NRC FORM 313M (9-81) 10 CFR 35	U.S. NUCLEAR REGULATORY COMMISSION APPLICATION FOR MATERIALS LICENSE – MEDICAL	Approved by OMB 3150-0041

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

Delnor Hospital
975 No. 5th Ave.
St. Charles, Il. 60174

TELEPHONE NO.: AREA CODE(312) 584 3300

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

John A. Taft, Jr. - President

TELEPHONE NO.: AREA CODE(312) 584 3300

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

a. ☐ NEW LICENSE
b. ☐ AMENDMENT TO LICENSE NO.
c. ☒ RENEWAL OF LICENSE NO. 12-15842-01

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

Alvin A. Zeman
James C. Pritchard
Robt. A. Carrara
Philip E. Rathbun
Edward J. Bruno
James G. Gagnon
Geoffrey L. Smoron

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.)*

Alvin A. Zeman,.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	2 curies
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	*** see below	

ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM	X	15mCi
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES	X	15mCi
PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
GOLD-198 AS COLLOID FOR INTRA-CAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA	X	250
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES.	X	100

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
*** Iridium 192	Seeds encased nylon	1000mCi	Interstitttial Treatment of cancer
Iodine 125	Seeds	1000mCi	Interstitttial Treatment of Cancer

NRC FORM 313M (9-81)

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

7. MEDICAL ISOTOPES COMMITTEE	
X	Names and Specialties Attached; and
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 preceptors attached
	Supplement A Attached for RSO.
9. INSTRUMENTATION *(Check One)*	
	Appendix C Form Attached; or
X	List by Name and Model Number
10. CALIBRATION OF INSTRUMENTS	
	Appendix D Procedures Followed for Survey Instruments; or *(Check One)*
X	Equivalent Procedures Attached; and
	Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*
X	Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	
X	Description and Diagram Attached
12. PERSONNEL TRAINING PROGRAM	
X	Description of Training Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	
X	Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	
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)*	
	Appendix I Procedures Followed; or
X	Equivalent Procedures Attached
18. WASTE DISPOSAL *(Check One)*	
	Appendix J Form Attached; or
X	Equivalent Information Attached
19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS *(Check One)*	
X	Appendix K Procedures Followed; or
	Equivalent Procedures Attached
20. THERAPEUTIC USE OF SEALED SOURCES	
X	Detailed Information Attached; and
X	Appendix L Procedures Followed; or *(Check One)*
X	~~Equivalent~~ Procedures Attached
21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)	
X	Detailed Information Attached
22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS	
N/A	Detailed Information Attached
23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b	
	Detailed Information Attached

procedures attached in Item #20 - for 2 items in Group VI

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY	X	FILM	R. S. Landauer & Co.	Bi-week ly
		TLD		
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	R.S. Landauer & Co.	Bi-weekly
		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: Not Applicable

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: 170.31-10CFR 170

(2) LICENSE FEE ENCLOSED: $ 580-Has already been pre-paid

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

(1) NAME *(Type or Print)*: John A. Taft, Jr.

(2) TITLE: President

c. DATE: 5/ /85

RECEIVED
MAY 23 1985
REGION III

NRC FORM 313M (9-81)

PRIVACY ACT STATEMENT

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

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

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

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

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

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

MEDICAL ISOTOPES COMMITTEE

Alvin A. Zeman, Chairman	Radiologist
Robert Carrarra	Pathologist
James Gagnon	Radiologist
Geoffrey Smoron	Radiologist
Rodney Nelson, III	Internal Medicine, M.D.
John Taft, Jr.	President Institutions Management

Item #7

APPENDIX B

MEDICAL ISOTOPES COMMITTEE*

Responsibility

The committee is responsible for :

1. 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 the conditions of the license.

2. 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.

Duties

The committee shall:

1. 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.

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

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

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

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

6. Review the entire radiation safety program at least annually to determine that all activities are being conducted safely and in accordance with NRC regulations and the conditions of the license. The review shall include an examination of all records, reports from the radiation safety officer, results of NRC inspection, written safety procedures, and the adequacy of the institution's management control system.

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

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

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

Meeting Frequency

The medical isotopes committee shall meet as often as necessary to conduct its business but not less than once in each calendar quarter.

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* A rule is expected in 1981 that would change the name, composition, and functions of this committee.

Item #7

Training and Experience of

Alvin A. Zeman, M.D. - User and RSO

Attachment #1

Item No. 8

Date: 7-21-80

...e is to be completed by the applicant physician's preceptor. If more than one preceptor is necessary to document ...ence, obtain a separate statement from each. Back of page may be used for comments.

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

Alvin A. Zeman, M.D.

860 Summit Street, Elgin, Ill. 60120
and
Delnor Hospital, St. Charles, Ill 60174

10. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 9 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	Diagnosis of thyroid function	see prev. lic.	12-00272-03
	Dilution studies		
	Excretion studies		
	Brain tumor localization		
	Scanning studies	see page 4	
	Treatment of hyperthyroidism	see prev. lic.	12-00272-03
	Treatment of cardiac conditions	"	"
	Treatment of thyroid carcinoma	"	"
P-32 Soluble	Treatment of polycythemia	"	"
	Treatment of leukemia		
	Treatment of bone metastases		
	Tumor localization		
	Intracavitary treatment		
	Interstitial treatment		
Au-198	Intracavitary treatment		
	Interstitial treatment		
	Scanning studies		
Cr-51	Blood determinations	see prev. lic.	12-00272-03
	Scanning studies	see page 4	
Co-58 or Co-60	Diagnosis of pernicious anemia	10	5
Co-60	Interstitial treatment		
I-192	Intracavitary treatment		
Co-60 or Cs-137	Teletherapy treatment		
Sr-90	Treatment of superficial diseases of the eye		
Other Isotopes Use back of page	see back page (4)		

Key to Columns (C) and (D) above

1 Observation should consist of observing the subject's administration techniques and discussion with preceptor the case histories to establish most appropriate diagnostic and/or therapeutic procedures, limitations, contraindications, etc.

2 Personal participation should consist of the supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation or storage to the prescribed [illegible] calibration of the dose and the actual administration of the dose to the patient including calculation of the prescription dose, [illegible] measurements and plotting of data and adequate period of training to enable the physician to manage radioactive patients and to follow patients through therapies and/or the course of treatment.

11. DATES AND TOTAL NUMBER OF HOURS OF CLINICAL RADIOISOTOPE TRAINING: 165 hours (June 1 to July 25, 1973)

12. THE TRAINING AND EXPERIENCE INDICATED WAS OBTAINED UNDER THE SUPERVISION OF: Virginia Patterson, M.D. Chief, Nuclear Medicine

University of Ill. Hosp. Chicago.

