCi	±3.7%
cesium-137	213 µCi	±4.3%

FACILITIES AND EQUIPMENT

Nuclear Medicine Department

1. The floor plans for the nuclear medicine facility are shown in Figure 1. The work bench surfaces of this laboratory will be of nonabsorbent material, such as stainless steel or plastic laminate. Floors are covered with vinyl tiles.

2. Isotopes will be stored in appropriately shielded and labeled storage areas. At least 1 mm of lead equivalent shielding shall be provided so that the dose rate outside the storage locations does not exceed 2 mR/hr.

3. Xenon-133 gas will be administered to patients through a Nuclear Associates Model 36-001 Lung Function Unit connected to a Model 36-023 "Nonex" xenon gas trap. All vials containing Xe-133 for dispensing will be contained in lead shielded glass syringes, and will be stored in the shielded storage area prior to use. Expired gases containing Xe-133 will be exhausted through the gas trap.

4. The trap for Xe-133 will be tested weekly by exhausting approximately 70 liters of air through the trap into a plastic bag and positioning the bag in front of the scintillation camera. The count rate obtained will be converted to microcuries and the airborne concentration in the room calculated. When the number of microcuries collected is equivalent to that which yields 0.01 MPC in the restricted area, the trap will be changed. Old traps will be sealed in a plastic bag and placed in the waste storage area.

should be after a patient study

5. It is estimated that as much as 10% of the administered xenon might leak during administration and storage of the charcoal trap. A workload of two patients per week is estimated, with an administration of 20 mCi per patient. The required ventilation flow rate to insure airborne activity concentrations are not exceeded is:

$$V = \frac{(40 \text{ mCi/wk})(.1)(1000 \text{ } \mu\text{Ci/mCi})}{(1 \times 10^{-3} \text{ } \mu\text{Ci/ml})(40 \text{ hr/wk})} \times \frac{\text{cfm}}{1.7 \times 10^{6} \text{ ml/hr}}$$

(low)

$$V = 6 \text{ cfm}$$

Even at f = .2 ⇒ V = 12 cfm. OK for restricted areas

6. The air from the imaging room is passed through an air conditioning cooler and distributed to another part of the hospital. The exhaust flow rate from the imaging room is 880 cfm.

7. Using the assumptions given above, the estimated concentration of the air at the distribution vent in the hospital is:

$$C = A/V$$

$$A = \frac{2 \text{ patients}}{\text{week}} \times \frac{20 \text{ mCi}}{\text{patient}} \times \frac{1000 \text{ } \mu\text{Ci}}{\text{mCi}} \times \frac{52 \text{ weeks}}{\text{year}} \times 0.1$$

$$A = 2 \times 10^{5} \text{ } \mu\text{Ci/year}$$

$$V = \frac{880 \text{ cu. ft.}}{\text{min.}} \times \frac{1.49 \times 10^{10} \text{ ml/year}}{\text{cu. ft./min.}}$$

$$V = 1.3 \times 10^{13} \text{ ml/year}$$

$$C = \frac{2 \times 10^{5} \text{ } \mu\text{Ci/year}}{1.3 \times 10^{13} \text{ ml/year}}$$

$$C = 1.5 \times 10^{-8} \text{ } \mu\text{Ci/ml}$$ at f=2 ⇒ 3×10^{-8} μCi/ml – Still o.K.

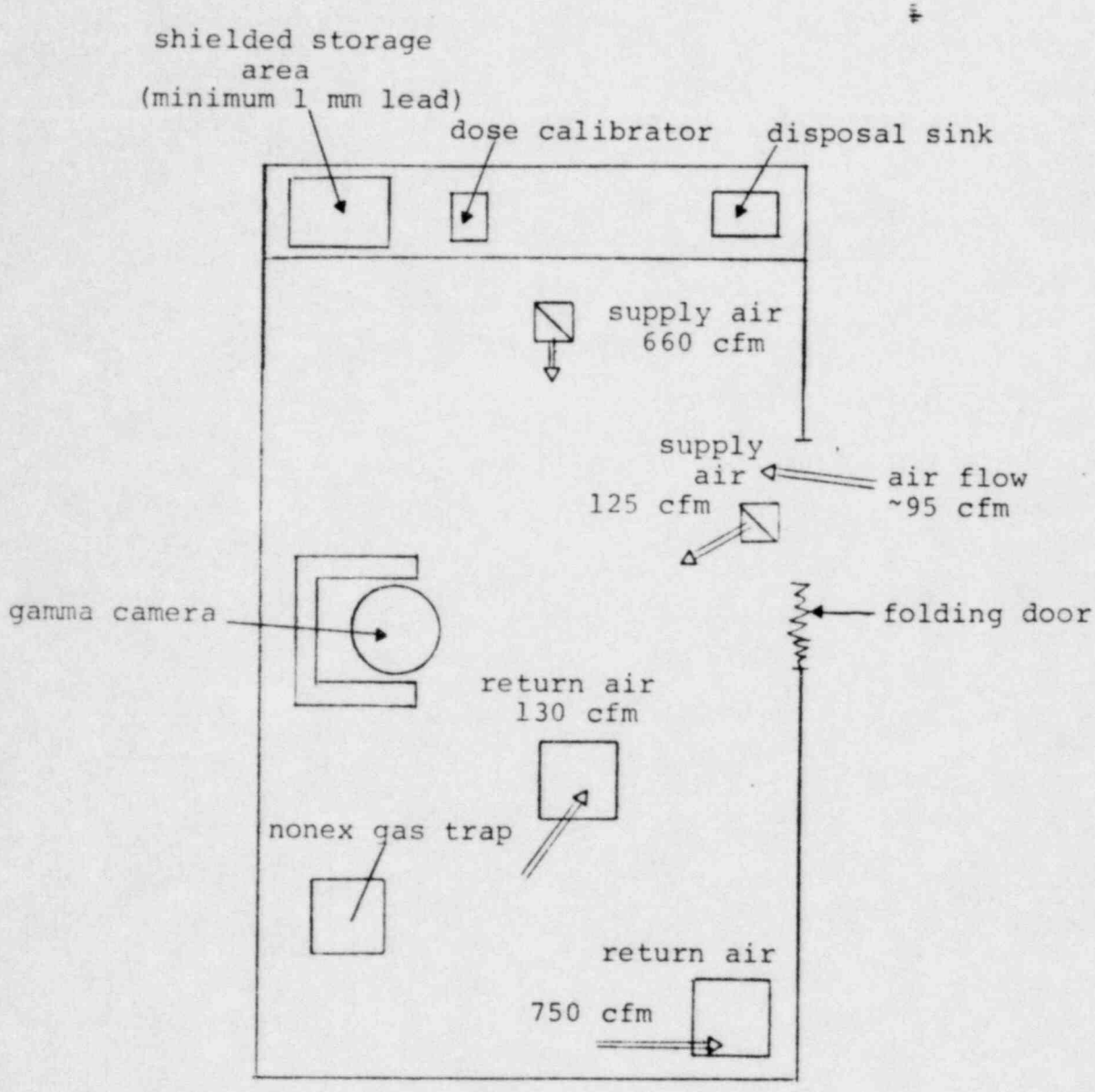
The estimated concentration of 1.5×10^{-8} μCi/ml supplied to unrestricted areas is below 10% of the allowable concentration of 3×10^{-7} μCi/ml.

