EXHIBIT A

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

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

1.a. NAME AND MAILING ADDRESS OF APPLICANT *(institution, firm, clinic, physician, etc.)* INCLUDE ZIP CODE	1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED *(If different from 1.a.)* INCLUDE ZIP CODE
Veterans Administration Medical Center Roseburg, Oregon 97470 TELEPHONE NO.: AREA CODE (503) 672 4411 X280	same
2. PERSON TO CONTACT REGARDING THIS APPLICATION Wallace Holter, M.D. TELEPHONE NO.: AREA CODE (503) 672 4411 X280	3. THIS IS AN APPLICATION FOR: *(Check appropriate item)* a. [X] NEW LICENSE b. [ ] AMENDMENT TO LICENSE NO. _____ c. [ ] RENEWAL OF LICENSE NO. _____
4. INDIVIDUAL USERS *(Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)* Wallace Holter, M.D.	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.)* Wallace Holter, M.D.

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
10 CFR 31.11 FOR IN VITRO STUDIES		
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	mCi
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	X	50 mCi
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES	X	20 mCi
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	X	200 mCi
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.	X	200 mCi

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

FORM NRC-313M
(8-78)

12117

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

For Items 7 through 23, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the medical licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10.8 , Rev. 1 Date: October 1980

7. MEDICAL ISOTOPES COMMITTEE	
	Names and Specialties Attached; and
X	Duties as in Appendix B; or *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
X	Supplements A & B Attached for Each Individual User; and
	Supplement A Attached for RSO.
9. INSTRUMENTATION *(Check One)*	
X	Appendix C Form Attached; or
	List by Name and Model Number
10. CALIBRATION OF INSTRUMENTS	
X	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*
	Equivalent Procedures Attached; and
X	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*
	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	
X	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
X	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
X	Appendix F Procedures Followed; or
	Equivalent Procedures Attached

15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL *(Check One)*	
X	Appendix G Rules Followed; or
	Equivalent Rules Attached
16. EMERGENCY PROCEDURES *(Check One)*	
X	Appendix H Procedures Followed; or
	Equivalent Procedures Attached
17. AREA SURVEY PROCEDURES *(Check One)*	
X	Appendix I Procedures Followed; or
	Equivalent Procedures Attached
18. WASTE DISPOSAL *(Check One)*	
X	Appendix J Form Attached; or
	Equivalent Information Attached
19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
X	Appendix K Procedures Followed; or
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
	Detailed Information Attached; and
	Appendix L Procedures Followed; or *(Check One)*
	Equivalent Procedures Attached
21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
X	Detailed Information Attached
22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
N/A	Detailed Information Attached
23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
N/A	Detailed Information Attached

MEDICAL ISOTOPES COMMITTEE

Responsibilities and Duties of the Committee shall be as in Appendix B.

Members of the Isotope Committee & Specialties:

Wallace Holter, M.D.	- Radiology & Nuclear Medicine
Thomas A. Lynch, M.D.	- Radiology
Phillip Wagner, M.D.	- Int. Med. Cardiology
A. Gerson Hollander, M.D.	- Int. Med. COS, Management Rep.

The committee shall meet as often as necessary, but not less than once in each calendar quarter.

Duties of committee as in Appendix B.

ITEM #7
DATE:

FORM NRC-313M-SUPPLEMENT A (8-78) U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
WALLACE R. HOLTER	Washington, California, Minnesota

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
American Board of Radiology	Radiology	December 1959
American Board of Radiology	Diagnostic Radiology with special competence in Nuclear Radiology	June 1974

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	V.A. Medical Center Martinez, California 1979-1980-1981	30	
b. RADIATION PROTECTION	"	8	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	"	4	
d. RADIATION BIOLOGY	"	12	
e. RADIOPHARMACEUTICAL CHEMISTRY	"	6	

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	25mCi	VA Medical Center	1 year, 1981-82	Diagnosis
Ga 67	8mCi	"	"	"
Co 57	18uCi	"	"	"
I-123	300uCi	"	"	"
I-131	100mCi	"	"	Therapy

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

WALLACE R. HOLTER

STREET ADDRESS

3341 Edgar Lane

CITY | STATE | ZIP CODE

Carmichael | CA | 95608

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	188	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	15	
	LIVER FUNCTION STUDIES	0	
	FAT ABSORPTION STUDIES	0	
	KIDNEY FUNCTION STUDIES	135	
	IN VITRO STUDIES Plasma Volume	13	
OTHER	Tl-201	220	
I-125	DETECTION OF THROMBOSIS	0	
I-123 XXXX	THYROID IMAGING	188	
P-32	EYE TUMOR LOCALIZATION	0	
Se-75	PANCREAS IMAGING	0	
Yb-169	CISTERNOGRAPHY	13	
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	163	
OTHER	Co 57 Schilling	59	
Tc-99m	BRAIN IMAGING	647	
	CARDIAC IMAGING	773	
	THYROID IMAGING	144	
	SALIVARY GLAND IMAGING	0	
	BLOOD POOL IMAGING	56	
	PLACENTA LOCALIZATION	0	
	LIVER AND SPLEEN IMAGING	1155	
	LUNG IMAGING	488	
	BONE IMAGING	898	
OTHER	Ga 67	88	

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	
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	0	
I-131	TREATMENT OF THYROID CARCINOMA	6	
	TREATMENT OF HYPERTHYROIDISM	11	
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		
Mo-99/ Tc-99m	GENERATOR	0	
Sn-113/ In-113m	GENERATOR	0	
Tc-99m	REAGENT KITS	50	
Other			

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

2400 hours

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

a. NAME OF SUPERVISOR
Paul A. Farrer, M.D.

b. NAME OF INSTITUTION
V.A. Medical Center

c. MAILING ADDRESS
150 Muir Road

d. CITY
Martinez, CA 94553

5. MATERIALS LICENSE NUMBER(S)
4-2956-2

6. PRECEPTOR'S SIGNATURE

Paul A. Farrer

7. PRECEPTOR'S NAME *(Please type or print)*

Paul A. Farrer, M.D.

8. DATE

May 5, 1982

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

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

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING	
		LECTURE/ LABORATORY COURSES (Hours) C	SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	Radiology 400-A Science Course Orientation Discussion Groups	25 2 100	50
b. RADIATION PROTECTION	Radiology 400-A Science Course Orientation Discussion Groups	5 2 50	50
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	Radiology 400-A Science Course Orientation Discussion Groups	10 2 30	25 2.5 hrs/wk 400-A homework
d. RADIATION BIOLOGY	Radiology 400-A Science Course Discussion Groups	9 15	
e. RADIOPHARMACEUTICAL CHEMISTRY	Radiology 400-A Science Course Introduction Orientation Discussion Groups	6 4 30	100

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 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

Wallace R. Holter, M.D.

STREET ADDRESS

3341 Edgar Lane

CITY | STATE | ZIP CODE

Carmichael, CA 95608

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 UCDMC 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	3		
	LIVER FUNCTION STUDIES	--		
	FAT ABSORPTION STUDIES	--		
	KIDNEY FUNCTION STUDIES	34		
	IN VITRO STUDIES			
OTHER				
I-125	DETECTION OF THROMBOSIS	5		
I-131	THYROID IMAGING	27		
P-32	EYE TUMOR LOCALIZATION	2		
Se-75	PANCREAS IMAGING	--		
Yb-169	CISTERNOGRAPHY	6		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	125		
OTHER				
Tc-99m	BRAIN IMAGING	30		
	CARDIAC IMAGING	73		
	THYROID IMAGING	--		
	SALIVARY GLAND IMAGING	3		
	BLOOD POOL IMAGING	4		
	PLACENTA LOCALIZATION	--		
	LIVER AND SPLEEN IMAGING	95		
	LUNG IMAGING	83		
	BONE IMAGING	101		
OTHER				

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	2	
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT	3	
I-131	TREATMENT OF THYROID CARCINOMA	2	
	TREATMENT OF HYPERTHYROIDISM	5	
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		
Mo-99/ Tc-99m	GENERATOR	10	
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS	25	
Other	Tl-201 Cardiac Study Ga-67 Body Survey Co-57 Schilling w & wo/IF I-123 Fib. Vein Phlebitis	35 50 17 27	

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
Gerald L. DeNardo, M.D.

b. NAME OF INSTITUTION
UC Davis Medical Center, Sacramento

c. MAILING ADDRESS
2315 Stockton Boulevard

d. CITY
Sacramento, CA 95817

5. MATERIALS LICENSE NUMBER(S)

6. PRECEPTOR'S SIGNATURE

Gerald DeNardo

7. PRECEPTOR'S NAME *(Please type or print)*

Gerald L. DeNardo, M.D.
Director, Nuclear Medicine

8. DATE

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

*U.S. GOVERNMENT PRINTING OFFICE: 1981—341-742/1160

APPENDIX C

INSTRUMENTATION

1. Survey meters

   a. Manufacturer's name: Victoreen

   Manufacturer's model number: 740

   Number of instruments available: 1

   Minimum range: 0 mR/hr to 25 mR/hr

   Maximum range: 0 mR/hr to 25000 mR/hr

   b. Manufacturer's name: _____

   Manufacturer's model number: _____

   Number of instruments available: _____

   Minimum range: _____ mR/hr to _____ mR/hr

   Maximum range: _____ mR/hr to _____ mR/hr

2. Dose calibrator

   Manufacturer's name: Capintec Instruments Inc.