[Typed Name and Address]

12-preceptor

Virginia Patterson
Signature of Preceptor

Item No. 8
Date: 7-21-80

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC HEALTH

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE - MEDICAL

Supplement A – Human Use

Isotope	Chemical	Use	Dosage
I 131	Iodide	Thyroid dysfunction	Up to 25 mCi
		Treatment of Carcinoma	75 mCi
Phosphorous 32	Sol. Phosphate	Treatment of Polycythemia	Up to 5 mCi
Radium 226	Cl.	Carc. of Uterus	Up to mgm. /or
Fluoride 18	Fluoride	Bone scanning	Up to 4 mCi.
Chromium 51	Chromate	Red cell surv.	Up to 300 uC
Gallium 67	Citrate	Lymph Nodes	Up to 5 mCi

Page 4
y be used for providing additional information

(A) Isotope	(B) Conditions	(C) No. Cases	(D) No. of cases
Technitium-99	Brain Scanning	60	7
"	Liver Scanning	57	8
"	Spleen; Liver-Spleen Sc.	20	5
"	Bone Scanning	12	2
Iodine-131	Thyroid Scanning	35	12
"	Lung Scanning	38	8
"	Liver Function	8	2
"	Renograms	20	5
"	Cardiac Pool	5	1
"	Blood Volume	10	2
"	Placenta Localiz.	6	2
"	Trioiodothyronine-T3	12	4
"	Thyroxine	12	4?
Fluorine-18	Bone Scanning	20	8
Chromium-51	Red Cell Survival	20	10
Cobalt-57	Schilling	10	5

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STATE OF ILLINOIS
DEPARTMENT OF PUBLIC HEALTH

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE
Supplement B – Training and Experience

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEMS 4 AND 5 ON FORM IDPH.KLM.001

TYPES OF TRAINING	WHERE EXPERIENCE WAS GAINED AND INSTRUCTOR (S)	DURATION OF TRAINING	ON THE JOB (Check Answer)	FORMAL COURSE (Check Answer)
ciples and practices of radiation tection	Alvin A Zeman.		☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
	Cook County Hospital		☐ Yes ☐ No	☒ Yes ☐ No
	Dr. I. Hummon	2 Mo.	☐ Yes ☐ No	☐ Yes ☐ No
	Unim.. Illinois		☒ Yes ☐ No	☐ Yes ☐ No
	Virginia Patterson	8 wks.	☐ Yes ☐ No	☐ Yes ☐ No
dioactivity measurement standardization d monitoring techniques and struments	Alvin A Zeman		☐ Yes ☐ No	☐ Yes ☐ No
	Cook County Hosp.		☐ Yes ☐ No	☐ Yes ☐ No
	Dr. I. Hummon	1 mo.	☐ Yes ☐ No	☒ Yes ☐ No
	Univ. of Illinois		☐ Yes ☐ No	☐ Yes ☐ No
	Virginia Patterson	2 wks.	☒ Yes ☐ No	☐ Yes ☐ No
thematics and calculations basic to the e and measurement of radioactivity	Alvin A. Zemen		☐ Yes ☐ No	☐ Yes ☐ No
	Cook County Hosp.		☐ Yes ☐ No	☐ Yes ☐ No
	Dr. I. Hummon	1 mo.	☐ Yes ☐ No	☒ Yes ☐ No
	Univ. of Ill.		☐ Yes ☐ No	☐ Yes ☐ No
	Virginia Patterson	2 wks.	☒ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
Biological effects of radiation	Alvin A. Zeman		☐ Yes ☐ No	☐ Yes ☐ No
	Cook County Hosp.		☐ Yes ☐ No	☐ Yes ☐ No
	Dr. I. Hummon	3 wks.	☐ Yes ☐ No	☒ Yes ☐ No
	Univ. of Ill.		☐ Yes ☐ No	☐ Yes ☐ No
	Virginia Patterson	2 wks.	☒ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No

Training and Experience of

James C. Pritchard, M.D.- User

Attachment #2

Item No. 8

Date: 7-21-80

(1/74) Page 1

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC HEALTH

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE

Page 3 | 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. Back of page may be used for comments.

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

James C. Pritchard M.D.

10. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 9 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	Diagnosis of thyroid function	100+	50+
	Dilution studies		
	Excretion studies		
	Brain tumor localization		
	Scanning studies		
	Treatment of hyperthyroidism	See page 4	
	Treatment of cardiac conditions		
	Treatment of thyroid carcinoma		
P-32 Soluble	Treatment of polycythemia		
	Treatment of leukemia		
	Treatment of bone metastases		
	Tumor localization		
	Intracavitary treatment		
	Interstitial treatment		
Au-198	Intracavitary treatment		
	Interstitial treatment		
	Scanning studies		
Cr-51	Blood determinations	50+	35+
	Scanning studies		
Co-58 or Co-60	Diagnosis of pernicious anemia	See page 4	
Co-60	Interstitial treatment		
I-192	Intracavitary treatment		
Co-60 or Cs-137	Teletherapy treatment		
Sr-90	Treatment of superficial diseases of the eye		
Other Isotopes Use back of page			

Key to Column (C) and (D) above

1. Observation should consist of observing radioisotope administration techniques and discussion with preceptor the case histories to establish most appropriate diagnostic and/or therapeutic procedure, limitation, contraindications, etc.

2. Personal participation should consist of (a) supervised examination of patients to determine the suitability for radioisotope diagnosis and/or treatment and recommendation on dosage to be prescribed; (b) collaboration in calibration of the dose and the actual administration of the dose to the patient, including calculation of the radiation dose, related measurements, and planing of data; and (c) adequate period of training to enable the physician to manage radioactive patients and to follow patients through diagnosis and/or the course of treatment.

11. DATES AND TOTAL NUMBER OF HOURS OF CLINICAL RADIOISOTOPE TRAINING 160 hours (Jan. 15 to Mar. 7, 1973)

12. THE TRAINING AND EXPERIENCE INDICATED ABOVE WAS OBTAINED UNDER THE SUPERVISION OF Virginia N. Patterson M.D. Chief-Nuclear-Med.

University of Ill. Hosp., Chicago, Ill.

STATE OF ILLINOIS
DEPARTMENT OF PUBLIC HEALTH

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE
SUPPLEMENT A—HUMAN USE

Page 4

This page may be used for providing additional information.

(A) Isotope	(B) Conditions	(C) No. Cases	(D) No. Partic.
Technitium 99	Brain scanning	54	6
"	Liver sdanning	43	6
"	Spleen , Liver-spleen	49	7
"	Bone scanning	10	1
Iodine 131	Thyroid scanning	33	10 6
"	Lung scanning	17	3
"	Renogram	12	
"	Cardiac Pool	4	2
"	Blood Volume	6	1
"	Placenta scan	5	1
"	Tri-iodothyronine T3	500+	500+
"	Thyroxine T4	500+	500+
Fluorine 18	Bone scanning	7	5
Cobalt 57	Schilling	7	5

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STATE OF ILLINOIS
DEPARTMENT OF PUBLIC HEALTH

APPLICATION FOR RADIOACTIVE MATERIALS LICENSE
Supplement B – Training and Experience

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEMS 4 AND 5 ON FORM IDPH.KLM.001

TYPES OF TRAINING	WHERE EXPERIENCE WAS GAINED AND INSTRUCTOR (S)	DURATION OF TRAINING	ON THE JOB (Check Answer)	FORMAL COURSE (Check Answer)
Principles and practices of radiation protection			☐ Yes ☐ No	☐ Yes ☐ No
	James Pritchard	7 wks.	☐ Yes ☐ No	☐ Yes ☐ No
	Univ. Illinois		☐ Yes ☐ No	☑ Yes ☐ No
	Virginia Patterson		☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
Radioactivity measurement standardization and monitoring techniques and instruments			☐ Yes ☐ No	☐ Yes ☐ No
	James Pritchard	3 wks	☐ Yes ☐ No	☐ Yes ☐ No
	Univ. Illinois		☐ Yes ☐ No	☑ Yes ☐ No
	Virginia Patterson		☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
Mathematics and calculations basic to the use and measurement of radioactivity			☐ Yes ☐ No	☐ Yes ☐ No
	James Pritchard	2 wks.	☐ Yes ☐ No	☐ Yes ☐ No
	Univ. ILLinois		☐ Yes ☐ No	☑ Yes ☐ No
	Virginia Patterson		☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
Biological effects of radiation			☐ Yes ☐ No	☐ Yes ☐ No
	James Pritchard	1wk.	☐ Yes ☐ No	☐ Yes ☐ No
	Univ. Of Ill.		☐ Yes ☐ No	☑ Yes ☐ No
	Virginia Patterson		☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No

Training and Experience of

Robert A. Carrara, M.D.

Attachment #3

Item No. 8

Date: 7-21-80

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. Back of page may be used for comments.

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

Robert A. Carrara M.D.