8. Items contaminated with Xe-133, such as disposable mouthpieces and masks, will be double-bagged in plastic bags and held for decay in a shielded storage area in the nuclear medicine imaging room. At least 1 mm of lead shielding will be used to shield the items.

9. Air flow rates specified in the application were determined with an Alnor portable velometer. Air flow rates will be checked on a semi-annual basis to verify that airflow in the imaging room is adequate and that the room is under negative pressure with respect to the adjacent hallway.

Figure 1

KAISER FOUNDATION HOSPITAL
NUCLEAR MEDICINE LABORATORY



scale: 1/4" = 1'

FACILITIES AND EQUIPMENT

Hepatitis Radioimmunoassay Area

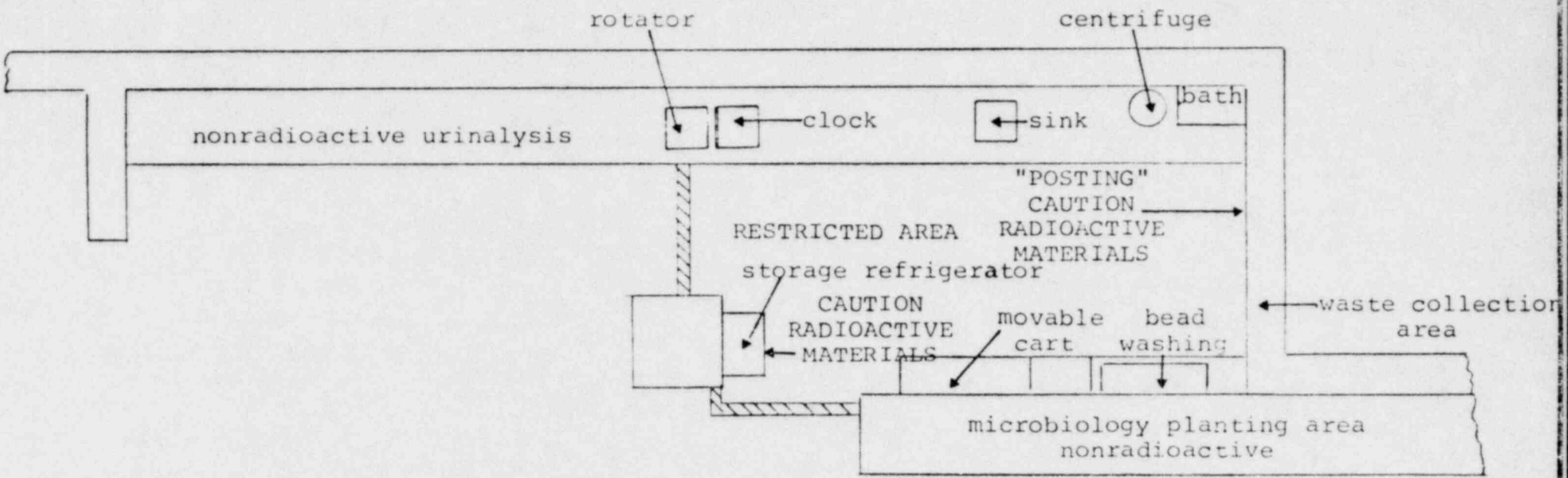
1. The floor plans for the hepatitis radioimmunoassay area is shown in Figure 2. All radiopharmaceuticals will be received as RIA kits in the laboratory, where they will be checked for leakage before being opened and stored.

2. The counter surfaces of this isotope laboratory area will be of nonabsorbent material, such as stainless steel or plastic laminate. The floor is covered with vinyl tiles.

3. Isotopes will be stored in appropriately labeled and locked storage areas. Figure 2 shows the location of the storage areas, along with details of the work area.

FIGURE 2

KAISER FOUNDATION HOSPITAL
MODULAR LABORATORY
RIA - SECTION FOR HEPATITIS TESTING



Scale: 1" = 3'