   Manufacturer's model number: CRC 10

   Number of instruments available: One

3. Instruments used for diagnostic procedures

Type of Instrument	Manufacturer's Name	Model No.
Scintillation Camera	General Electric	S 8000 CA
Thyroid Uptake System		
Photomultiplier Tube Assembly	Harshaw	7S8/2
Spectrometer	Ludlum	26000

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

   Radiation Area Monitor Atomic Products 052-496

ITEM 9
DATE:

CALIBRATION OF SURVEY INSTRUMENTS

Check appropriate items.

X 1. Survey instruments will be calibrated at least annually and following repair.

_____ 2. Calibration will be performed at two points on each scale used for radiation protection purposes, i.e., at least up to 1 R/hr.

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

3. Survey instruments will be calibrated

_____ a. By the manufacturer

_____ b. At the licensee's facility

(1) Calibration source

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

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

X c. By a consultant or outside firm

(1) Name Health Physics Northwest

(2) Location P.O. Box 87, West Linn, Oregon 97068

(3) Procedures and sources

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

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

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

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

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

ITEM 10
DATE:

CERTIFICATE OF INSTRUMENT CALIBRATION

For:

Instrument:

Manufacturer _____

Type _____

Model No. _____

Serial No. _____

Calibration Data:

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

Comments:

Nuclide	Activity or Exposure Rate at Specified Distance	Calibration Accuracy

Calibration Source:

Calibrated by _____ Date _____

STATE OF OREGON
OREGON STATE HEALTH DIVISION
DEPARTMENT OF HUMAN RESOURCES

RADIOACTIVE MATERIALS LICENSE

Pursuant to the Radiation Control Act and the Oregon Regulations for the Control of Radiation, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the State Health Division and to any and all conditions specified below.

Licensee	3. License number: ORE-0361-1
1. Name: Health Physics Northwest, Inc.	4. Expiration date: October 31, 1982
2. Address: P. O. Box 87 West Linn, Oregon 97068	5. Reference number:

6. Radioactive materials (element and mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Cesium 137	A. Sealed Source (Amersham/Searle Model No. CDC 809)	A. One source not to exceed 100 millicuries

9. Authorized use.

A. To be used for the calibration of survey instruments as a customer service.

CONDITIONS

10. Radioactive material may only be used at the licensee's facility located at 812 Taylor Street, Oregon City, Oregon.

11. The licensee shall comply with the provisions of the Oregon Regulations for the Control of Radiation, Part C, "Standards for Protection Against Radiation," and Part J, "Notices, Instructions and Reports to Workers: Inspections."

12. This license is subject to and void without an annual validation certificate.

ITEM 10

CONDITIONS (continued)

13. Radioactive material shall be used by Ross Mercer or Doug Richardson.

14. Sealed sources containing radioactive material shall not be opened.

15. Each sealed source of radioactive material to be used outside of a shielded exposure device shall bear a durable, legible, and visible tag permanently attached to the source. The tag shall be at least one (1) inch square, shall bear the conventional radiation symbol prescribed in Section C.203, Part C, Oregon Regulations for the Control of Radiation, and a minimum of the following instructions: DANGER - RADIOACTIVE MATERIAL - DO NOT HANDLE - NOTIFY CIVIL AUTHORITIES IF FOUND. Repair or replacement of tags shall be accomplished by persons specifically licensed by the Oregon State Health Division to perform this service.

16. A. Sealed sources containing radioactive material shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to transfer, the sealed source shall not be put into use until tested.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Oregon State Health Division.

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Oregon Regulations. A report shall be filed within 5 days of the test with the Manager, Radiation Control Section, Oregon State Health Division, 1400 S.W. 5th Avenue, Portland, Oregon, describing the equipment involved, the test results, and the corrective action taken.

D. Tests for leakage and/or contamination may be made by the licensee provided that the analysis of each test is performed only by persons specifically authorized by the Oregon State Health Division, another agreement state, or the U. S. Nuclear Regulatory Commission to perform such services.

(See Page 3)

Form RH-3a

STATE OF OREGON

RADIOACTIVE MATERIALS LICENSE

SUPPLEMENTARY SHEET

License Number ORE-0361-1

CONDITIONS (continued)

17. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in application dated September 13, 1977 and letters dated October 4, 1977 and October 19, 1977, all signed by Ross Mercer.

ITEM 10

12117

State of Oregon
OREGON STATE HEALTH DIVISION
Department of Human Resources
RADIOACTIVE MATERIALS LICENSE

Page 1 of 1 Pages

License Number ORE-0361-I
AMENDMENT NUMBER 3

SUPPLEMENTARY SHEET

Health Physics Northwest Inc.
P.O. Box 87
West Linn, OR 97068

Radioactive Materials License Number ORE-0361 is amended in part as follows:

To add:

6. Radioactive material (element and mass number)	7. Chemical and/or Physical Form	8. Maximum quantity licensee may possess at any one time
C. Cesium 137	C. Sealed Source (Amersham Model No. CDC 804)	C. One source not to exceed 5 millicurie

9. Authorized use:
C. To be held in storage only in unopened manufacturer's original shipping container.

Condition 10 is changed to read:

10. Radioactive material shall be stored and used only at the licensee's facility located at 1912 S.W. 7th Avenue, West Linn, Oregon. Leak test samples may be collected at customers' sites throughout the State of Oregon.

Condition 18 is changed to read:

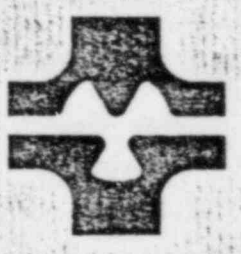
18. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in application dated September 13, 1977 and letters dated October 4, 1977, October 19, 1977, January 30, 1978, February 28, 1978, March 1, 1978, April 6, 1978, October 3, 1978 and January 18, 1979.

ITEM 10

Health Physics Northwest

CALIBRATION PROCEDURES

1. Instrument received at Health Physics Northwest for calibration or repair, listed in instrument log on receipt (show instrument type, serial number and customer name). The instrument is checked for shipping damage and leaking batteries. The instrument is tagged with the customers name and after seeing that the instrument is turned off it is placed in the lab for calibration.



2. The instrument is operationally checked, weak batteries are replaced and the instrument is exposed to the appropriate isotope for calibration.

3. Calibration sources are checked semi-annually for leakage (contamination) and gamma calibration distances are recalculated using the inverse square law at least semiannually.

4. Instruments are normally checked at two positions on each scale (40% and 80%) and information is recorded showing the exposure rate, before calibration and after calibration readings. This is furnished to the customer as part of the calibration report.

ITEM 10

P.O. Box 87, West Linn, Oregon 97068 (503) 657-5226

Health Physics Northwest

CALIBRATION CERTIFICATION

FOR _____

_____

_____

INSTRUMENT _____

MODEL NUMBER _____ SERIAL NUMBER _____

CALIBRATION SOURCE _____

SCALE	EXPOSURE RATE	INSTRUMENT RESPONSE	
		BEFORE CALIBRATION	AFTER CALIBRATION

CALIBRATED BY _____ DATE _____

ITEM 10

P.O. Box 87, West Linn, Oregon 97068 (503) ~~635-2834~~

Health Physics Northwest

CALIBRATION CERTIFICATION

FOR _____

_____

_____

INSTRUMENT _____

MODEL NUMBER _____ SERIAL NUMBER _____

CALIBRATION SOURCE _____

SCALE	EXPOSURE RATE	INSTRUMENT RESPONSE	
		BEFORE CALIBRATION	AFTER CALIBRATION

CALIBRATED BY _____ DATE _____

ITEM 10

P.O. Box 87, West Linn, Oregon 97068 (503) ~~635-2694~~

The activity levels of the reference sources used should approximate those levels normally encountered in clinical use (e.g., Co-57, 3-5 millicuries) giving adequate attention to source configuration. Identify in your application the three sources that you will use. State nuclide, activity, and calibration accuracy. The lower-energy reference standards (Tc-99m, Xe-133, I-125) must be in vials with the same thickness of glass as the actual samples to be measured for best accuracy.

1. Assay the reference standard in the dose calibrator at the appropriate setting, and subtract the background level to obtain the net activity.

2. Repeat step 1 for a total of 3 determinations, and average results.

3. The average activity determined in step 2 should agree with the certified activity of the reference source within ±5 percent after decay corrections.

4. Repeat the above steps for other commonly used radionuclides for which adequate reference standards are available.

5. Keep a log of these calibration checks.

6. Calibration checks that do not agree within ±5 percent indicate that the instrument should be repaired or adjusted. If this is not possible, a calibration factor should be calculated for use during routine assays of radionuclides.

7. At the same time the instrument is being initially calibrated at the licensee's facility with the reference standards, place a long-lived source in the calibrator, set the instrument, in turn, at the various radionuclide settings used (Cs-137, I-131, Tc-99m, I-125, etc.), and record the readings. These values may later be used to check instrument calibration at each setting (after correcting for decay of the long-lived source) without requiring more reference standards. Keep a log of these initial and subsequent readings.

CALIBRATION OF DOSE CALIBRATOR

A. Sources Used for Linearity Test

(Check as appropriate)

__X__ First elution from new Mo-99/Tc-99m generator

or

_____ Other* (specify) _____

B. Sources Used for Instrument Accuracy and Constancy Tests

Radionuclide	Suggested Activity (mCi)	Activity (mCi)	Accuracy
Co-57	3-5	5 mCi	± 5%
Ba-133	0.1-0.5	250 uCi	± 5%
Cs-137	0.1-0.2	200 uCi	± 5%
Ra-226	1-2	_____	_____
_____		_____	_____

C. __X__ The procedures described in Section 2 of Appendix D will be used for calibration of the dose calibrator

or

_____ Equivalent procedures are attached.

*For licensees who are not authorized for Mo-99/Tc-99m generators, activity must be equivalent to the highest activity used.