10. CLINICAL TRAINING AND EXPERIENCE OF PHYSICIAN NAMED IN ITEM 9 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	Diagnosis of thyroid function	50 plus	25 +
	Dilution studies		
	Excretion studies		
	Brain tumor localization		
	Scanning studies	See page 4	
	Treatment of hyperthyroidism		
	Treatment of cardiac conditions		
	Treatment of thyroid carcinoma		
P-32 Soluble	Treatment of polycythemia		
	Treatment of leukemia		
	Treatment of bone metastases		
	Tumor localization		
	Intracavitary treatment		
	Interstitial treatment		
Au-198	Intracavitary treatment		
	Interstitial treatment		
	Scanning studies		
Cr-51	Blood determinations	50 plus	25+
	Scanning studies		
Co-58 or Co-60	Diagnosis of pernicious anemia	75+	15+
Co-60	Interstitial treatment		
I-192	Intracavitary treatment		
Co-60 or Cs-137	Teletherapy treatment		
Sr-90	Treatment of superficial diseases of the eye		
Other Isotopes Use back of page			

Key to Column (C) and (D) above

1. Observation should consist of observing radioisotope administration techniques and discussion with preceptor the case histories to establish the most appropriate diagnostic and/or therapeutic procedure, limitation, contraindications, etc.

2. Personal participation should consist of (a) supervised examination of patients to determine the suitability for radioisotope diagnosis and/or therapy and recommendation on dosage to be prescribed, (b) collaboration in calibration of the dose and the actual administration of the dose to the patient including calculation of the radiation dose, related measurements, and plotting of data, and (c) adequate period of training to enable the physician to manage radioactive patients and to follow patients through diagnosis and/or the course of treatment.

11. DATES AND TOTAL NUMBER OF HOURS OF CLINICAL RADIOISOTOPE TRAINING

12. THE TRAINING AND EXPERIENCE INDICATED ABOVE WAS OBTAINED UNDER THE SUPERVISION OF Virginia N. Patterson M.D

Univ. Of Illinois, Chicago, Illinois 12-00078-26 Virginia N. Patterson

(Institution) (Address) (Byproduct Material License Number) (Signature of Preceptor)

Page 4
This page may be used for providing additional information.

(A) ISOTPE	(B) Condition	(C) No. of Cases	(D) No. (part.)
Tc 99	Brain Scanning	85	9
	Liver scanning	48	6
	Spleen, Liver - spleen	--	--
	Bone scanning	--	--
	Thyroid scanning	80	26
	Lung scanning	40	9
	Renogram	80	6
	Cardiac Pool	10	3
	Blood Volume	33	7
	Placenta scanning	2	1
	Tri-iodothyronine T3 Thyroxine T4	50	25
Fluorine 18	Bone scanning	5	2
Cobalt 58	Schilling	75	18

Unit

* U.S. GOVERNMENT PRINTING OFFICE

University of Illinois Hospital-- Department of Radiology

Section of Nuclear Medicine

RRobert A. Carrara M.D.

1968

Nuclear Medicine from Pathology		January	February	March			
	RAIU single ^{131}I	12	18	18			48
	RAIU mult "		1				
	RAIU w scan "	33	36	32			101
	w TSH "						
	w suppression "						
	Thyr scan only "	3	2				5
	T-3 ^{125}I	50+	50+	50+			150
	P Vol or REC ^{131}I	10	13	17			40
	REC survival ^{51}Cr	1					1
	Fe turnover						
	Fat abs ^{131}I	1	1				2
	Schilling test ^{57}Co	5	10	3			18
	Renogr ^{131}I	16	32	33			81
	Puln funct						
	Liver funct						
	Misc abn-accur						
I	Brain ^{99m}Tc	33	35	26			94
	Lung ^{131}I (MAA)	13	20	16			49
	Liver ^{131}I R.B.	17	21	16			54
M	Skeleton ^{85}Sr		3	4			7
	Pancreas ^{75}Se	1	1	1			3
	Renal ^{197}Hg	7	4	4			15
A	Cardiac pool ^{131}I	1	7	5			13
	Metas. survey Thyr						
	Cisternagram ^{131}I						
G	Liver-lung ^{131}I						
	Flow study ^{99m}Tc						
	Orbital "						
I	Transmission "						
	Spleen						
	Salivary gland						
N	Placenta ^{131}I IUSA	1	1				2
	Spinal cord						
	VV or VP shunt						
G	Lymphatic						
	Liver spleen						
	Cystogram						
	Rx benign thyroid	4	6	5			15

USERS: ATTACHMENT #5

Geoffrey L. Smoron, M.D.

and

James B. Gagnon, M.D.

Both licensed under NRC # 12-06593-01

Item #8

Training and Experience of

Philip E. Rathbun, M.D. - User

Attachment #4

Item No. 8

Date: 7-21-80

FORM NRC-313M-SUPPLEMENT A
(7-77)
10 CFR 30

U.S. NUCLEAR REGULATORY COMMISS

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION PROTECTION OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION PROTECTION OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
Dr. Philip E. Rathbun	Ill.

3. CERTIFICATION

SPECIALITY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Radiology with Special Competence in Nuclear Radiology	Diagnostic	June 1978

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		20	120
b. RADIATION PROTECTION		18	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY		15	
d. RADIATION BIOLOGY		12	
e. RADIOPHARMACEUTICAL CHEMISTRY			20

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	3	
P-32 (Colloidal)	INTRACAVITARY TREATMENT	0	
I-131	TREATMENT OF THYROID CARCINOMA	0	
	TREATMENT OF HYPERTHYROIDISM AND CARDIAC CONDITION	9	
Au-198	INTRACAVITARY TREATMENT		
Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	INTRACAVITARY TREATMENT		
I-125 or I-192 or Co-60 or Cs-137	INTERSTITIAL TREATMENT		
	TELETHERAPY TREATMENT		
Sr-90	TREATMENT OF EYE DISEASE		
	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

10/1/76 to 12/1/76
244 HRS.

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

a. NAME OF SUPERVISOR
James L. Quinn III, M.D.

b. NAME OF INSTITUTION
Northwestern Memorial Hospital

c. MAILING ADDRESS
250 East Superior

d. CITY
Chicago, Illinois 60611

5. MATERIALS LICENSE NUMBER(S)
12-02501-03

6. PRECEPTOR'S SIGNATURE
James L. Quinn III

7. PRECEPTOR'S NAME (Please type or print)
James L. Quinn III, M.D.

8. DATE
November 21, 1978

FORM NRC-313M-SUPPLEMENT B
(7-77)

10 CFR 30

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

Dr. P.E. Rathbun

STREET ADDRESS

1970 Wessel Court

CITY | STATE | ZIP CODE

St. Charles | Illinois 60174

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	107	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	10	
	LIVER FUNCTION STUDIES	1	
	FAT ABSORPTION STUDIES	0	
	KIDNEY FUNCTION STUDIES	61	
	IN VITRO STUDIES	0	
OTHER			
I-125	DETECTION OF THROMBOSIS	0	
I-131	THYROID IMAGING	5	
P-32	EYE TUMOR LOCALIZATION	0	
Se-75	PANCREAS IMAGING	6	
Yb-169	CISTERNOGRAPHY	0	
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	31	
OTHER			
Tc-99m	BRAIN IMAGING	128	
	CARDIAC IMAGING	46	
	THYROID IMAGING	127	
	SALIVARY GLAND IMAGING	0	
	BLOOD POOL IMAGING	5	
	PLACENTA LOCALIZATION	0	
	LIVER AND SPLEEN IMAGING	206	
	LUNG IMAGING	124	
	BONE IMAGING	184	
OTHER			

USERS: ATTACHMENT #6

Edward J. Bruno, M.D.