FACILITIES AND EQUIPMENT

RIA Laboratory

1. The floor plans for the RIA laboratory are shown on Figure 3. All radiopharmaceuticals will be received as RIA kits.

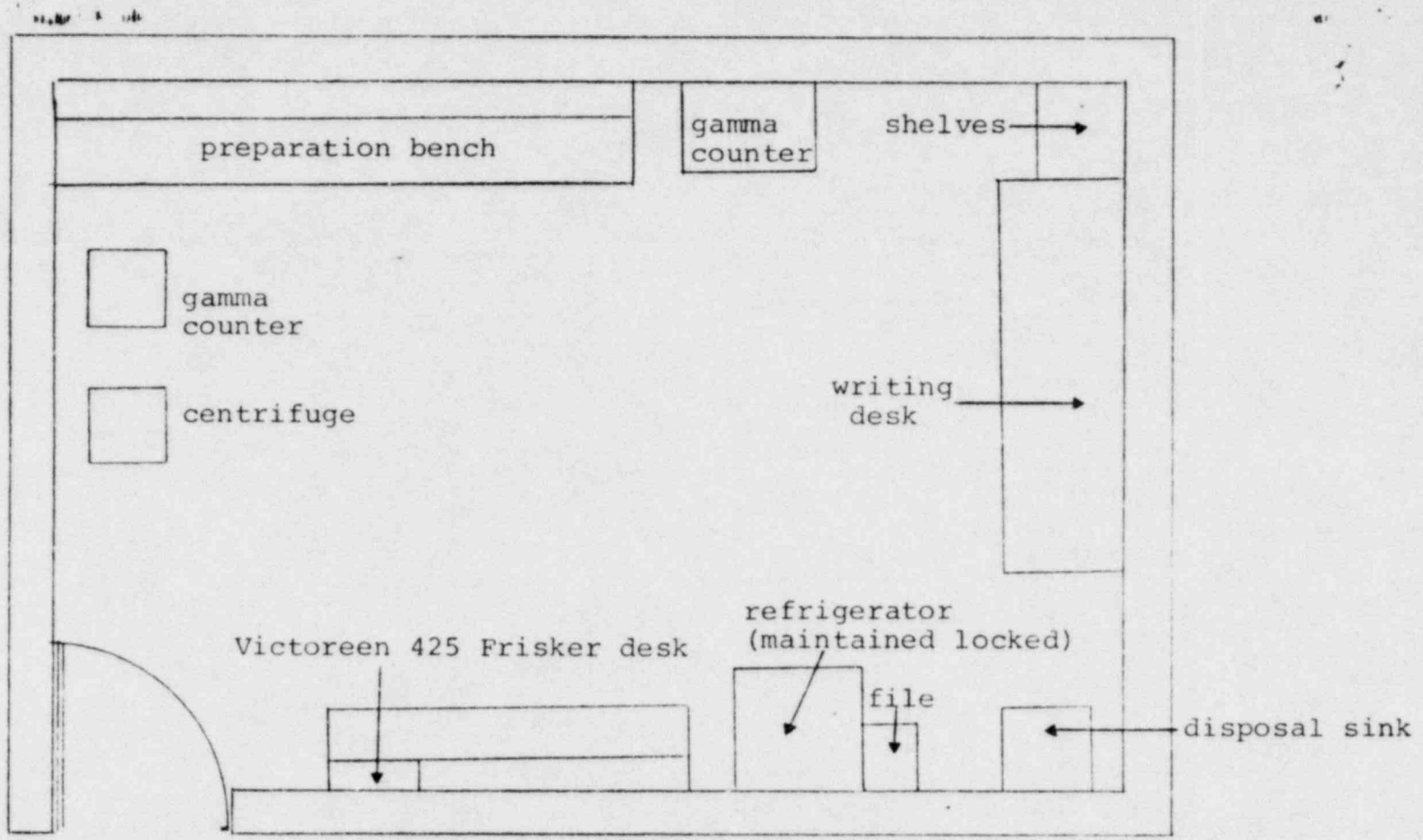
2. The counter surfaces of this laboratory will be of nonabsorbent material, such as stainless steel or plastic laminate. The floor will be covered with vinyl tiles.

3. RIA kits will be stored and locked in the storage refrigerator. Figure 3 shows the location of storage areas, along with the details of the work area.

4. A room in the Pacific Building Clinical Laboratory has been designated as the central waste storage area. Figure 4 is a sketch of this area.

Figure 3

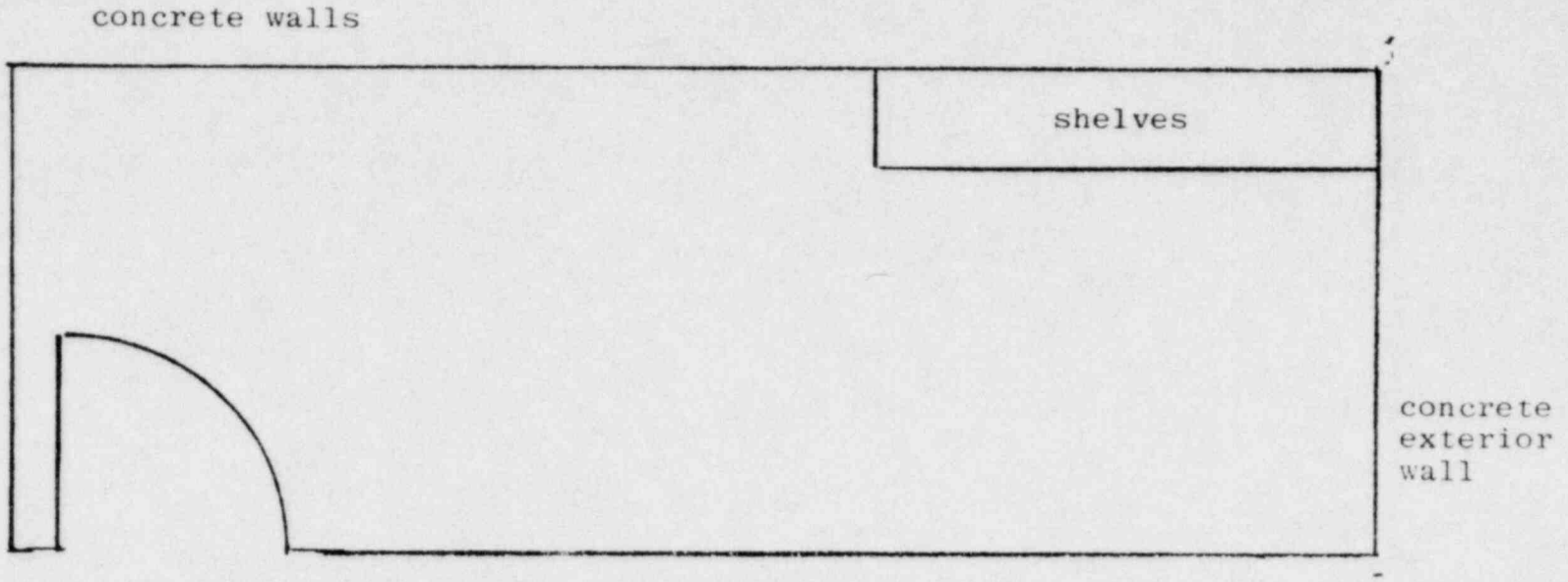
KAISER FOUNDATION HOSPITAL
RIA LABORATORY



scale = 1" = 3'

FIGURE 4

KAISER FOUNDATION HOSPITAL
RADIOACTIVE WASTE STORAGE AREA



Door locked at all times.

scale: 1" = 2'

PERSONNEL TRAINING PROGRAM AND FREQUENCY

1. All personnel (including nursing, maintenance and housekeeping personnel) who enter the controlled areas of the laboratories and nuclear medicine will have a copy of the Kaiser Foundation Hospital Radiation Safety Manual made available to them for their reading.