ITEM 10
DATE:

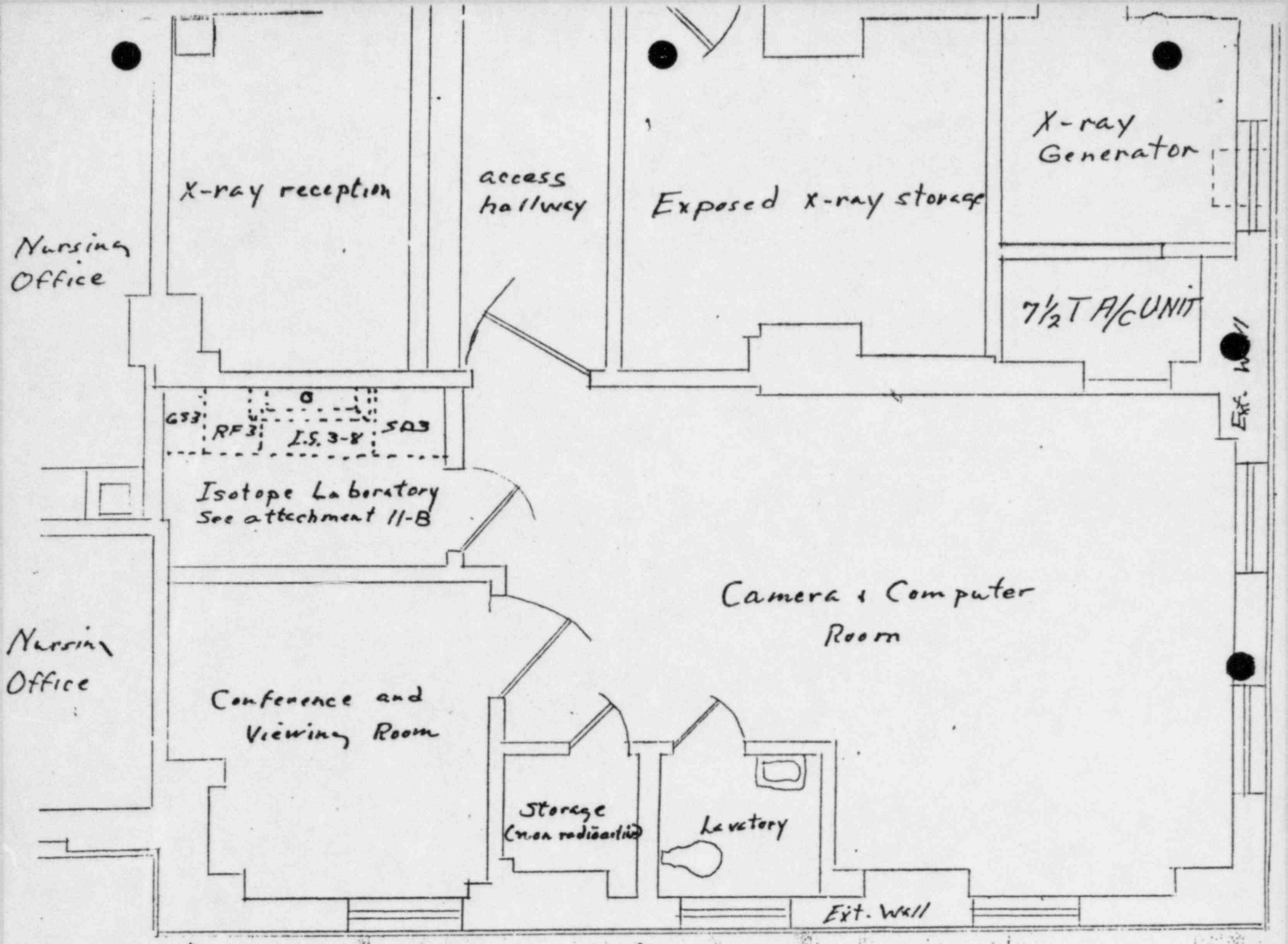
11. Facilities and Equipment

a. General facilities. This is a 360 bed hospital approximately one-half general medicine and surgery and one-half psychiatry. The Medical Center is composed of a cluster of buildings of reinforced concrete and brick construction. Nuclear Medicine is in Building One which is five stories high, the service is located on the second floor.

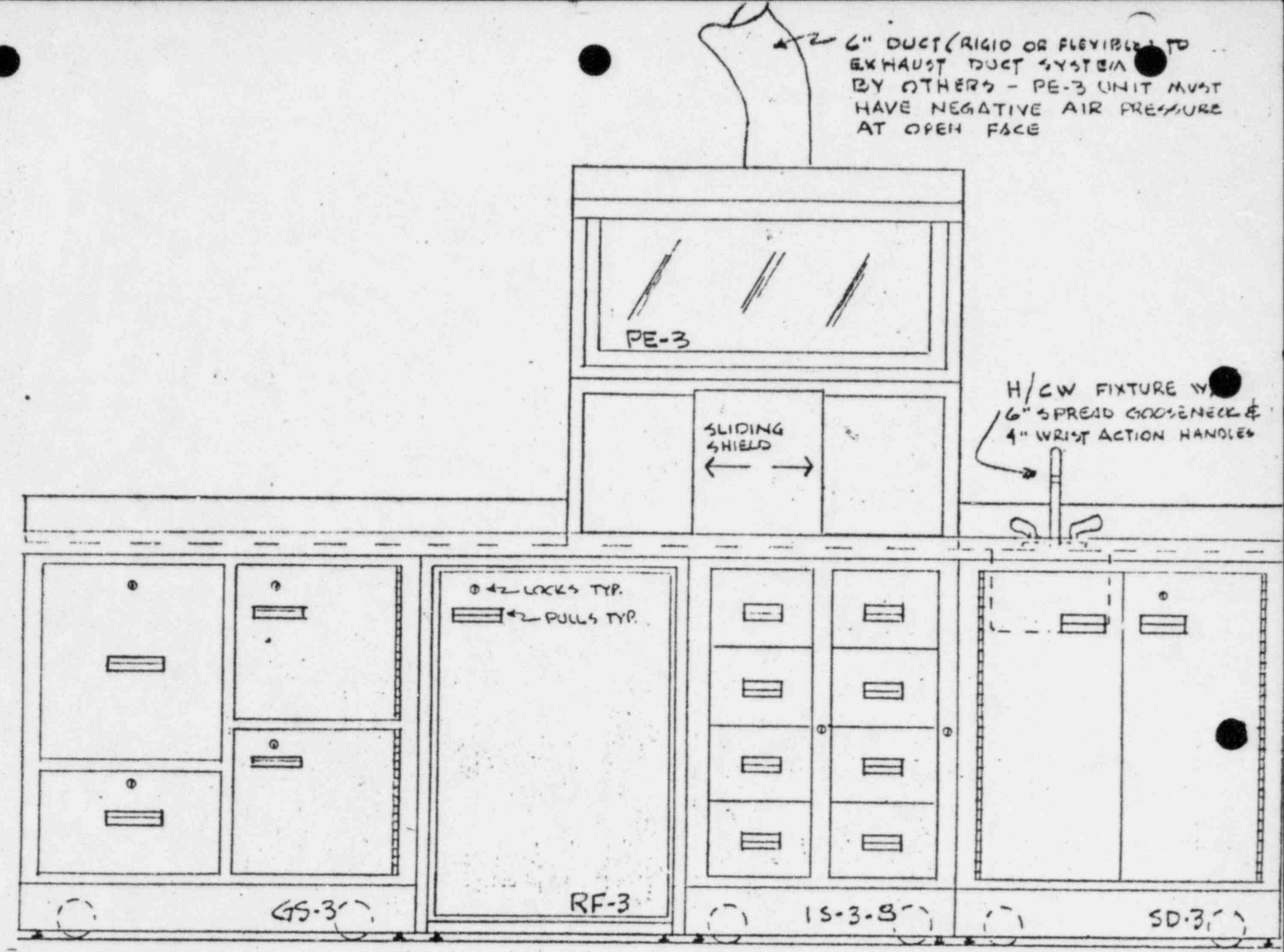
b. Specific facilities. The Nuclear Medicine Service is part of the Radiology Department and is contiguous with that department. Common reception and waiting areas are utilized. There is one gamma camera and computer room supported by a hot lab, conference and viewing room and dressing room lavatory. Two of the walls are exterior walls.

(1) Refer to attachments 11-A & 11-B for diagrams of department layout.

(2) Equipment. In the hot lab there is a shielded hood with negative pressure exhaust to the roof. There are shielded storage facilities and an area for receipt of radioactive shipments. There is shielded area for waste disposal and a decay area. See attachment 11-B.



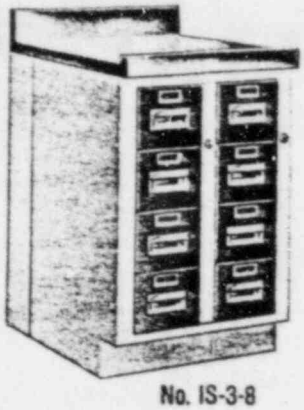
Scale ⅛" = 1' Nuclear Medicine Section Item 11



FRONT ELEVATION

Kewaunee Scientific Equipment Corp.