FORM NRC-313M-SUPPLEMENT A
6-78)

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
Edward J. Bruno, M.D.	Illinois

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
AMERICAN BOARD OF RADIOLOGY	RADIOLOGY	ELIGIBLE IN OCT. 1983 Now CERTIFIED E. Bruno M.D. A.S.O

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	MT. SINAI HOSPITAL CHICAGO, IL JANUARY 4, '82 - March 31,'82	120	60
b. RADIATION PROTECTION	same as above	35	15
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	same as above	20	10
d. RADIATION BIOLOGY	same as above	35	15
e. RADIOPHARMACEUTICAL CHEMISTRY	same as above	40	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
I-123 Tc99m In-111 Xe-133 P-32 I-131	400 uCi 25mCi 0.5 mCi 10 mCi 5 mCi 150 mCi	See Item 4B above	See Item 4B above	Diagnostic Human Use Therapeutic Human Use

NRC FORM 313 (8-78)

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	30	
P-32 *(Colloidal)*	INTRACAVITARY TREATMENT		
I-131	TREATMENT OF THYROID CARCINOMA	3	
	TREATMENT OF HYPERTHYROIDISM	10	
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

January 4, 1982 through March 31, 1982 (500 hours)

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

a. NAME OF SUPERVISOR
Charles J. Martinez, M.D.

b. NAME OF INSTITUTION
Mount Sinai Hospital

c. MAILING ADDRESS
California Avenue @ 15th St.

d. CITY
Chicago, IL 60608

5. MATERIALS LICENSE NUMBER(S)
12-01491-01

6. PRECEPTOR'S SIGNATURE
Edward J Brund MD

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

8. DATE
3-31-82

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

EDWARD J. BRUNO, M.D.

STREET ADDRESS

8335 Balmoral

CITY	STATE	ZIP CODE
Chicago,	IL	60656

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.)
I-131 or I-125	DIAGNOSIS OF THYROID FUNCTION	34	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	5	
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES	12	
	IN VITRO STUDIES	1800	
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING	35	
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING	1	
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	50	
OTHER			
Tc-99m	BRAIN IMAGING	25	
	CARDIAC IMAGING	18	
	THYROID IMAGING	5	
	SALIVARY GLAND IMAGING	3	
	BLOOD POOL IMAGING	60	
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING	105	
	LUNG IMAGING	91	
	BONE IMAGING	140	
OTHER	CHOLESCINTIGRAM	32	

INSTRUMENTATION

1. Survey Meters
   A. Name: Victoreen Survet Meter (1)
      Model: #498

   B. Name: Victoreen Survet Meter (1)
      Model: 6A-CDV-700

2. Dose Calibrator
   A. Name: Nuclear Chicago (1)
      Model: #30614

3. Diagnostic Instruments
   Searle/Siemens LFOV (1)
   Whole Body System w/
   Microdot Imager

   Model #760

4. Other:
   A. Xenon-133 Delivery/Trapping Unit - ADC Medical No. Xe-400A (1)

Item No. 9
Date: 7-21-80

CALIBRATION OF SURVEY INSTRUMENTS

1. Survey instruments will be calibrated at least annually and following repair by a commercial firm as follows:

   Instrument Calibration Center
   NRC Li.# 12-14821-01

2. Survey instruments will be checked prior to each use with a check source.

CALIBRATION FOR DOSE CALIBRATOR

1. Annual calibration will be performed by Radiation Protection Consultants under NRC # 12-13370-01 and Illinois # IL 00374-01
2. In addition, it will be tested daily with Cs ^{137} (this will be a reference source.) A check is made to make sure that the activity is ± 5% for Cs 137. Then a check will be made for all isotopes setting that are routinely used and a comparison of these activity values with those recorded on the day the instrument was calibrated will be made and these values must fall within ± 5%.
3. Quarterly Linearity Check:
   50mCi Tc99m will be used for a 48hr. Activity Measurement as follows:
   1. Check at precalibrated time
   2. 6hrs.
   3. 24hrs.
   4. 30hrs.
   5. 48hrs.

   A 30hr. measurement will be used as a starting point; a calculated predicated activity for all other measurements is then made. This will be plotted on log-log paper and the error noted must be within ± 5%.

Item # 10
Date: 7-21-80

DOSE CALIBRATOR CONSTANCY CHECK

SOURCE: Cs-137
ACTIVITY: 210 uCi
CALIBRATION DATE: 5-13-80

TYPE: MEDIAC MODEL 6372
SERIAL No.: 30614

DATE	Cs-137 uCi	Xe-133 mCi	I-131 uCi	Mo-99 mCi	Tc-99m uCi	Ga-67 uCi	I-123 uCi	TECH

SURVEY METER CALIBRATION CHECK

SOURCE: Cs-137	METERS:	LAST ANNUAL CALIBRATION	SOURCE READING	LIMITS
ACTIVITY: 210 uCi	Victoreen CDV-700; S/N 70660	1-31-83	4.4	±10%
CALIBRATED: 5-13-80	Victoreen 498; S/N 358	6-17-83	3.8	

DATE	CDV-700	498	DATE	CDV-700	498	DATE	CDV-700	498

EQUIPMENT

Scanning:

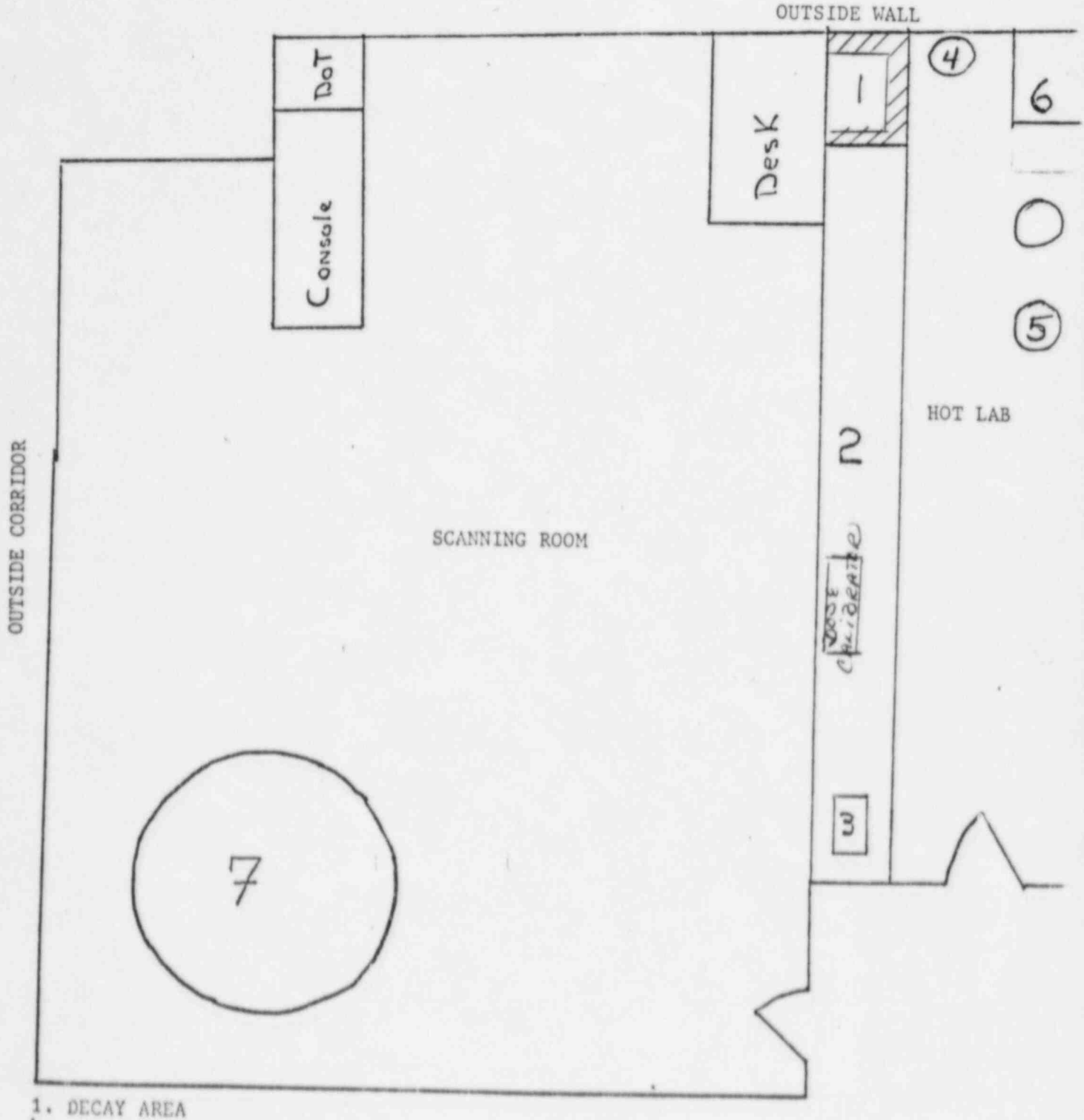
1. Searle/ Siemens LFOV- Whole body Scanning System
   Model #760 w/ Microdot