2. All personnel (including nursing, maintenance and housekeeping personnel) will be given a one hour lecture (or tape-slide show) before being allowed to enter a controlled area and annually thereafter. The topics to be included in the training will be:

   a. ALARA exposure philosophy
   b. The Hospital's procedures for handling radioactive sources
   c. The NRC license and license conditions
   d. The topics required by 10 CFR 19.12

3. In addition to the above training, nuclear medicine personnel and isotope laboratory personnel will be told the procedures to follow when handling radioactive materials in their own areas, the methods to minimize their own exposure in their specific work situations, the specific health problems associated with working with radioactive materials in their own area, and the steps to respond to an emergency in their own area. In addition, they will be informed of the reports they may request pursuant to 10 CFR 19.13. Additional instruction will be provided whenever there is a significant change in duties.

4. Hospital personnel providing care for patients who have received therapeutic doses of radioisotopes or implants will be briefed on the procedures for handling of such patients.

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

NUCLEAR MEDICINE DEPARTMENT

1. The Chief Nuclear Medicine Technologist will place all orders for radioactive material and will insure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

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

3. During off-duty hours, security personnel will accept delivery of radioactive packages in accordance with the procedures outlined in Mr. Mikolajczyk's memorandum (attached).

RIA LABORATORY

1. The Laboratory Supervisor will place all orders for radioactive material and will insure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

2. A system for ordering and receiving radioactive materials will be established and maintained. The system will include written requisition records that identify the isotope and RIA kit.

3. During normal working hours, carriers will be instructed to deliver radioactive packages directly to the laboratory. The written order record will be referenced when the materials are received.

4. During off-duty hours, laboratory personnel will accept delivery of radioactive packages in accordance with the procedures outlined in Mr. Mikolajczyk's memorandum (attached).

MEMORANDUM FOR: Evening and Night Laboratory Personnel

FROM: Ronald J. Mikolajczyk, Hospital Administrator

SUBJECT: RECEIPT OF PACKAGES CONTAINING RADIOACTIVE MATERIAL

Any packages containing radioactive material that arrive between 5:00 P.M. and 8:00 A.M. weekdays or after 12:00 noon on Saturday shall be signed for by the technologist on duty and taken immediately to the RIA storage refrigerator. Unlock the door, place the package inside and relock the door.

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

ON-SITE RADIATION SAFETY OFFICER:

NUCLEAR MEDICINE: Frances Watanabe
Chief Nuclear Medicine Technologist
OFFICE PHONE: 944-6319
HOME PHONE:

LABORATORY: Thelma Oshiro
Medical Technologist
OFFICE PHONE: 944-6308
HOME PHONE:

ALTERNATE: Philip Manly or Nicola Rinaldi
OFFICE PHONE: 621-8892
BEEPER: 533-3877 X5584 (Mr. Manly)
X6054 (Mr. Rinaldi)

PROCEDURES FOR SAFELY OPENING PACKAGES
CONTAINING RADIOACTIVE MATERIALS

1. All packages that are labelled with WHITE I or YELLOW II and YELLOW III transportation labels will be monitored for external radiation levels. A survey shall be made around each package (1) at the surface, and (2) at 3 feet from the package with a Geiger-Mueller detector.

2. If the survey reveals radiation levels greater than 10 mrem per hour at 3 feet or greater than 200 mrem per hour at the package surface, stop the procedure and notify the Radiation Safety Officer or alternates. The RSO or alternates will make and record a more careful measurement of the radiation levels. These results shall be provided to the carrier and the NRC Region V as soon as available.

3. All shipments of liquid radioactive materials greater than exempt quantities will be tested for leakage. Visually inspect the package for any sign of damage, i.e., wetness or crushed package. If damage is noted, stop immediately and notify Ms. Watanabe, Mr. Manly or Mr. Rinaldi.

4. Wipe the external surface of the package with a dry filter paper or section of a paper towel and count the wipe in a gamma counter or with a pancake detector and calibrated low level survey meter. If the removable contamination exceeds 0.01 $\mu Ci/100\ cm^2$ (greater than 200 counts per minute above background measured with a pancake detector), put on plastic gloves and seal the package in a plastic bag. Notify Ms. Watanable, Mr. Manly or Mr. Rinaldi immediately and do not proceed further.

5. If the package is not contaminated, open the outer package following manufacturer's directions, as supplied. Put on protective gloves and remove the packing slip. Open the inner package to verify the contents against the packing slip. Also inspect the final container to insure it is not broken or leaking, and that all seals are intact.

6. Wipe the external surface of the final container with a dry wipe held with forceps or a cotton swab on a stick. Count the wipe and record the results.

7. Monitor the packing material and the packages for contamination before discarding.

   a. If the package or packing material is contaminated, discard as radioactive waste.

   b. If the package and the packing material are not contaminated, obliterate all radiation labels and discard as clean waste.

11878

PROCEDURES FOR RECEIVING PACKAGES FROM
PACIFIC RADIOPHARMACY, LTD.

1. Pacific Radiopharmacy carriers will deliver radiopharmaceuticals (glass vials inside lead containers) directly to the Nuclear Medicine Department during normal working hours.

2. The Type A container used to carry radiopharmaceuticals will be opened by Pacific Radiopharmacy carriers and the lead containers transfered. Steps 3 through 7 below apply to the lead containers.

3. All shipments of liquid radioactive materials greater than exempt quantities will be tested for leakage. Visually inspect the package for any sign of damage, i.e., wetness or crushed package. If damage is noted, stop immediately and notify Ms. Watanabe, Mr. Manly or Mr. Rinaldi.

4. Wipe the external surface of the package with a dry filter paper or section of a paper towel and count the wipe in a gamma counter or with a pancake detector and calibrated low level survey meter. If the removable contamination exceeds 0.01 $\mu Ci/100\ cm^2$ (greater than 200 counts per minute above background measured with a pancake detector), put on plastic gloves and seal the package in a plastic bag. Notify Ms. Watanable, Mr. Manly or Mr. Rinaldi immediately and do not proceed further.

5. If the package is not contaminated, open the outer package following manufacturer's directions, as supplied. Put on protective gloves and remove the packing slip. Open the inner package to verify the contents against the packing slip. Also inspect the final container to insure it is not broken or leaking, and that all seals are intact.

6. Wipe the external surface of the final container with a dry wipe held with forceps or a cotton swab on a stick. Count the wipe and record the results.