Item 11-B



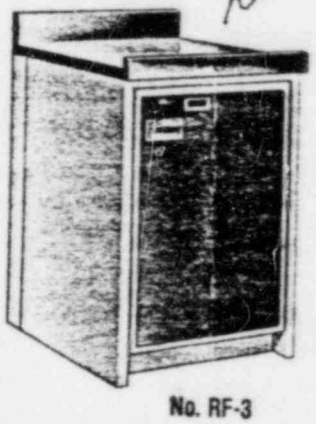
No. IS-3-8

No. IS-3-12 Inventory and Storage Module provides for the inventory of generator prepared reagents and other radiopharmaceuticals. Utilization of this module will facilitate record keeping. The twelve drawers operate on heavy duty roller slides, and are individually lead shielded on the top, bottom and all four sides. All drawers are provided with coved interior plastic inserts for ease of cleaning and/or decontamination.

No. IS-3-8 Inventory and Storage Module is similar to No. IS-3-12, except provides only eight drawers.

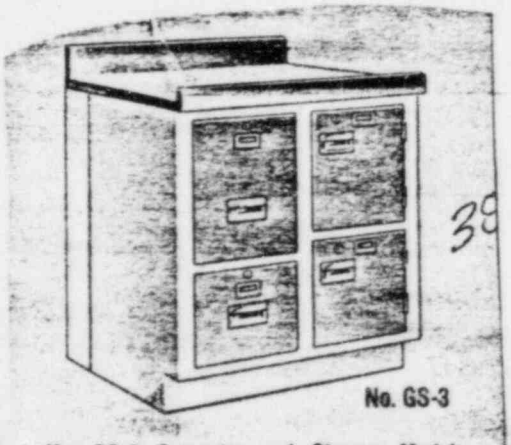
No. PE-3 4100.00

No. PE-3 Preparation Enclosure is a counter mounted fume hood type enclosure, totally shielded by lead. The enclosure opening is equipped with a sliding lead shield for personal radiation protection during the reagent preparation procedures. The enclosure has a lead glass viewing panel, and a stainless steel interior lining and baffle. Sufficient space is provided within the enclosure for required apparatus. A rear baffle, with a fixed open upper exhaust slot and an adjustable lower exhaust slot, is provided for exhaust of gaseous radiopharmaceuticals. A fluorescent light is provided at the top of the viewing panel. Gas, air, vacuum or other service fittings can be provided when specified.



No. RF-3

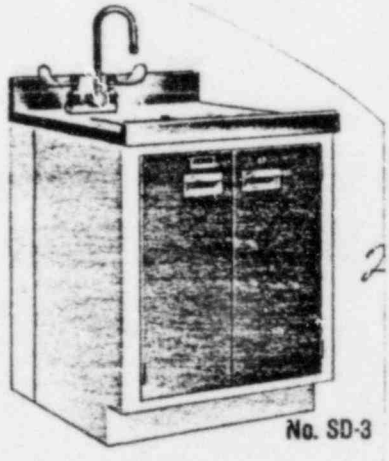
No. RF-3 Refrigerator Module provides a 4 cu. ft. lead shielded refrigerator complete with a freezer compartment and two lead shielded drawers. The U.L. listed refrigerator operates on single phase, 60 cycle, 115 volt AC, and is equipped with wide range temperature control and push button defrost.



No. GS-3

No. GS-3 Generator and Storage Module provides radiation protection without hampering the generator elution process. The upper left hand drawer is for active generator use, and is designed for eluting either top or front elution generators. This drawer is shielded on all four sides and bottom, and has a shielded removable top for generator replacement. In addition, the module provides a shielded drawer beneath the generator drawer, and two shielded cupboard compartments on the right hand side. This additional storage space is provided for storage of decaying generators prior to disposal.

Modules for Isotope work bench.



No. SD-3

No. SD-3 Sink and Decay Storage Module complements the preparation area. It provides separate plastic tray waste receptacles for both long and short term decay. These waste receptacles can be used for the disposition of residual preparation materials, used syringes and other insoluble radioactive waste. Five trays are provided for daily waste of short half-life material, and three trays for long half-life material. The stainless steel waste chutes built into the work top over the decay section are complete with shielded stainless steel covers, and are provided for disposition of waste without exposure to the entire decay section of the module. The sink may be used for disposition of soluble radioactive waste within regulatory confines and/or personal hygiene. Wrist controls are provided for hot and cold water mixing gooseneck faucet. In addition to the normal module lead shielding, lead shielding is also provided between the decay and sink areas.

Item # 11-B

12. Personnel Training Program and Frequency

a. All technical personnel are qualified medical technologists or technicians and have completed formal training in radiologic safety procedures appropriate to their respective duties. Each technician/technologist in addition to their formal training shall on commencing their duties here be fully indoctrinated in safety procedures in this institution and shall be instructed in the use of specific equipment in this department. Technicians will attend yearly or more frequent CME courses.

b. Hospital Fire and Safety Committee coordinator has a record of where all radioactive materials are stored and who to call for emergency surveys in the event of emergency off hours question of radioactive contamination.

c. Housekeeping employees receive training in proper cleaning techniques, what receptacles to avoid, where radioactive materials are kept, etc.

d. A Radiation Safety Manual is maintained which is reviewed by all technical personnel upon their employment and thereafter upon institution of policy changes or at least annually. This manual contains:

1. Memorandum to all Nuclear Medicine personnel describing regulations in 10 CFR Part 19 and Part 20 stating where these documents are located for examination and calling attention to Form NRC-3 "Notice to Employees" which is posted in the hot lab.

2. Procedure for receiving and opening packages of radioactive materials.

3. Laboratory rules for the use of radioactive materials.

4. Emergency Procedures - Spills

5. Survey Procedures

6. Disposal Procedures

7. Therapy Procedures

8. Copy of License

9. Copy of Hospital Radiation Safety Program

10. A copy of NCRP Report No. 48: Radiation Protection for Medical and Allied Health Personnel.

11. A section for filing reports of accidents involving radioactive materials.

VA Medical Center
Roseburg, Oregon

MEMORANDUM 114-2
June 1, 1982

PROCEDURES FOR PROCUREMENT AND
HANDLING OF RADIOACTIVE MATERIALS SHIPMENTS

1. PURPOSE: To inform hospital personnel as to procedures for procurement and handling of radioactive materials shipments.

2. POLICY: Procedure below will be strictly adhered to.

3. RESPONSIBILITY: Chief Nuclear Medicine Technologist

4. PROCEDURES:

a. The Supervisory Nuclear Medicine Technologist will place all orders for radioactive materials and will ensure that the requested materials and quantities are authorized by the license and that possession limits are not exceeded.

(1) The technologist will keep written records identifying the isotope, compound, activity levels and supplier.

(2) Written record will be referenced when opening or storing radioactive shipment.

b. Ordering of specially used materials (e.g., therapeutic uses).

(1) A written request will be obtained from the physician who will perform the procedure.

(2) Persons ordering the materials will reference the physician's written request when placing the order. The physician's request will indicate isotope, compound, activity level, etc.

c. It is essential that written records be maintained for all ordering and receipt procedures.

d. During normal working hours, carriers will be instructed to deliver radioactive packages directly to Supply Service. Supply service will deliver to Nuclear Medicine.

e. During off-duty hours, security personnel or other designated individuals will accept delivery of radioactive packages in accordance with the following procedures:

(1) Any packages containing radioactive material that arrive during off-duty hours for Nuclear Medicine Department shall be signed for by the Police Officer on duty or AOD in the event Police are unable to respond and taken immediately to Room B-212-E in Bldg. 1. The officer shall unlock the door, place the package on top of the stainless steel counter to the right of the door and relock the door to Room B-212-E.

ITEM 13
DATE:

MEMORANDUM 114-2

(2) If the package is wet or appears damaged, immediately contact the Radiation Safety Officer. RSO's name and phone number are posted on hood over counter in Room B-212-E. Ask the carrier to remain at the hospital until it can be determined that neither he nor the delivery vehicle is contaminated.

Reference: None

Rescission: None

Distri bution: C
132 (4)
Each Staff Physician

T. KAYE MIYAMOTO
Medical Center Director

ITEM 14 PROCEDURES FOR SAFELY OPENING PACKAGES
CONTAINING RADIOACTIVE MATERIALS

Appendix F procedures followed.

ITEM 15 GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL

Appendix G rules followed.

ITEM 16 EMERGENCY PROCEDURES

Appendix H procedures followed.

ITEM 17 AREA SURVEY PROCEDURES

Appendix I procedures followed.

APPENDIX J

WASTE DISPOSAL

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

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

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

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

_____ Other (specify): _____

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

X Returned to the manufacturer for disposal.

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

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

_____ Other (specify): _____

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

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

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

_____ Other (specify): _____

4. The commercial waste disposal service used will be

_____
(Name) (City, State)

NRC/Agreement State License No. _____

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

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

ITEM 18
DATE:

ITEM 19 THERAPEUTIC USE OF RADIOPHARMACEUTICALS

Appendix K procedures followed.

ITEM 19
DATE: 12/17

ITEM 20 THERAPEUTIC USE OF SEALED SOURCES

Sealed sources will not be used.

PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES
(Xe-133)

1. Quantities to be used

   a. Patient Information

      (1) Based on experience in this institution it is estimated that 5 studies/wk would be the maximum. We have never reached this figure in the past.

      (2) Average activity/pt 10 mCi.

   b. Possession limit will be 200 mCi in 10-20 mCi vials in shielded tubes. These tubes and vials will be stored in inventory storage modules.