2. Xenon-133 Delivery/ Trapping System - ADC Medical No. Xe-400A

3. Dose Calibrator- Nuclear Chicago Model # 30614

ITEM #17 shows a detailed form used for surveying this area on a weekly basis.

DELNOR HOSPITAL
DEPT. OF NUCLEAR MEDICINE



1. DECAY AREA
2. COUNTER
3. SINK
4. WASTE CAN
5. WASTE CAN
6. DOSE AREA - lead glass L-Block
7. GAMMA CAMERA

ATTACHMENT #11

Description of Training required for all personnel who work with or in the vicinity of radioactive materials:

Subject matter includes storage and usage of radioactive materials, NRC regulations, potential hazards and restrictions. Personnel are given initial instruction before assuming their duties with or in the vicinity of radioactive materials . Thereafter, instruction of personnel is carried out annually through in-service and departmental meetings or whenever there has been a significant change in procedures.

Instruction shall include:

1. Radiation Safety
2. Areas where radioactive material is stored
3. Hazards
4. Radiological safety procedures appropriate to their respective dates
5. Pertinent NRC Regulations & rules
6. Obligations to report unsafe conditions to RSO
7. Appropriate response to emergencies or unsafe conditions
8. Right to be informed of their radiation exposure
9. Location where available notices, regulations, licensing documents, conditions and correspondence is kept.

Item #12

Procedures for Ordering and Receiving Radioactive Materials

1. The Nuclear Medicine Technologist will place all orders for daily use, during normal working hours and will ensure that requested materials and quantities are authorized by the license and that possession limits are not exceeded.

2. During working hours orders are to be brought directly to the Nuclear Medicine Dept. and the technologist will accept the shipment.

3. Any packages that arrive between 3:30p.m. and 7:00a.m. will be accepted by either the Security Guard or Nursing Supervisor. The radioactive materials will then be taken immediately to the Nuclear Medicine Dept. (Scanning Room) and placed on an absorbable pad either on the desk or floor. The door must then be locked.
   * If the package appears damaged or wet, the Nuclear Medicine Supervisor will be called and he/she will notify the RSO. The carrier is to remain at the hospital until it can be determined that neither he nor the delivery vehicle is contaminated.

Item No. 13

Date: 7-21-80

APPENDIX F

PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIAL

1. Special requirements will be followed for packages containing quantities of radioactive material in excess of the Type A quantity limits as specified in paragraphs 20.205(a)(1) and (c)(1) of 10 CFR Part 20 (more than 20 Ci for Mo-99 and Tc-99m). They will be monitored for surface contamination and external radiation levels within 3 hours after receipt if received during working hours or within 18 hours if received after working hours, in accordance with the requirements of paragraphs 20.205(a) through (c). All shipments of liquids greater than exempt quantities will be tested for leakage. The NRC Regional Office will be notified in accordance with the regulations if removable contamination exceeds 0.01 $\mu Ci/100\ cm^2$ or if external radiation levels exceed 200 mR/hr at the package surface or 10 mR/hr at 3 feet (or 1 m).

2. For all packages, the following additional procedures for opening packages will be carried out:

   a. Put on gloves to prevent hand contamination.

   b. Visually inspect package for any sign of damage (e.g., wetness, crushed). If damage is noted, stop procedure and notify Radiation Safety Officer.

   c. Measure exposure rate at 3 feet (or 1 m) from package surface and record. If >10 mR/hr, stop procedure and notify Radiation Safety Officer.

   d. Measure surface exposure rate and record. If >200 mR/hr, stop procedure and notify Radiation Safety Officer.

   e. Open the package with the following precautionary steps:

      (1) Open the outer package (following manufacturer's directions, if supplied) and remove packing slip.

      (2) Open inner package and verify that contents agree with those on packing slip. Compare requisition,* packing slip, and label on bottle.

      (3) Check integrity of final source container (i.e., inspect for breakage of seals or vials, loss of liquid, and discoloration of packaging material).

      (4) Check also that shipment does not exceed possession limits.

   f. Wipe external surface of final source container and remove wipe to low background area. Assay the wipe and record amount of removable radioactivity (e.g., $\mu Ci/100\ cm^2$, etc.). Check wipes with a thin-end-window G-M survey meter, and take precautions against the spread of contamination as necessary.

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

      (1) If contaminated, treat as radioactive waste.

      (2) If not contaminated, obliterate radiation labels before discarding in regular trash.

3. Maintain records of the results of checking each package, using "Radioactive Shipment Receipt Record" (see next page) or a form containing the same information.

---

*In the case of special orders (e.g., therapy doses), also compare with physician's written request.

RADIONUCLIDES RECEIVED

_________ TO _________

DATE RECEIVED	RADIO— NUCLIDE	CHEM. FORM	ACIVITY (mCi)	SUPPLIER	PACKAGE mR/hr		WIPE	RE-MOVAL (CASE)	RETURN
					3'	0'			

APPENDIX G

GENERAL RULES FOR SAFE USE OF RADIOACTIVE MATERIAL

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

2. Wear disposable gloves at all times while handling radioactive materials.

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

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

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

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

6. a. 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 percent.

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

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

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

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

10. Never pipette by mouth.

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

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

13. Always transport radioactive material in shielded containers

Item #15

HAND AND LAB COAT ASSAY

DATE	NOON	CONTAM.	DECON.	TECH	1300	CONTAM.	DECON.	TECH

APPENDIX H

EMERGENCY PROCEDURES

Minor Spills

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

2. PREVENT THE SPREAD: Cover the spill with absorbent paper.

3. CLEAN UP: Use disposable gloves and remote handling tongs. Carefully fold the absorbent paper and pad. Insert into a plastic bag and dispose of in the radioactive waste container. Also insert into the plastic bag all other contaminated materials such as disposable gloves.

4. SURVEY: With a low-range, thin-window G-M survey meter, check the area around the spill, hands, and clothing for contamination.

5. REPORT: Report incident to the Radiation Safety Office.

Major Spills

1. CLEAR THE AREA: Notify all persons not involved in the spill to vacate the room.

2. PREVENT THE SPREAD: Cover the spill with absorbent pads, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.

3. SHIELD THE SOURCE: If possible, the spill should be shielded, but only if it can be done without further contamination or without significantly increasing your radiation exposure.

4. CLOSE THE ROOM: Leave the room and lock the door(s) to prevent entry.

5. CALL FOR HELP: Notify the Radiation Safety Officer immediately.

6. PERSONNEL DECONTAMINATION: Contaminated clothing should be removed and stored for further evaluation by the Radiation Safety Officer. If the spill is on the skin, flush thoroughly and then wash with mild soap and lukewarm water.