7. Monitor the packing material and the packages for contamination before discarding.

   a. If the package or packing material is contaminated, discard as radioactive waste.

   b. If the package and the packing material are not contaminated, obliterate all radiation labels and discard as clean waste.

LABORATORY RULES FOR THE USE OF RADIOACTIVE MATERIAL IN NUCLEAR MEDICINE

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.

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

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

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

6. Assay each patient dose in the dose calibrator prior to administration. Do not use any doses that differ from the prescribed dose by more than 10%. For therapy doses, also check the patient's name, isotope, chemical form, and activity against the physician's order.

7. Wear personnel monitoring devices (film badges or TLD's) at all times while in areas where radioactive materials are used or stored. These should be worn at chest or waist level. When not used, store the devices 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 the specially designated and properly shielded waste containers.

10. Never pipette by mouth.

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

12. Always transport radioactive material in shielded containers.

GENERAL HANDLING PROCEDURES IN THE RADIOCHEMISTRY LABORATORY

1. No mouth pipetting, eating, smoking, or application of cosmetics.

2. Wear appropriate protective clothing (gloves, lab coat, shoes).

3. Avoid airborne releases - keep containers sealed when not in use and keep volatile materials in a fume hood.

4. Contain radioactive materials in a minimum work space. Prevent contamination of clean areas.

5. Label all radioactive material containers with a caution sticker and appropriate information. The additional information should include:

   isotope
   activity estimate
   date of labelling
   physical form
   chemical name

6. Ensure that contaminated waste is put in properly designated waste containers.

7. Volatile materials should be bagged and sealed before disposal.

8. Obliterate all radioactive material labels on empty shipping containers being thrown away, or on waste that is no longer controlled as radioactive.

9. Always monitor hands, clothing, and work areas upon completion of work. Be sure you are using the correct monitoring equipment for the radioactive materials being monitored.

10. If protective clothing is found to be contaminated, discard it as radioactive waste (for disposable items) or notify the Radiation Safety Officer for proper decontamination of the item.

11. Decontaminate work areas found to be contaminated, using detergent and small amounts of water. Treat the disposable cleanup supplies as radioactive waste.

EMERGENCY PROCEDURES

TO BE POSTED IN RESTRICTED AREAS

MINOR SPILLS:

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

2. PREVENT THE SPREAD by covering the spill with absorbent paper.

3. CLEAN UP the spill using disposable gloves and remote handling tongs. Carefully fold the absorbent paper and wipe from the outer edge to the center of the spill area. Dispose of the absorbent paper into a plastic bag along with the gloves and treat as radioactive waste.

4. SURVEY the area with a survey meter. Check the spill area, the area around the spill, and your hands and clothing.

MAJOR SPILLS:

1. CLEAR THE AREA and notify all persons not involved in the spill to vacate the room.

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

3. SHIELD THE SOURCE if there is a direct radiation source problem, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

4. CLOSE THE ROOM and lock the door behind you.

5. CALL FOR HELP by notifying the Radiation Safety Officer.

6. NOTIFY Hospital Administrator or designee in his absence immediately of spill.

7. STAND BY FOR MONITORING and decontamination if necessary. Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer or his alternate. If the spill is on the skin, flush thoroughly then wash with mild soap and lukewarm water.

RADIATION SAFETY OFFICERS:

NUCLEAR MEDICINE: Frances Watanabe
OFFICE TELEPHONE: 944-6319
HOME TELEPHONE:

LABORATORY: Thelma Oshiro
OFFICE TELEPHONE: 944-6308
HOME TELEPHONE:

ALTERNATES: Philip Manly or Nicola Rinaldi
OFFICE TELEPHONE: 621-8892
BEEPER: 533-3877 x5584 (Mr. Manly) x6054 (Mr. Rinaldi)

SURVEY PROCEDURES

1. All elution, preparation and injection areas will be surveyed daily with a GM survey meter and decontaminated if necessary.

2. Laboratory areas where only small quantities of radioactive material are used (less than 200 μCi) will be surveyed monthly.

3. Waste storage areas and all other laboratory areas will be surveyed weekly.

4. The weekly and monthly survey will consist of:

   a. A measurement of radiation levels with a 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/100 sq. cm.

5. Periodic surveys of unrestricted areas shall be made at least semi-annually with a low level survey meter.

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

   a. A drawing of the area surveyed, identifying relevant features such as active storage areas, active waste areas, etc.

   b. The name of the person conducting the survey and the date of the survey.

   c. The equipment used for the survey, including serial numbers and detection efficiencies for contamination.

   d. Measured exposure rates, keyed to locations on the drawing (including identification of dose rates requiring reduction).

   e. Detected contamination levels, keyed to locations on the drawing (including identification of contamination levels requiring reduction).

   f. Corrective action taken to reduce radiation or contamination levels requiring reduction, and the radfation or contamination levels after the action was taken.

7. Areas will be cleaned if the contamination levels exceed 200 dpm/100 square centimeters.

NOTE: For daily surveys where no abnormal exposures are found, only the date, identification of person performing the survey, and the survey results need be recorded.

WASTE DISPOSAL PROCEDURES

1. Solid radioactive waste generated in any laboratory will be segregated according to half-life and collected in specially designated waste containers lined with plastic bags. Radionuclides of less than 8 day half-life shall be collected and stored in a central waste storage area, and radionuclides of greater than 8 day half-life shall be stored in separate containers in the storage area. Each container of short-lived radionuclides (less than 8 day half-life) will be monitored in a low background area with a low level survey meter and a detector having a 1.4 mg/cm^2 thin end window to determine if the radiation levels are different from background. If no radiation above background is measured, the container may be released to ordinary trash for disposal. All radiation warning signs and labels will be removed or obliterated.

2. Radioactive waste containing isotopes with a half-life greater than 8 days will either be stored for decay and eventually released as above or will be packaged in accordance with D.O.T. requirements and shipped to U.S. Ecology Company (Washington State License No. WN-I019-2).

3. A record of the monitoring and results of each container that is released will be maintained in the laboratory.

4. Liquid waste will be disposed of through the sink in the laboratory to the sanitary sewer system. The limits for maximum permissible concentration and quantities in water specified in 10 CFR 20.303 shall be adhered to. A log of all waste disposed of to the sewer will be maintained at the designated disposal sink.