2. Use and Storage Areas

   a. The Xenon will be used in the Nuclear Medicine Section. See diagram and description enclosed under Item 11.

   b. See the enclosed diagram. No changes in flow rate are expected on a seasonal basis. The air is completely exchanged every 10 minutes routinely. If emergency exhaust switch is activated the exchange is complete in 5 minutes. No air is recirculated.

   c. The area where Xenon is used will be under constant negative pressure. The airflow will be checked by an air flow meter semi annually.

3. Procedures for Routine Use

   a. Following techniques will be used

      (1) Place unit dose vial of Xenon gas of proper activity in dispenser.

      (2) Attach dispenser to delivery unit.

      (3) Adjust valve to close system circuit.

      (4) Connect patient to system by face mask.

      (5) Add O_2 to system.

      (6) Check function timer set.

      (7) Inject Xenon Gas Calidose.

ITEM 21
DATE:

b. We will use a Pulmonex Xenon system. A copy of the distributors description is included which gives the design characteristics. This unit is Catalog #130-500 Atomic Products Corp. See attachment.

4. Emergency Procedures

a. In event of Xenon leak, evacuate all personnel and patients from area.

b. Activate emergency exhaust switch. (see location on diagram).

c. Calculate time necessary for air concentration of Xenon (based on known activity of spill) to reach 1×10^{-5} uCi/ml. Air turnover = 12X/hr.

d. Following adequate time lapse measure activity in area before resuming operations.

5. Air Concentrations Xe-133 in Restricted Areas

a. Maximum activity to be used per week will be 50 mCi or 5×10^4uCi.

b. Estimated fraction lost from all possible sources = 20%.

c. The volume of the area of interest is 4420 cu ft. The normal air flow in this area is 450 $ft.^3$ /min, every 10 min. there is complete exchange of air. Under emergency exhaust conditions the air is turned over every 5 min. This means 64,800 $ft.^3$ of air is available for dilution of Xe-133 per week.

d. Our lab will use 10 mCi Xe-133 per patient and the maximum number of patients per week will be 5.

A = 10 mCi X5 = 50 mCi or 5×10^4uCi

F = .2

$$V = \frac{AX4}{1X10^{-5}} = \frac{5X10^4 X.2}{1X10^{-5}} = \frac{1X10^4}{1X10^{-5}} = 1X10^9 ml/wk$$

$$\frac{1X10^9 ml/wk}{(40\ hr)\ (60\ min/hr.)\ (.24X10^4)} = 4.17X10^5 ml/min.$$

and $2.832X10^4 ml = ft.^3$

ITEM 21
DATE:

so $\frac{4.17 \times 10^5 \text{ml/min}}{2.83 \times 10^4 \text{ml/ft.}} = 1.47 \times 10$ or $14.7 \text{ ft.}^3\text{/min}$

circulation is 450 ft.^3/min. this is more than sufficient to keep the activity below maximum permissible.

6. Air concentrations of Xe-133 in Unrestricted Areas

a. Disposal of Xe-133 will not be through exhaust system.

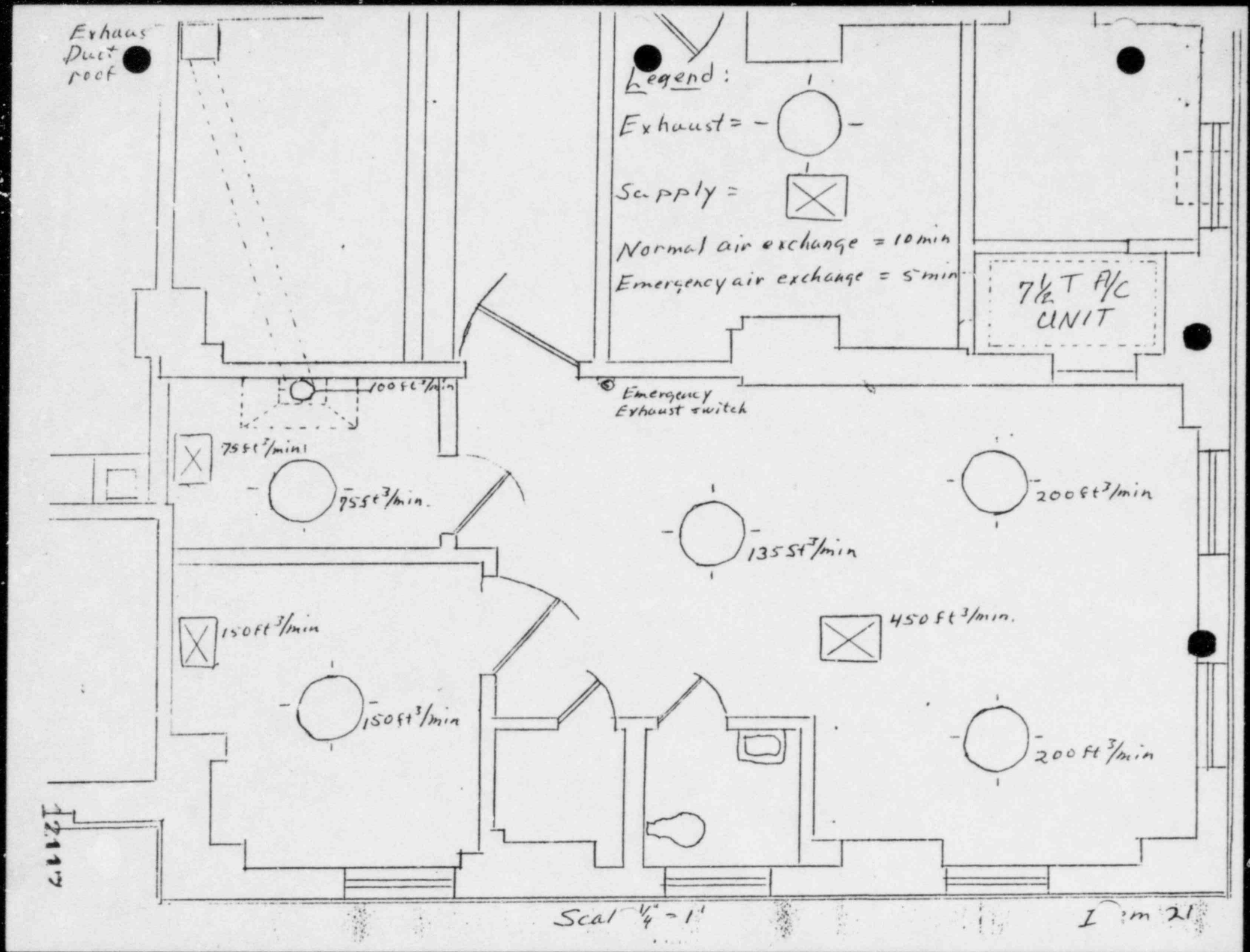
b. Disposal into Charcoal Traps.

(1) Xe-133 will be disposed of by charcoal traps integrated in the dispensing system. The cartridge is enclosed in 1/8" lead.

(2) Charcoal traps will be monitored by Xenalarm trap monitor. See enclosed description. When trap is saturated the monitor gives an audio signal.

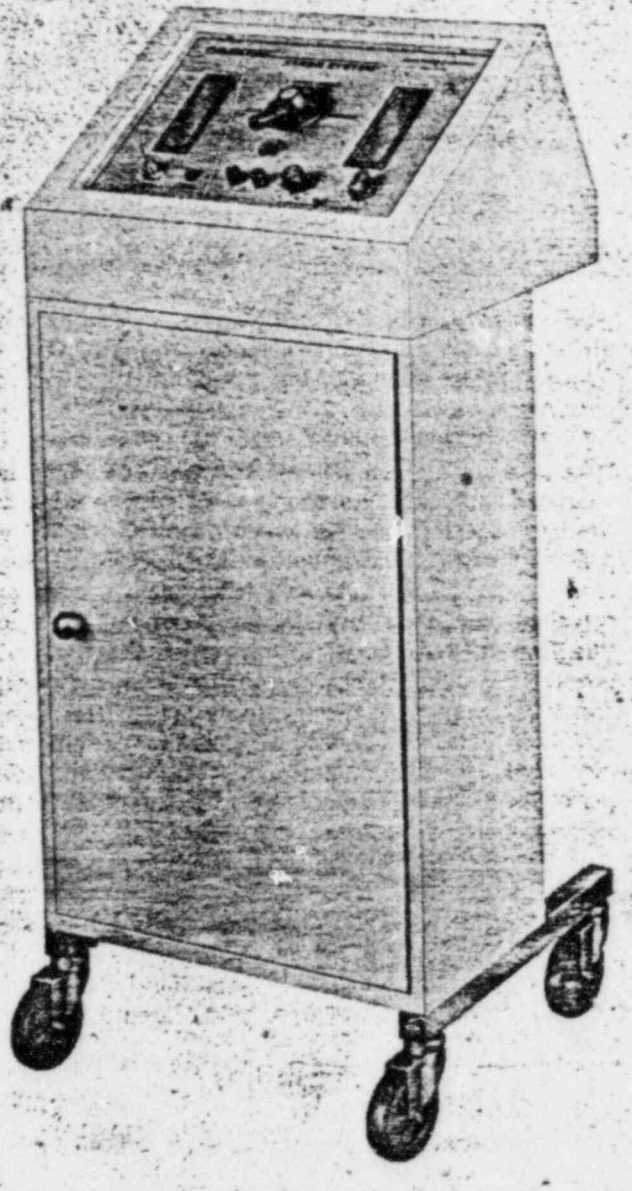
(3) Saturated charcoal cartridges will be stored for decay in the laboratory in the decay storage module. This room has a locked door and negative air pressure with two exhaust vents including the hood with 100 ft.^3.min and room exhaust vent with 75 ft.^3/min. See diagram of ventilation enclosed.