RADIATION SAFETY OFFICER DR ZEMAN*
OFFICE PHONE: 742-4944 OR 584-3300
HOME PHONE: 742-6322

ALTERNATE NAMES AND TELEPHONE NUMBERS DESIGNATED BY RADIATION SAFETY OFFICER:
JOE PARSONS - 635-6193
CHRIS MCCURRY - 237-7255
TOM TAFT, JR - 584-3300 AFTER 5

*The appropriate information for your facility should be supplied in these blanks when posting these procedures or submitting them with the application.

ATTACH #16

SURVEY PROCEDURES

A. All elution, preparation and injection areas will be surveyed daily with a G-M survey meter and decontaminated if necessary.

B. All other areas will be surveyed weekly.

C. The weekly survey will consist of:

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

2. A series of wipe tests to measure contamination levels.

D. A permanent record will be kept of all survey results, including negative results. The record will include: See following page

Item # 17

Date: 7-21-80

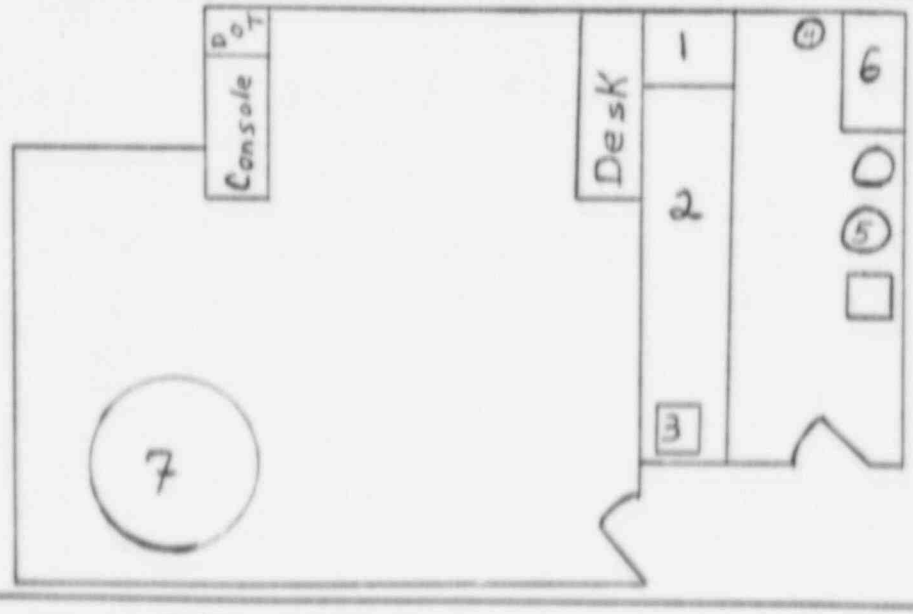
NUCLEAR MEDICINE DEPARTMENT

WEEK OF _____ TO _____

	MON.	TUES.	WED.	THUR.	FRI.	
G-M SURVEY BACKGROUND MR/HR						
CAMERA BACKGROUND CPM						

AREA SURVEY'S & WEEKLY WIPE TEST

	MR/HR					WIPE CPM	CONTAMINATION	FINAL SURVEY
1. DECAY AREA								
2. COUNTER								
3. SINK								
4. WASTE CAN								
5. WASTE CAN								
6. DOSE AREA								
7. CAMERA								
PERFORMED BY								



DAILY COMPARITIVE COUNTS

DAY	ACTIVITY uCi Tc-99m	COUNTS x 10^6	DAY	ACTIVITY uCi Tc-99m	COUNTS x 10^6
MON.			THUR.		
TUE.			FRI.		
WED.					

Item #17

Waste Disposal Procedures

May do in any one (1) of four (4) ways:

SEWER SYSTEM

1. Liquids may be flushed down the sink in prep room with sufficient water to assure that material reaches the main sewer pipes of the hospital. Data will be obtained from appropriate hospital personnel to estimate the quantity of water leaving the hospital sewage system each day and activity levels will not exceed those permitted by 10CFR20 Section 20.303

RETURN TO SUPPLIERS

2. Items may be returned to suppliers in proper D.O.T. approved containers with proper posting or may be picked up by the supplier.

DECAY METHOD

3. Materials placed in waste storage will be in plastic bags and labeled with the date placed in storage and a list of principal isotopes. Periodically, the bags with the oldest dates will be checked in an area of low background using the GM counter. Any packages demonstrating no activity above background will be disposed of in our regular hospital disposal service. No items disposed of in this manner will contain Radioactive labels. Packages that are checked and indicate any activity above background will be placed back into storage for further decay.

COMMERCIAL DISPOSAL

4. Should commercial disposal be utilized, it will be done by Nuclear Engineering Corporation or other NRC licensed and approved form. Should this method be utilized, we will have our Health Physics Consultant assist us. We will have available NRC and DOT regulations and assure that packaging and disposal meets the requirements.

Item # 18

Date: 7-21-80

Instructions for Waste Disposal 10-14-80

To Technologist:

See attached forms for Waste disposal. Follow along with form:

1. Numbar all items.
2. Check whether item is solid, liquid or gas.
3. Measure radiation with GN counter- record.
4. List Isotope
5. List weight in either grams, lbs., or cubic feet.
6. List By-product curies
7. List cask # if applicable
8. Remove all "Radioactive " labels and discard.
   Check yes or no if done.

Sign your name under disclaimers NAME- top of page.

Bag all articles in plastic containers and put in regular hospital waste disposal. This is approved in NRC License - Item # 18.

From now on, all items that are placed in barrels, must be bagged in plastic and dated on the outside of bag. Upon next disposal, bags with the oldest dates will be checked first; any bags that have radiation levels detected will be placed back in the barrel for further decay.

J. Meyers, R.T.

J. Meyers, R.T.
Technical Director

APPENDIX K

RADIATION SAFETY PROCEDURES FOR THERAPEUTIC USE OF RADIOPHARMACEUTICALS*

1. All patients treated with I-131 or Au-198 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 as appropriate to the amounts of contamination to be expected. Attention should be given to objects likely to be touched by the patient, e.g., telephones, doorknobs, and other items that would be difficult to decontaminate. Plastic bags or wrappings that are waterproof and easily disposable should be used on the smaller items.

2. The patient's room will be properly posted or attended in accordance with §§20.203 or 20.204 of 10 CFR Part 20.

3. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after administration of the treatment dose. Exposure rates will be measured at the patient's bedside and 3 feet (or 1 m) from the patient after administration and at the entrance to the room. The Radiation Safety Officer or his designee will then determine how long a person may remain at these positions and will post these times on the patient's chart and on his door. The results of daily surveys will be used to recalculate permitted times, which will be posted on the patient's chart and on his door.

4. The form, Nursing Instructions for Patients Treated with Phosphorus-32, Gold-198, or Iodine-131 (or a similar form containing all the requested information), will be completed immediately after administration of the treatment dose. A copy will be posted on the patient's chart.

5. Radiation levels in unrestricted areas will be maintained less than the limits specified in paragraph 20.105(b) of 10 CFR Part 20.

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

7. Disposable plates, cups, eating utensils, tissue, surgical dressings, and other similar waste items will be placed in a specially designated container. The material will be collected daily by the Radiation Safety Officer or his designee, checked for contamination, and disposed of as normal or radioactive waste, as appropriate.

8. Nondisposable items used for these patients will be held in plastic bags in the patient's room and will be checked for contamination by the Radiation Safety Officer or his designee. Items may be returned for normal use, held for decay, or decontaminated, as appropriate.