THERAPEUTIC USE OF RADIOPHARMACEUTICALS

1. All patients treated with I-131 will be placed in a private room that has a toilet. 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. Small items, such as telephones, doorknobs, or other items touched by the patients will be covered with plastic bags or wrappings.

2. The patients room will be properly posted with a RADIOACTIVE MATERIALS sign.

3. The patient's room and surrounding areas are surveyed as soon as practical after administration of therapeutic doses (bedside, 3 feet from patient and at doorway). The Radiation Safety Officer or his designee will determine stay times based on these radiation surveys, and the stay times shall be posted on the patient's chart and on the door. These surveys will be taken daily and stay times will be recalculated and reposted.

4. The form, Doctor's Orders for Patients Who Have Received Phosphorus-32 or Iodine-131 Radionuclide Therapy, and Nursing Instructions, will be completed immediately after administration of the treatment dose and posted on the patient's chart. Nurses who attend the patient will be advised of the requirements for wearing personnel monitoring by the Radiation Safety Officer.

5. Radiation levels in unrestricted areas will be maintained less than 2 mR/hr or less than 100 mR/seven days.

6. All linens will be surveyed for contamination before being removed from the patient's room and, if necessary, held for decay.

7. Disposable plates, cups, eating utensils, tissue, surgical dressings, and other similar waste, will be placed in a specially designated container. The material will be held until surveyed and released by the Radiation Safety Officer.

8. Nondisposable items used for patients will be held in designated containers and checked for contamination by the Radiation Safety Officer or his designee. Items may be returned for normal use after verified free of contamination.

9. If urine and vomitus from I-131 patients is collected, it will be stored for decay in the radioactive waste storage area. Such stored wastes will be retained until they have reached background levels, as measured with a low level survey meter and released to the sanitary sewer system.

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

11. Hospital staff personnel who routinely render medical or nursing care to the therapy patient will be provided with and required to read the special instructions on the patient's chart for handling patients with therapeutic doses of radionuclides.

12. Nurses will change surgical dressings only by direction of a physician.

13. Patients may be released from the hospital with greater than 8 mCi but less than 30 mCi of activity, if instructions as enclosed are given to the patient. These instructions shall be given by the patient's physician or the Radiation Safety Officer, and a written copy shall be provided for the patient. A copy of these instructions shall be maintained in the patient's file.

14. The Radiation Safety Officer or his designee shall be consulted before surgery is performed on a patient with therapeutic amounts of radionuclides; he shall also be consulted before autopsy is performed on a deceased patient with therapeutic amounts of radionuclides.

RADIATION SAFETY PROCEDURES FOR HANDLING PATIENTS
WITH THERAPEUTIC DOSES OF RADIONUCLIDES

1. PURPOSE

a. The purpose of these procedures is to familiarize nursing personnel with the procedures to be followed to minimize their exposure and minimize the chance of spreading contamination when caring for patients who have received therapeutic doses of radionuclides.

2. GENERAL

a. Non-sealed radioactive sources are usually administered in liquid form, either by injection or orally. The radioactive material will remain in the patient until it decays by radioactive decay or is excreted.

b. These procedures apply to patients who have received non-sealed radioactive sources for therapeutic purposes. They do not apply to patients who have received small amounts of radioactive material in connection with diagnostic tests such as scans.

3. SPECIFIC PROCEDURES

a. Place the patient in a room with the bed near the outside wall of the room. A corner room is ideal. Place no other patients in the room.

b. Consistent with good care for the patient, carry out only minimal nursing procedures close to the patient. If the patient's clinical condition requires constant observation, rotate personnel required to perform adequate nursing care in order to minimize personnel exposure. The patient's bed should be approached only when required by nursing duties.

c. Nursing personnel should observe their stay time restrictions. Custodial, utility, maintenance, and food service personnel should not enter the room until they have first checked at the nursing station.

d. Unless contraindicated for other reasons, the patient may have visitors. Visitors should be instructed to stay at least six feet from the patient, except for short periods to deliver mail or shake hands, etc. The visitors should limit their visits to not more than 30 minutes per day, and the patient must remain in bed while visitors are in the room.

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e. A television set, telephone, books, etc., may be provided to the patient. These items should not be returned to unrestricted use until they have been monitored and found to be free from radioactive contamination.

f. The food tray will be prepared entirely with disposable components. These will be disposed of as waste within the patient's room. Uneaten food will not be given to other patients or staff members.

g. Necessary contamination control measures are very similar to isolation techniques:

1) Cover the mattress and pillow on the bed with plastic or rubber material.

2) Wear gloves when changing bed linen, dressings, or other items that have been in contact with the patient. When done, remove gloves inside out and dispose of in radioactive waste container and wash hands.

3) The patient must wear hospital pajamas.

4) Place a plastic-lined waste basket and linen hamper in the patient's room.

5) Place waste, soiled linen, etc., in designated containers for monitoring before release or disposal.

6) Personnel items for patient care (thermometer, bedpan, etc.) will be kept in the patient's room.

7) Ambulatory patients will use toilet in their room.

8) Diagnostic samples of blood, urine, and feces should be obtained only when authorized by the Nuclear Medicine Department physician.

9) Urine and vomitus can be radioactive. In case of any accident involving a spillage of urine or a patient who vomits, notify the Radiation Safety Officer or the Chief Nuclear Medicine Technologist. Wear gloves to clean up the spill, and place the clean-up rags in the designated container.

h. No nurse, visitor, or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic dose of radioactivity until

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the patient no longer presents a radiation hazard. Female visitors should be asked whether they are pregnant.

i. If a nurse, attendant, or anyone else suspects that his skin or clothing is contaminated, he should notify the Nuclear Medicine Department immediately. He should remain in the patient's room until checked by someone from the Nuclear Medicine Department.

j. If the patient dies, notify the physician who administered the radionuclide. The body will not be removed from the room until the physician advises on appropriate measures to be taken.

k. The room will not be returned to general use until cleared by the Radiation Safety Officer or his designee.

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INSTRUCTIONS FOR FAMILY OF RELEASED PATIENT

Name of Patient _____

Name of Hospital: _____

For further information contact _____ Tel. _____

Please show this form to every physician consulted concerning the patient until _____.

_____ was treated on _____, 19___, with _____ millicuries of _____ in the form of _____.

NO SPECIAL RADIATION SAFETY PRECAUTIONS ARE NECESSARY AFTER _____.