ITEM 21
DATE:


Exhaus Duct roof
Legend:
Exhaust =
Supply =
Normal air exchange = 10 min
Emergency air exchange = 5 min
7½ T A/C UNIT
100 ft³/min
Emergency Exhaust switch
75 ft³/min
755 ft³/min.
200 ft³/min
1355 ft³/min
150 ft³/min
450 ft³/min.
150 ft³/min
200 ft³/min
Scal 1/4" = 1'
I :m 21

PULMONEX XENON SYSTEM

One technician can perform an entire study by simply moving a single handle.



Full-function xenon delivery system with built-in xenon gas trap for rebreathing, washout, perfusion and single breath studies on supine or seated patients.

- **Complete easy-to-use system.**
- **"Air-in"/"Air-out" breathing tubes and motor-driven circulator assures resistance-free breathing.**
- **Two lead glass windows permit observation of patient breathing bags.**
- **All flow circuits automatically controlled by a master valve system.**
- **Automatically timed washout.**
- **Accepts any commercial form of xenon.**
- **Rolls easily on large casters for positioning of supine or seated patients.**
- **Fully shielded.**
- **Carbon dioxide and moisture traps included.**

SIMPLE, SAFE OPERATION

Pertains to: #3b

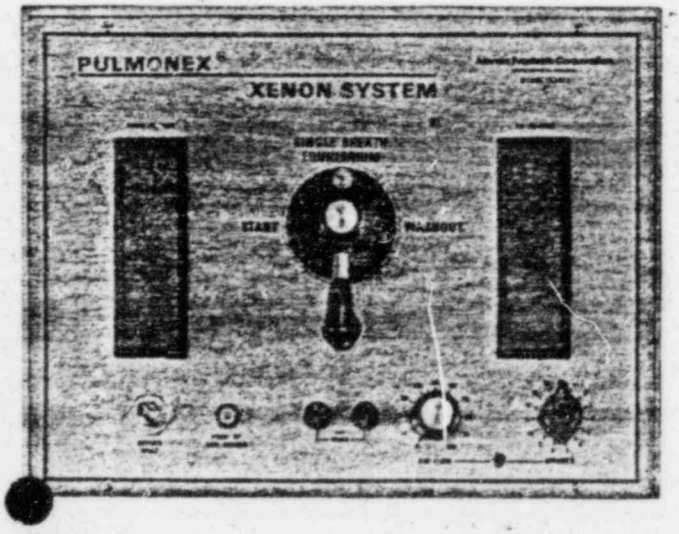
Item 21

The Pulmonex Xenon System is a simple to use, reliable and complete system for the performance of all regional ventilation studies. A built-in xenon gas trap with disposable charcoal cartridge removes xenon effluent after each study and eliminates the need for expensive venting systems. Motor-controlled air flow assures resistance-free breathing, regardless of your patient's pulmonary condition. Practical cabinet design and total mobility permit easy patient positioning in the seated or supine positions.

PULMONEX. .the complete, self-contained xenon system

Pulmonex provides a completely integrated system (delivery unit, and built-in gas trap) for performing xenon studies. A sensitive, responsive master valve, controlled by a single handle on the front panel, and silent synchronized motors permit full-system control of xenon gas flow from initial application to ultimate disposition of the xenon effluent into the gas trap.

All controls are conveniently located on an "up-front" control panel. With the patient on-line, either seated or supine, the user can control the system and observe the patient and gamma camera from one position. The control panel is clearly marked and each mode in the study procedure is distinctively apparent. The two internal patient breathing bags (Air-in and Air-out) are easily observed through individual viewing windows on the front panel. An adjustable manual 15-minute timer initially activates all functions and automatically shuts down the system to complete the study after patient and system washout.



The PULMONEX SYSTEM

The Pulmonex Xenon System effectively integrates manual and electronic controls into a simple, sensitive system that provides maximum, reliable test results using minimum effort. System complexities have been eliminated. All internal circuitry, valves and tubing have been designed to afford ease of operation and patient comfort.

A master valve, controlled by one handle on the front panel, directs the flow of gases throughout the system. Oxygen may be added to the system any time during a study by fingertip button control. A push button operates a circulator blower motor to provide gentle positive system pressure. This, combined with a specially-designed master valve and wide diameter, short circuit airways, provides resistance-free patient breathing. There is no dead air space. An injected bolus of xenon reaches your patient exactly when desired. An in-line CO_2 absorber prevents hyperventilation. The system has automatic timer and pressure control dials to accommodate your patient's breathing pattern and to assure complete system washout into the gas trap.

All internal systems are completely shielded for patient and operator safety. A bacteriostatic filter may be used at the mouthpiece to prevent system contamination.

INTEGRATED XENON GAS TRAP

The Pulmonex system has its own built-in gas trap. Exhaled xenon is gently pulled through activated charcoal contained within a "U" shaped cartridge made of 1/8" lead by an induction vacuum pump. The control panel timer and airflow pressure dial regulation of the trap pump assures complete patient and system purging. Only clean air leaves the trap exit port. Under normal usage the charcoal cartridge will last about a year. The gas trap cartridge is easily replaced when expended.

SPECIFICATIONS:
Motor UL approved. 115 VAC, 50/60 Hz.
Size: 18" x 19" x 46"
Weight: 150 lbs.

130-500	Pulmonex Xenon System, complete	$ 2725.00

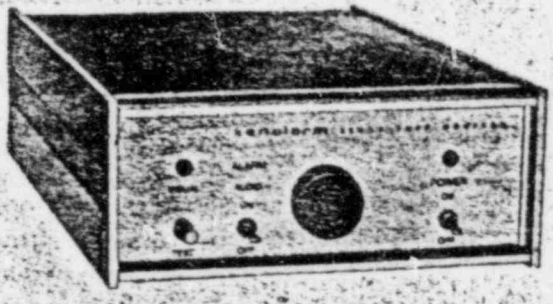
Replacement Items

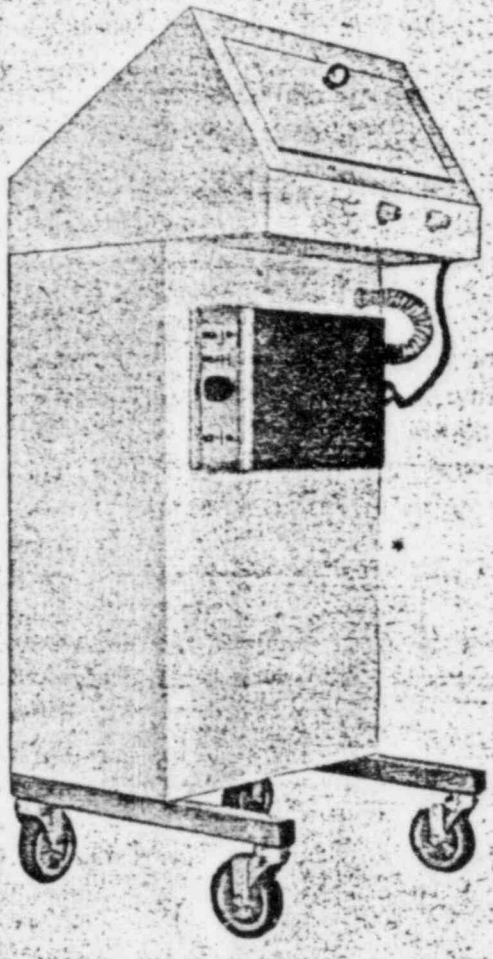
127-319	Disposable Charcoal Cartridge	325.00
130-550	Disposable Mouthpiece	1.85 ea.
130-700	Disposable Bacteria Filter	2.95 ea.
139-101	Moisture Absorber (Drierite)	7.50 lb.
130-019	Soda Lime, CO_2 Absorber	4.25 lb.
087-130	220V Converter	150.00

Item 21

XENALARM XENON TRAP MONITOR

- Simple, sensitive, compact unit immediately alerts user to excess concentrations of radioactive xenon.
- Visual and aural alarms.





Placed at the exhaust port of any xenon gas trap, the Xenalarm monitors the xenon exhaust level and automatically trips a visual and aural alarm when concentrations of radioactive xenon exceed 1×10^{-2} uCi/ml. NRC and State agencies require that the xenon concentration in controlled areas does not exceed 1×10^{-5} uCi/ml averaged over one year based on a 40 hour work week. Xenalarm allows an exhaust rate in excess of the limit as the exhaust is diluted in the room and still further diluted by virtue of the required room ventilation.

The detector is a sensitive end window G-M tube inserted directly in the exhaust stream. The system measures both beta and gamma emissions of xenon.

A "beeper" audio alarm and a flashing red light warn of excessive radioactive xenon. The audio alarm may be turned off at any time by a simple "off-on" switch. Should the alarm activate during or after a study, the charcoal cartridge in the trap should be changed immediately after the completion of the study.

The "Test" button permits manual activation of the alarm system to ascertain its operation. A method to calibrate the unit with a known ^{137}Cs source is provided.

The complete unit measures 8-1/2" W x 3-11/16" H x 13-3/16" D.

136-250 Xenalarm Xenon Trap Monitor, 110V $795.00

136-257 Xenalarm Xenon Trap Monitor, 230V $895.00

Item 21

ITEM 22 PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS

No radioactive materials will be used in animals.

ITEM 23 PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6B

Not applicable.