9. If urine and vomitus from I-131 therapy patients are collected, they 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. They will then be 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. Nursing Instructions

    a. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the precaution sheet on the patient's chart. Nurses should read these restrictions before administering to the patients. Call the Nuclear Medicine Department or the Radiation Safety Officer with any questions about the care of these patients. Nursing personnel who attend the patient will wear personnel monitoring devices as advised by the Radiation Safety Office.

    b. Visitors will be limited to those 18 years of age or over unless other instructions are noted on the precaution sheet on the patient's chart.

    c. Patients must remain in bed while visitors are in the room and visitors should remain at least 3 feet (or 1 m) from the patient.

    d. Patients containing radioactive materials are to be confined to their rooms except for special medical or nursing purposes approved by the Nuclear Medicine Department.

    e. No nurse, visitor, or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic amount of radioactivity until the patient no longer presents a radiation hazard. Female visitors should be asked whether they are pregnant.

    f. Attending personnel should wear rubber or disposable plastic gloves when handling urinals,

*Be sure to submit a complete response to Item 19h in addition to referencing procedures in Appendix K.

ATTACHMENT 19

bedpans, emesis basins, or other containers having any material obtained from the body of the patient. Wash gloves before removing and then wash hands. The gloves should be left in the patient's room in the designated waste container. These gloves need not be sterile or surgical in type.

g. Disposable items should be used in the care of these patients, whenever possible. These items should be placed in the designated waste container. Contact the Radiation Safety Officer or his designee for proper disposal of the contents of the designated waste container.

h. All clothes and bed linens used by the patient should be placed in the laundry bag provided and should be left in the patient's room to be checked by the Radiation Safety Officer or his designee.

i. All nondisposable items should be placed in a plastic bag and should be left in the patient's room to be checked by the Radiation Safety Officer or his designee.

j. Surgical dressings should be changed only as directed by the physician. Au-198 leaking from a puncture wound may stain the dressings dark red or purple. Such dressings should not be discarded but should be collected in plastic bags and turned over to the Radiation Safety Officer or his designee. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

k. For I-131 patients:

(1) To the degree possible with cooperative patients, urine will be collected in special containers provided by the Radiation Safety Officer or his designee. The patient should be encouraged to collect his own urine in the container. If the patient is bedridden, a separate urinal or bed pan should be provided. The urinal or bed pan should be flushed several times with hot soapy water after use.

(2) If the nurse helps to collect the excreta, disposable gloves should be worn. Afterward, hands should be washed with the gloves on and again after the gloves are removed. The gloves should be placed in the designated waste container for disposal by the Radiation Safety Officer or his designee.

(3) Disposable plates, cups, and eating utensils will be used by patients who are treated with I-131.

(4) Vomiting within 24 hours after oral administration, urinary incontinence, or excessive sweating within the first 48 hours may result in contamination of linen and floor. In any situation where the patient's room may be contaminated or if radioactive urine and/or feces is spilled during collection, call the Radiation Safety Officer or his designee, Ext._____. Meanwhile, handle all contaminated material with disposable gloves and avoid spreading contamination.

(5) Keep all contaminated wastes and vomitus in plastic bags in the patient's room for disposal by the Radiation Safety Officer or his designee. Feces need not be routinely saved unless ordered on the chart. The same toilet should be used by the patient at all times and it should be well flushed (3 times). The Radiation Safety Officer will establish procedures for disposal of wastes (see Item 12 below).

l. If a nurse, attendant, or anyone else knows or suspects that his or her skin or clothing, including shoes, is contaminated, notify the Radiation Safety Officer or his designee immediately. This person should remain in an area adjacent to the patient's room and should not walk about the hospital. If the hands become contaminated, wash them immediately with soap and water.

m. If a therapy patient should need emergency surgery or should die, notify the Radiation Safety Officer or the Nuclear Medicine Department immediately.

n. When the patient is discharged, call the Radiation Safety Officer or his designee or the Nuclear Medicine Department and request that the room be surveyed for contamination before remaking the room.

12. Waste Disposal

When contaminated wastes are transported to the Waste Storage/Disposal area, precautions will be taken to minimize external irradiation of personnel. Stored wastes will be shielded to maintain exposure to personnel in restricted and unrestricted areas ALARA.

Date _____

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

Patient's Name: _____

Room No.: _____ Physician's Name: _____

Radioisotope Administered: _____

Date and Time of Adininistration: _____

Dose Received: _____ Method of Administration: _____

Exposure Rates in mR/hr

Date	3 feet from bed	10 feet from bed

(Comply with all checked items)

_____ 1. Visiting time permitted: _____

_____ 2. Visitors must remain_____from patient.

_____ 3. Patient may not leave room.

_____ 4. Visitors under 18 are not permitted.

_____ 5. Pregnant visitors are not permitted.

_____ 6. Film or TLD badges must be worn.

_____ 7. Pocket chambers will be worn for supplementary personnel monitoring of individual tasks.

_____ 8. Tag the following objects and fill out the tag:

_____ door _____ chart

_____ bed _____ wrist

_____ 9. Disposable gloves must be worn while attending patient.

_____ 10. Patient must use disposable utensils.

_____ 11. All items must remain in room until approved for removal by the Radiation Safety Officer or his designee.

_____ 12. Smoking is not permitted.

_____ 13. Room is not to be released to Admitting Office until approved by the Radiation Safety Officer or his designee.

_____ 14. Other instructions.

In case of an emergency contact:

RSO

_____

Name On-duty/Off-duty Telephone Numbers

SUBJECT: Radioactive Therapy-General Information Regarding Patient's Receiving Radioactive Iodine Therapy

DATE: REVISED DATE:

DISTRIBUTION: Nursing Units FROM: Nursing Administration

PURPOSE: In addition to providing a safe environment for personnel and other patients, the need to provide a therapeutic, anxiety-reducing milieu is of utmost importance.

RATIONALE AND GENERAL INFORMATION:

1. Radioactive Iodine, also known as 1131, is administered to patients for treatment of hyperthyroidism, carcinoma of the thyroid and some cardiac disorders. The radioacti iodine is given either in liquid or capsule form, by mout and in amounts much greater than is used for thyroid scan or diagnostic studies. In the amounts given, the radiati from the radioactive Iodine may create exposure problems which should be understood and dealt with appropriately. The majority of the utilized Iodine is attracted and captured by the thyroid gland where it remains to do its work. Only varying amounts of the radioactive Iodine, however, are used by the thyroid and most of the excess is quickly discharged in the urine, feces, and perspirati within 24 to 48 hours. It should also be noted that radi active Iodine has a particular decay pattern and that the Isotope has a half life of 8 days. Only one-half of the radioactivity or radiation strength remains after 8 days and only one-quarter remains after 16 days, etc. Obviou the patient receiving radioactive Iodine emits radiation does the patient's excrets, soiled bedsheets or vomitus.

2. All persons are exposed to radiation from so-called actin and cosmic radiation. The latter are very small in quan . Any amount of radiation over and above cosmic radiation, except as is necessary for medical purposes or for medic purposes for performance of duties, is to be limited.

3. The amount of radiation exposure for scans and diagnosti procedures is extremely small. The dosage of 1131 for treatment of hyperthyroidism is considerably more than for diagnostic tests but is relatively small as compared to the dosage generally administered for carcinoma of th thyroid which is usually very large. The Nursing and Dietary Staff should understand that in terms of annual permissable dosage, the amount of radiation received fro one or a few patients during usual nursing care is not

ITEM #19
DATE: 7-21-80

considered prohibitive nor excessive. It is however prudent that nursing care and attendance should be brief, but not so abrupt as to unduly frighten the patient.

APPROVED BY:

SUBJECT: Radioactive Iodine Therapy for Hyperthyroidism

DATE: REVISED DATE:

DISTRIBUTION: Nursing Units FROM: Nursing Administration

I. OBJECTIVES: Provide knowledge regarding order of scheduling patient preparation and technique of exam.

II. RATIONALE: Radioactive Iodine is given for treatment of hyperthyroic in much smaller doses than those given for carcinoma of t thyroid and are of the order of 5 to 8mCi. While some of these patients may be treated as a hospital in-patient, they very often are treated on an out-patient basis and may be discharged to home from the hospital at any time during their stay by direction of the referring physicia and/or Nuclear Medicine Department. The patient constit very little hazard to others especially after the first 24 hours, but most of the principles of nursing care enu in the procedure on radioactive iodine therapy for carci of the thyroid should be observed during the patient's hospital stay. Care should be given considering that th dosage of I131 for treatment of hyperthyroidism is cons less than the dosage used for carcinoma of the thyroid.