UNTIL THAT DATE:

Persons under 45 years of age should not remain closer than 3 feet for more than 1/2 hour per day, and not remain closer than 6 feet for more than 2 hours per day for a period of three weeks. At other times, remain at least 6 feet from the patient.

Persons under 45 years of age should not remain closer than 3 feet for more than 4 hours per day for the next three weeks. At other times, remain at least 6 feet from the patient.

NOTE: During the above times brief periods of closer contact (for example while shaking hands, etc.) are permissible.

SPECIAL PRECAUTIONS:

a. Spouse or other person caring for patient: _____

_____

b. Children or pregnant women: _____

_____

c. Sleeping arrangements: _____

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

_____ _____

DOCTOR'S ORDERS FOR PATIENTS WHO HAVE RECEIVED THERAPY
DOSES OF IODINE-131 OR PHOSPHORUS-32

Patient, _____ (name), received _____ mCi of _____ (isotope)
by _____ (route) at _____ (time) am/pm on _____ (date), 19_____.

Exposure Rates in mR/hr

Date	Bedside	3 feet from bed	Room entrance

COMPLY WITH ALL CHECKED ITEMS

___ 1. No visitors.
___ 2. Assign to room with bed near outside wall.
___ 3. Patient may not leave room.
___ 4. Pregnant visitors are not permitted.
___ 5. Visitors under 18 are not permitted.
___ 6. Attendants wear personnel dosimeters.
___ 7. Visitors should stay 6 ft. from patient.
___ 8. Visitors should limit visiting time to 30 minutes.
___ 9. Patient to use disposable utensils and dishes.
___ 10. Cover mattress and pillow with plastic.
___ 11. Wear gloves when changing bed linen, dressings, etc.
___ 12. Patient to wear hospital pajamas.
___ 13. Place plastic-lined waste basket and linen hamper in patient's room. Place waste, soiled linen in these containers.
___ 14. Personal items for patient to be kept in patient's room.
___ 15. Diagnostic samples of blood, urine, and feces obtained only when authorized by Nuclear Medicine Department physician.
___ 16. Ambulatory patients to use commode in their room.
___ 17. Notify Nuclear Medicine or Radiaton Safety Officer in case of spillage of urine or patient who vomits.
___ 18. Hold all linens and disposable wastes in room until cleared by Nuclear Medicine or Radiation Safety Officer.
___ 19. At patient's discharge, call Nuclear Medicine to clear the room prior to admitting housekeeping personnel to room.

Special orders: _____

_____

In case of any difficulty, call the RSO or alternates:

	days	nights
_____	_____	_____
_____	_____	_____

If patient dies before _____, notify Nuclear Medicine or Radiation Safety Officer.

_____, M.D.
Attending Physician

_____
Date

PROCEDURES FOR ADMINISTERING I-131 DOSES

1. Personnel administering therapeutic doses of I-131 should wear their personnel dosimeters, including ring dosimeters.

2. Never handle a therapeutic dose of I-131 directly with the hands. Use forceps or other remote handling devices. Whenever possible, keep the dose in a shielded container.

3. Always wear disposable gloves and a lab coat or other protective clothing when administering a therapeutic dose. After the administration is complete, dispose of the gloves as waste and monitor hands and clothing for contamination.

4. Liquid doses of I-131 will release vapors to the atmosphere when they are opened. Whenever opening a liquid dose, do so in a fume hood or near an exhaust ventilation duct in such a way that vapors will be drawn away from you into the duct. Capsules do not release vapors and do not need to be handled in this manner unless they are crushed.

5. The number of personnel present in an area where administration of a therapeutic dose of I-131 is performed should be minimized. All personnel present where administration of a greater than 1.0 mCi of liquid I-131 must have bioassays performed of their thyroid burden before and after the administration.

BIOASSAY FOR I-131

1. Bioassay for I-131 will be required for all personnel who handle unsealed sources of more than 10 mCi of I-131 in a fume hood, or more than 1 mCi of I131 on an open bench. In addition, all personnel who are within 6 feet of operations involving more than the above mentioned quantities shall also participate in bioassays.

2. Bioassays shall be performed at the following frequencies:

a. Within two weeks prior to handling I-131 in the quantities mentioned above.

b. Between 24 and 72 hours after exposure to I-131 in the quantities mentioned above.

c. Within two weeks after the last possible exposure to I-131 when the employee is terminating activities involving I-131.

d. As soon as possible after any accident, especially if skin contamination occurs.

3. Bioassays shall consist of a determination of the individual's thyroid burden. The equipment used for this determination shall have a minimum detectable activity of 0.01 µCi I-131, as determined with a standard thyroid phantom.

4. If the measured thyroid burden exceeds 0.04 µCi I-131, the following action shall be taken:

a. An investigation of the operations involved, including air and other in-plant surveys, shall be carried out to determine the causes of exposure and evaluate the potential for further exposures.

b. The bioassay must be repeated within two weeks.

c. If continued work in the area might cause the limits for air concentration in 10 CFR 20 to be exceeded, the worker will be restricted from such work.

d. Actions shall be taken to reduce the potential for further exposures.

e. Any reports of exposure required by 10 CFR 20 will be furnished to the employee.

5. If the measured thyroid burden exceeds 0.14 µCi I-131, the following actions shall be taken in addition to the steps outlined in 4 above:

a. Refer the employee to appropriate medical/health physics consultation for administration of agents to accelerate removal of I-131.

b. Determine thyroid burden at one week intervals until the thyroid burden is less than 0.04 µCi I-131. If there is a possibility of other organs of the body containing I-131 that require evaluation, make measurements to determine the level of exposure to the other organs.

Note: Exposure to I-125 in volatile form in quantities greater than the levels given for I-131 would also require bioassay for I-125. However, the quantities of I-125 normally handled in a laboratory working with commercially supplied RIA kits is less than 100 µCi. In addition, the I-125 in these kits is normally bound to a non-volatile agent and does not disperse as readily.

Iodine-131 in capsules are considered sealed sources unless the capsules are crushed or broken; consequently, no bioassays are required for personnel administering less than 100 mCi in a capsule.

PROCEDURES FOR USING XENON-133

1. Each patient to use the Xe-133 system will first be evaluated by the physician to determine if the patient can complete the study and give quantative results. The patient will then be instructed on the purpose of the test and the hazards involved, as well as what the patient is expected to do to minimize leakage of xenon.

2. The patient will wear nose clamps and will be tested on the apparatus prior to injection of Xe-133.

3. If the patient accidently comes off the apparatus prior to washout, the physician or technologist will immediately close the valve to the gas delivery system and assist the patient out of the room.