ITEM 23
DATE:

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY	X	FILM	~~Radiation Detection Company~~ Sunnivale, California 94086	Monthly
		TLD		
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	Same as above	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:

(2) LICENSE FEE ENCLOSED: $

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

(1) NAME *(Type or Print)*

(2) TITLE

c. DATE

FORM NRC-313M (8-78)

ITEM 24
DATE: 12117

PRIVACY ACT STATEMENT

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

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

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

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

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

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

EXHIBIT A

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

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

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

Veterans Administration Medical Center
Roseburg, Oregon 97470

TELEPHONE NO.: AREA CODE(503) 672 4411 X280

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

same

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Wallace Holter, M.D.
TELEPHONE NO.: AREA CODE (503) 672 4411 X280

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

a. [X] NEW LICENSE
b. [ ] AMENDMENT TO LICENSE NO. _____
c. [ ] RENEWAL OF LICENSE NO. _____

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

Wallace Holter, M.D.

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.)*

Wallace Holter, M.D.

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
10 CFR 31.11 FOR IN VITRO STUDIES		
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	400 mCi
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	X	50 mCi
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES	X	20 mCi
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	X	200 mCi
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.	X	200 mCi

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

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

For Items 7 through 23, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the medical licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10.8 , Rev. 1 Date: October 1980

7. MEDICAL ISOTOPES COMMITTEE	
	Names and Specialties Attached; and
X	Duties as in Appendix B; or *(Check One)*
	Equivalent Duties Attached
8. TRAINING AND EXPERIENCE	
X	Supplements A & B Attached for Each Individual User; and
	Supplement A Attached for RSO.
9. INSTRUMENTATION *(Check One)*	
X	Appendix C Form Attached; or
	List by Name and Model Number
10. CALIBRATION OF INSTRUMENTS	
X	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*
	Equivalent Procedures Attached; and
X	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*
	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	
X	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
X	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
X	Appendix F Procedures Followed; or
	Equivalent Procedures Attached

15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL *(Check One)*	
X	Appendix G Rules Followed; or
	Equivalent Rules Attached
16. EMERGENCY PROCEDURES *(Check One)*	
X	Appendix H Procedures Followed; or
	Equivalent Procedures Attached
17. AREA SURVEY PROCEDURES *(Check One)*	
X	Appendix I Procedures Followed; or
	Equivalent Procedures Attached
18. WASTE DISPOSAL *(Check One)*	
X	Appendix J Form Attached; or
	Equivalent Information Attached
19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
X	Appendix K Procedures Followed; or
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
	Detailed Information Attached; and
	Appendix L Procedures Followed; or *(Check One)*
	Equivalent Procedures Attached
21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
X	Detailed Information Attached
22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
N/A	Detailed Information Attached
23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
N/A	Detailed Information Attached

1715

Re: #1 Control No. 12117

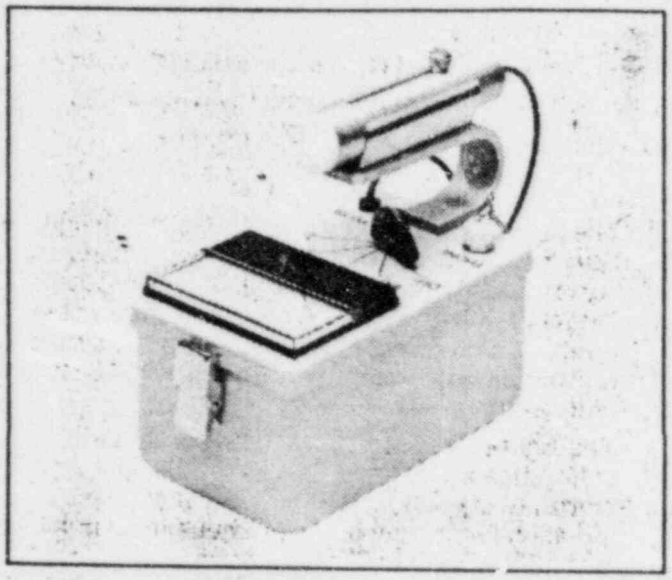
Attached is response to Item 6.a showing 400 mCi of Group III Isotope.

Re: #2 Control No. 12117

Please refer to photo of Beta-Gamma Survey Meter. This instrument is on order and Atomic Products assures us the meter will cover the 0.02 - 2.5 mr/hr. range.

The manufacturer is Atomic Products and Model No. 069-701.

BETA·GAMMA SURVEY METER



• Portable, lightweight, battery operated, transistorized.

This solid-state survey meter is recommended for checking radioactive contamination of instruments, personnel, work areas, food, clothing, etc., for locating spilled radiochemicals, and for detecting stray radiation from apparatus, containers, etc.

Radioactivity is indicated by clicking sounds in a headphone and by a 3-range meter that is graduated from 0 to 50 mR/hr and from 0 to 30,000 cpm. One knob turns on the unit, selects the proper range and checks the batteries.

The probe consists of a side-wall halogen quenched geiger tube located in a shield with a telescoping metal holder. When the gm tube is shielded, only gammas are detected. When the gm tube is exposed, betas above 175keV are detected. Ideal for ^{131}I, ^{32}P and higher-energy beta radiation.

The survey meter is extremely stable and should require very little maintenance or readjustments.

Meter Ranges: 0-0.5, 0-5, 0-50 mR/hr; 0-300, 0-3000, 0-30,000 cpm.

GM Detector: Side-Wall (069-993).

Controls: Selector switch for power on-off, bat. check and 3 ranges (X1, X10, X100). Internal calibration adjust pot for each range.

Audio Indication: Clicks in headphone or audible speaker.

Meter Accuracy: ± 2% of full scale.

Batteries: Two "D" cells, 1½ V.

Cable: 33 inch length.

Equipment Included: Batteries, manual, probe/detector.

Size: 7¼" long x 4¼" wide x 7⅜" high.

Shipping Weight: 2 lb. 11 oz.

069-701	Survey Meter, Beta-Gamma	$ 325.00
069-993	GM Detector, Side-Wall (M). Stainless steel, halogen quenched	$ 40.00
069-888	Headphones	$ 25.00
069-877	Audible Speaker	$ 50.00
101-103	^{137}Cs check source, 10 uCi, Flat Disc, 1" D	$ 20.00

1715

Model Program for Maintaining Occupational Radiation Exposures at Medical Institutions ALARA

Veterans Administration Medical Center, Roseburg, Oregon
(Licensee's Name)

October 22, 1982
(Date)

I. Management Commitment

a. We, the management of this (medical facility, hospital, etc.) are committed to the program described in this paper for keeping exposures (individual and collective) as low as reasonably achievable (ALARA). In accord with this commitment, we hereby describe an administrative organization for radiation safety and will develop the necessary written policy, procedures and instructions to foster the ALARA concept within our institution. The organization will include a Radiation Safety Committee (RSC)[1] and a Radiation Safety Officer (RSO).

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

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

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

---

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

II. Radiation Safety Committee (RSC)[2]

a. Review of Proposed Users and Uses

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

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

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

b. Delegation of Authority

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

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

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

c. Review of ALARA Program

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

2. The RSC will perform a quarterly review of occupational radiation exposure with particular attention to instances where Investigational Levels in Table I below are exceeded. The principle purpose of this review is to assess trends in occupational exposure as an index of the ALARA program quality and to decide if action is warranted when Investigational Levels are exceeded (see paragraph VI).[3]

---

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

---

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

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

III. Radiation Safety Officer (RSO)

a. Annual and Quarterly Review

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

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

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

b. Education Responsibilities for an ALARA Program

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

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

c. Cooperative Efforts for Development of ALARA Procedures

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

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

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

d. Reviewing Instances of Deviation from Good ALARA Practices

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

IV. Authorized Users

a. New Procedures Involving Potential Radiation Exposures

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

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

b. Responsibility of the Authorized User to Those He Supervises

1. The authorized user will explain the ALARA concept and his commitment to maintain exposures ALARA to all of those he supervises.

2. The authorized user will ensure that those under his supervision who are subject to occupational radiation exposure are trained and educated in good health physics practices and in maintaining exposures ALARA.

V. Persons Who Receive Occupational Radiation Exposure

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

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

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

This institution (or private practice) hereby establishes Investigational Levels for occupational external radiation exposure which, when exceeded, will initiate review or investigation by the Radiation Safety Committee and/or the Radiation Safety Officer. The Investigational Levels that we have adopted are listed in Table 1 below. These levels apply to the exposure of individual workers.

Table 1

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

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

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

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

Except when deemed appropriate by the RSO, no further action will be taken in those cases where an individual's exposure is less than Table I values for the Investigational Level I.

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

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

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

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

d. Re-establishment of an individual occupational worker's Investigational Level II Above That Listed In Table I.