4. All other personnel will be instructed to vacate the room. The Radiation Safety Officer will be notified and personnel will not be allowed to re-enter the room for at least 15 minutes.

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RADIATION SAFETY PROCEDURES FOR USE OF SEALED SOURCES

PROCEDURES FOR USE OF STRONTIUM-90 EYE APPLICATOR

1. The Sr-90 source will be kept in a locked storage container when it is not being used. Sufficient shielding shall be provided in the container to reduce the dose rate at 12" from the container to less than 5 mR/hr.

2. The storage container will be stored in a locked storage room. Only authorized personnel will have access to the storage room.

3. No service or repair of the source will be attempted by the licensee. The source will be returned to the manufacturer for any necessary repairs. Should repair of the source not be feasible, the source will be disposed of by transfer to an authorized waste disposal contractor.

4. Disposal of the source will be accomplished by transfer to an authorized waste disposal contractor. At present, U.S. Ecology is used, but other licensed waste disposal firms may also be used.

5. Before the source is disposed of, a check will be made to insure the disposal firm is licensed to receive the radioactive material being disposed of.

PROCEDURES FOR USING ANATOMICAL MARKER, AMERICIUM-241 SOURCE

1. The instructions for use of the anatomical marker supplied by the manufacturer shall be followed.

2. Store the marker in the shielded storage area (Item 11 - Page 3) when it is not being used.

3. Should the marker become disconnected from the cable holding it to the camera, notify the Radiation Safety Officer and the service engineer for the camera immediately. Store it in the holder in the camera head, taped in place, until the cable is repaired.

4. Leak testing of the source shall be performed every six months. If the results of the leak test show activity greater than 0.005 μCi, notify the NRC immediately and remove the source from use.

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5. The sealed source shall be disposed of only by transfer to another licensed user or by disposal to a licensed waste disposal firm. The source shall be packaged in accordance with D.O.T regulations when shipped.

LEAK TEST PROCEDURES

Leak tests will be performed by Gamma Corporation. The leak test procedures are on file under license No. 53-16847-01.

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PROCEDURES FOR MAINTAINING OCCUPATIONAL RADIATION EXPOSURES AS LOW AS REASONABLY ACHIEVABLE

1. Management Philosophy and Responsibilities

a. The management of Kaiser Medical Center is committed to the philosophy of maintaining occupational radiation exposures as low as reasonably achievable (ALARA). The procedures described below outline the methods by which the management philosophy will be implemented.

b. The management will perform an annual audit of the ALARA program of the hospital. This review will include review of personnel exposure records and inspections, and consultation with the Radiation Safety Officer. The results of the audit will be documented.

c. The management encourages changes to facilities or operating procedures where such changes will reduce occupational radiation exposure at reasonable costs.

d. The management will review suggestions by employees of ways to reduce occupational radiation exposure. Where suggestions are not implemented, the reasons for not implementing them will be documented.

2. Responsibilites of Radiation Safety Committee

a. The Radiation Safety Committee will review the qualifications of each potential authorized user with respect to the types and quantities of materials and uses for which he has applied to assure that appropriate measures will be taken to maintain exposures ALARA.

b. When considering a new use of byproduct material, the Radiation Safety Committee will review the measures taken to maintain exposures ALARA. The measures to be taken to maintain exposures ALARA, such as procedures or special equipment, should be outlined in the proposal.

c. The Radiation Safety Committee delegates to the Radiation Safety Officer the authority to enforce the ALARA concept. If the Radiation Safety Committee overrules the decision of the Radiation Safety Officer in a matter regarding the application of ALARA, the Radiation Safety

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Committee will record the reason for the action.

d. The Radiation Safety Committee will review the radiation safety program on an annual basis. This review will be performed independently of the audit performed by management.

e. The Radiation Safety Committee will review the Radiation Safety Officer's report of all instances where personnel occupational exposures exceed the hospital's control levels.

3. Radiation Safety Officer Responsibilities

a. The Radiation Safety Officer will audit the effectiveness of the radiation protection program on a semi-annual basis. Included in this audit will be a review of the effectiveness of the ALARA program.

b. The Radiation Safety Officer will review personnel occupational radiation exposures to determine that they are ALARA. He will perform an investigation of all exposures exceeding the hospital's control levels and submit a report to the Radiation Safety Committee outlining the cause of the high exposure and the steps taken to reduce exposures.

c. The Radiation Safety Officer will determine radiation levels in unrestricted areas and will review records of releases to unrestricted areas to determine that they are ALARA.

d. The Radiation Safety Officer will instruct all occupational workers in the philosophy of ALARA, the management's commitment to ALARA, the control levels established by the hospital management, and the procedures to be taken when occupational exposure exceeds the control level.

e. The Radiation Safety Officer will establish a means for soliciting and evaluating employee suggestions for reducing occupational radiation exposure.

4. Authorized User Responsibilities

a. Authorized users will consult with the Radiation Safety Officer for proper procedures to maintain exposures ALARA for all new radioisotope procedures.

b. Authorized users will inform all people they supervise of the ALARA concept and their support of it.

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5. Occupational Worker Responsibilities

a. Occupational workers will follow radiation safety procedures and use any special equipment designated to keep his exposures ALARA.

b. Occupational workers will report instances to the Radiation Safety Officer where they think their exposure may have exceeded the control levels, or where they think their personnel monitoring device may have been inadvertently exposed.

c. Occupational workers are encouraged to suggest any changes to operating procedures or special equipment that they think may reduce occupation radiation exposures. Such suggestions will be evaluated by the Radiation Safety Officer.

6. Establishment of Control Levels for Maintaining Occupational Radiation Exposures ALARA

a. In order to maintain exposures ALARA, the hospital management has established control levels for occupational radiation exposure. The control levels are as follows:

Organ	Control Level
Whole body, head and trunk; active blood-forming organs; lens of eyes; or gonads. . .	0.125 rems/qtr.
Hands and forearms; feet and ankles	1.875 rems/qtr.
Skin of the whole body . . .	0.750 rems/qtr.

no level II

b. Instances where personnel exposure exceeds the control levels will be investigated by the Radiation Safety Officer, who will prepare a report of his investigation and steps taken to reduce exposures. These reports shall be kept on file for review by the Radiation Safety Committee and the Nuclear Regulatory Commission.

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