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

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

VII. Signature of Certifying Official[4]

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

A. Gerson Hollander, MD
Signature

for/ A. GERSON HOLLANDER, M.D., CHIEF OF STAFF 10/21/82
FOR: T. KAYE MIYAMOTO
Name (print or type)

MEDICAL CENTER DIRECTOR
Title

Institution (or Private Practice) Name and Address:

VETERANS ADMINISTRATION MEDICAL CENTER, ROSEBURG, OREGON 97470

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

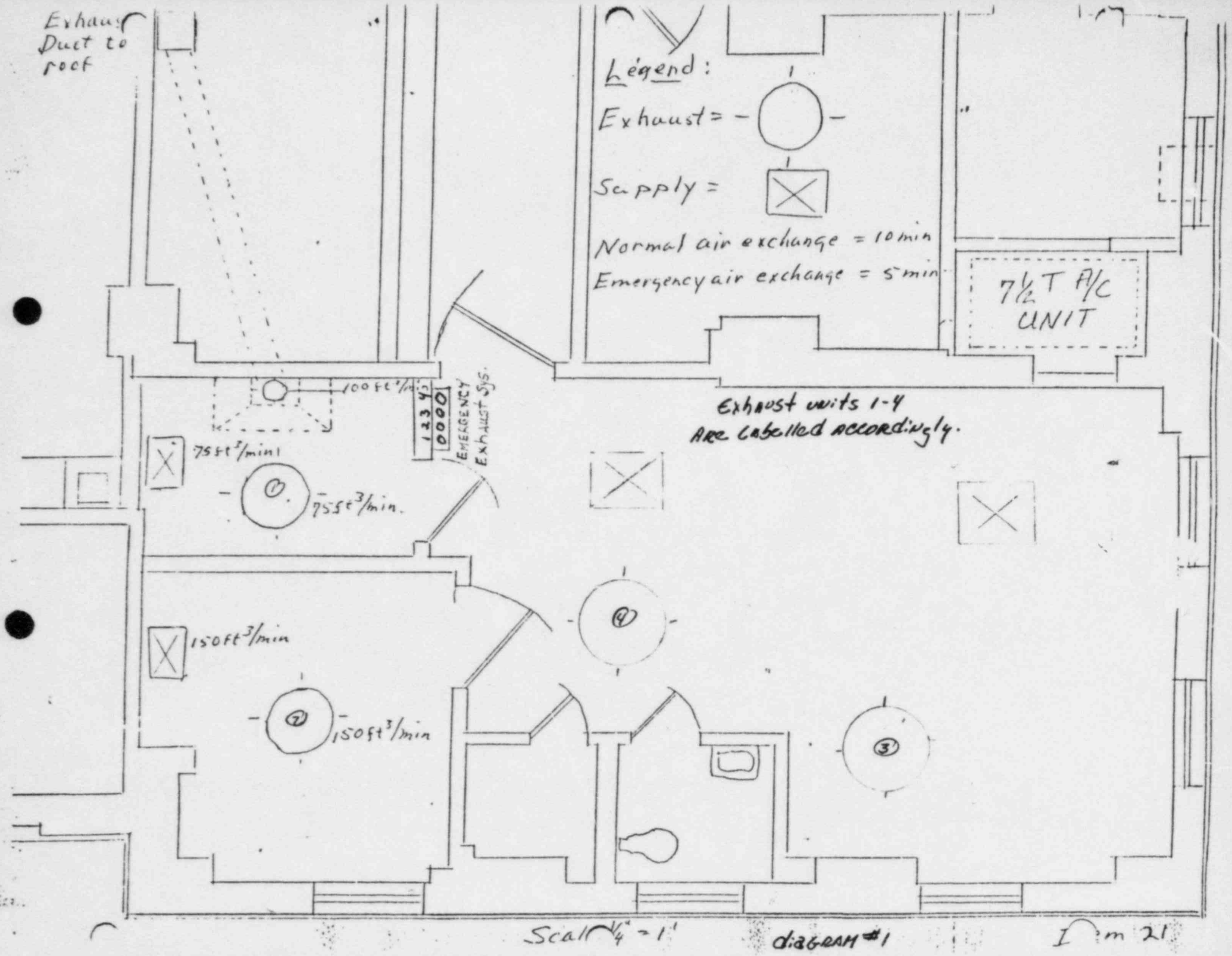
Re: #4 Control No. 12117

Please refer to diagram No. 1 showing location of supply and exhaust vents. The measured air flow is attached stating cfm as certified by Air Balance Specialty, Inc.

a. The exhaust hood fan will operate continuously.

b. The exhaust units are labelled 1-4 and their location is shown on diagram No. 1.

c. The total exhaust in the room will be 638 cfm based on Air Balance Inc.'s report (attached), not the 450 cfm reported earlier.


Exhaust Duct to roof
Legend:
Exhaust = -
Supply =
Normal air exchange = 10 min
Emergency air exchange = 5 min
7½ T A/C UNIT
100 ft³/min
1234
0000
EMERGENCY Exhaust Sys.
Exhaust units 1-4 are labelled accordingly.
75 ft³/min
① 755 ft³/min.
④
150 ft³/min
② 150 ft³/min
③
Scale ¼" = 1'
diagram #1
Im 21

AIR BALANCE SPECIALITY, INC.
10515 S.W. 53RD. • Portland, Oregon 97219
Phone: 245-1411

AIR BALANCE DATA SHEET

Project: V. A. Hospital - Nuclear Medicine - Roseburg, OR

Architect: Veteran Administration | Sheet Metal Contractor: Roseburg Refrigeration | Section:

Mechanical Engineer: Veteran Administration | Control Contractor: | Fan System: A C - 1

Mechanical Contractor: | Date: 07-82 | Tested By: RCN | Sheet No. 1 of 2

SPACE NAME		Outlet Size	Outlet Free Area	Outlet Velocity Req'd	CFM Req'd	OUTLET READING					Final CFM
						Test 1	Test 2	Test 3	Test 4	Test 5	
A C - 1 Supply											
Room B 212 A	1	24x24	1.0	221	221	220	235			465	235
" "	2	24x24	1.0	221	221	305	225				225
Room B 212 D		24x24	1.0	121	121	120	135				135
Room B 212 E		24x24	1.0	60	60	80	68				68
Room B 212 B		12x6	1.0	25	25	125	30				30
Room B 212 C		24x24	1.0	25	25	100	30				30
Room B 213		24x24	1.0	20	20	75	30				30
Room B 214		24x24	1.0	20	20	70	32				32
Room B 215 B		10x4	1.0	42	42	105	55				55
Room B 215		12x8	1.0	204	204	315	220				220
Room B 215 A		10x4	0.139	287	40	520	305				42
Room B 216		10x4	0.139	430	60	470	460				64
Room B 217		24x24	1.0	120	120	90	125				125
Room B 218		10x4	0.139	260	36	390	270				37
Room B 219	1	24x24	1.0	161	161	120	165				165
" "	2	24x24	1.0	161	161	155	170				170
Room B 219 A		5" Ø	0.136	515	70		620				84
Room B 220		24x24	1.0	144	144	240	160				160
Room E 207 A	1	24x24	1.0	240	240	240	250				250
" "	2	24x24	1.0	240	240	300	260				260
" "	3	24x24	1.0	240	240	245	245				245

AIR BALANCING SPECIALITY, INC.
10615 S.W. 53RD. • Portland, Oregon 97219
Phone: 245-1411

AIR BALANCE DATA SHEET

Project: V. A. Hospital - Nuclear Medicine - Roseburg, OR

Architect: Veteran Administration
Sheet Metal Contractor: Roseburg Refrigeration
Section:
Mechanical Engineer: Veterans Administration
Control Contractor:
Fan System: AC-1 & Exhaust
Mechanical Contractor:
Date: 7-82
Tested By: RCN
Sheet No. 2 of 2

SPACE NAME	Outlet Size	Outlet Free Area	Outlet Velocity Req'd	CFM Req'd	OUTLET READING Test 1	Test 2	Test 3	Test 4	Test 5	Final CFM
A C - 1 Return Air					100% RA					
Room B 220	24x24	1.41	102	144	360					507
Room B 219	24x24	1.41	228	322	210					296
Room B 217	24x24	1.41	85	120	120					169
Room B 215	24x24	1.41	144	204	120					169
Room E 207 A 1	24x24	1.41	384	542	330					465
" " 2	24x24	1.41	99	140	420					592
Exhaust										
Room B 212 A										
Low Speed	18.5x9	0.58	362	221	375					217
High Speed	18.5x9	0.58	762	442	500				290	290
Room B 212 A								638		
Low Speed	18.5x9	0.58	362	221	370					215
High Speed	18.5x9	0.58	762	442	600				348	348
Room B 212 D										
Low Speed	18.5x9	0.58	208	121	*					
High Speed	18.5x9	0.58	417	242	*					
Room B 212 E										
Low Speed	18.5x9	0.58	103	60	120					69
High Speed	18.5x9	0.58	206	120	600					348
Note: * Unit not running at time of balancing.										

AIR BALANCING SPECIALITY, INC.
10515 S.W. 53RD.
PORTLAND, OREGON 97219
PHONE: 245-1411

Project: V.A. Hospital - Nuclear Medicine - Roseburg, OR

EQUIPMENT DATA

Equipment Identification A C - 1

Make, Size, Model Trane SWUB - B 756 - A C 81 M 07637

Design - RPM _____ Reading - RPM 941

Motor

Make and Serial Frankin Electric Hp. 1 1/2 RPM 3450

Phase 3 Volts 230 Rated Amps 4.8

Measured Volts 230 Measured Amps 4.4

Overload Heater Capacity Built in overload

Drive Data

Driven Sheave Browning A K 16

Motor Sheave Browning V P 50

Belts Goodyear A 60

Drive Changes

Revised Drive Data _____

Revised Speed RPM _____

Revised Motor Amps _____

Equipment Capacity

Req'd 2,436 CFM

Actual 2,662 CFM

Static Pressure

Suction _____

Discharge _____

Total _____

Re: #5 Control #12117

The air from the rooms in which Xenon 133 is used and stored is exhausted through the vents described in reply to question 4. These vents are routed to a stack that discharges from a dormer in the attic. There is no accessibility to the area of discharge, therefore no placards are used. The nearest windows are dormer windows of the unoccupied attic which are 25 feet away. The nearest air intake is for air conditioning for the 5th floor and is 75 feet away. The closest windows to occupied areas are on the floor below (5th floor), these windows are closed because of air conditioning and are 25 feet away.