III. EQUIPMENT:

1. Linen changes as necessary.
2. Linen hamper with isolation bags.
3. Trash bags - plastic.
4. Disposable water pitcher/isolation trays from dieta
5. Isolation gowns.
6. Disposable gloves.
7. Specimen collection items as needed.
8. Scrub brushes, 2.

IV. APPROX. LENGTH OF PROCEDURE: Variable-limited to 3-4 minutes each nursing visit.

V. PROCEDURE:

A. Scheduling

Scheduling of 1131 therapy for hyperthyroidism agai should be done through the Nuclear Medicine Depart as was indicated for therapeutic dosage for carcino of the thyroid. Special precautions for the patien receiving such therapy are those of avoiding specia medications that act blocking agents or anti-thyroi drugs. Likewise, the patient's diet prior to thera should be low-salt diet.

B. Nursing care for patients receiving 1131 for hyperthyroidism

1. The patient should be given a preliminary bath and personal care.

2. The patient should be instructed in self care including bathing

3. Nursing care should be brief and limited to 3 or 4 minutes as necessary.

4. The patient should be instructed concerning flushing of the toilet 3 or 4 times after each use. No pregnant visitor nor personnel shall attend the patient. (PREG.)

5. Sufficient disposable linens, gowns and gloves should be made available in the room. All of these considered soiled shall be retained in the room, preferably within plastic bags.

6. In the event of vomiting, the vomitus should be saved, the Nuclear Medicine Department should be informed, and any handlin of materials should be done with rubber gloves. The Dietary Department should follow the same instructions for attendance.

7. The Nuclear Medicine Department shall monitor the room and its contents after the patients dismissal.

VI RECORDING: Nursing care, observations, teaching, and any unusual occurance must be recorded within the nurses' notes.

SUBJECT: Radioactive Therapy-Radioactive Iodine Therapy for Carcinoma of the Thyro and/or Metastatic Disease (I131)

DATE: REVISED DATE:

DISTRIBUTION: Nursing Units FROM: Nursing Administration

I OBJECTIVES: In addition to providing a safe environment for personnel and other patients, the need to provide a therapeutic, anxiety-reducing milieu is of utmost importance.

II RATIONALE:

1. Radioactive Iodine is given to destroy the carcinomato thyroid, its post-operative remnants or its neoplastic metastases especially the metastases of some forms of thyroid carcinoma. Large doses of Iodine are required for treatment and may be as high as 150mCi. This dose may be repeated at 6 months intervals, if necessary.
2. Patients treated with radioactive therapy are fearful that they will continuously be dangerous to others.
3. They also fear the damage that radiation may do to other non-cancerous tissues of the body.
4. There can be little close patient-nurse contact durin isolation, due to the hazard of exposure.
5. Being segregated produces boredom and sense of reject
6. Body secretions (including perspiration) and excretio are radioactive.
7. Flushing the toilet three to four times dilutes radio active materials to safe level.
8. Iodine-containing salts are restricted in the patient with I 131 therapy due to the uptake of iodine by th thyroid which may limit the effective therapeutic up of I 131 tagged isotope.

III EQUIPMENT:

1. Linen changes as necessary.
2. Linen hamper with isolation bags.
3. Trash bags - plastic.
4. Disposable water pitcher/isolation trays from dietar
5. Isolation gowns.
6. Disposable gloves.
7. Specimen collection items as needed.
8. Scrub brushes, 2.

IV PROCEDURE:

A. Scheduling and Requisitioning

Radioactive Iodine treatments will be scheduled wit the Nuclear Medicine Department through the Chief N. Technician and during regular Department hours. A written requisition should accompany the request an the latter should be authenticated by the att..ding physician and should provide a clinical history as. Emergencies will be arranged for through a special system, as is necessary.

B. Care of the Patient Receiving Therapy

1. The patient shall be assigned and will require a single or private room with bath. The patient sha remain hospitalized for at least 3 or 4 days and until the amount of administered isotope has dimin to less than 30 mCl, as determined by the Nuclear Medicine Department.
2. The Nuclear Medicine Department will determine the dosage of radioactive Iodine to be given to the patient and when the patient shall be discharged. A special instruction sheet will be attached to the front of the patient's chart with any special instructions or protection recommendations.
3. Preliminary preparation should include the followi

a. All laboratory specimens and tests shall be drawn and obtained prior to administration of Isotope therapy unless otherwise indicated by the Nuclear Medicine Department
b. A compassionate and well planned explanation shall be given to the patient, to explain their isolation and the handling of their nursing n This generally will allay the fears of the pa concerning any dangers of the radioactivity t others or to themselves.
c. An explanation should be given to the patient concerning their individual and personal care including special items such as bathing and bathroom instructions. The patient should be informed concerning the communication and ale ing the nursing desk in the event of vomiting or incontinence.
d. The patient should be specially instructed th toilets should be flushed 3 or 4 times after
e. The patient should have bathed or have receiv a bath prior to administration of therapy.
f. A double check of the patient's wrist band identification is desired before therapy.
g. Arrangements should be made for diversions su as radio, television, books, etc.
h. The patient's room should be well supplied wi disposables so as to avoid additional trips and out of the room. Items such as gowns, g trays, glasses and plastic bags should be su in sufficient amounts. (Dietary personnel sh follow the same brief attendance to the patie is indicated for the nursing staff.
i. The patient's room shall be posted with the magenta Radioactivity sticker recommended by N.R.C. (Nuclear Regulatory Commission).
j. Room will be surveyed by technologist and . O will review survey results.

4. During Therapy:

   a. Close patient contact should be limited to a f minutes (3 or 4 minutes) per visit as require and as is necessary. No pregnant nurse nor other pregnant persons should be in attendanc or visiting.
   b. Gowns and disposable gloves are to be worn fo direct patient contact and handling any linen excreta and contaminants.
   c. If the patient should vomit within 3-4 hours of the time of administration of the isotope, notify the Nuclear Medicine Department and safety officer immediately. Do not dispose o vomitus or soiled linen until it has been monitored. Keep in a separate plastic bag. (Red isolation bag) Handle only with gloves.
   d. All linens and other items including contamin shall remain in the patient's room throughout the patient's stay and until all things have been monitored by the Nuclear Medicine Depart
   e. All contaminations such as utensils may be washed in the patient's sink, but are to rema in the room.
   f. The patient's room shall be subsequently moni by Nuclear Medicine Department and all of the utensils shall be thoroughly washed and scrub using rubber gloves.
   g. Visitation is permitted for limited periods i the rooms of patients receiving radioactive Iodine treatment. Visitation should be limit to 45 - 60 minutes about 8 feet from the pati
   h. Any unusual circumstances, occurance, contami tion or accident should be immediately report to the Radiation Safety Officer and Nuclear Medicine Department. The occurance should be recorded in the patient's chart.

5. Terminal Care of Room and Equipment:

   a. Thoroughly wash the equipment with soap under running water. Wash the sink with a brush, soap, and running water after each use to pre collection of radioactivity and subsequent di semination. Always wear disposable gloves whe washing contaminated equipment; discard glove with other contaminated material.
   b. When the patient is discharged, call the Depa ment of Nuclear Medicine for removal of conta materials and monitoring of the room.

RECORDING: Nursing care, record of untoward effects of therapy, disp of contaminated materials are recorded in the nurses' not

Any unusual circumstances, occurance, contamination or accident should be immediately reported to the radiation safety officer and Nuclear Medicine Department. All Such occurances should be recorded in the nurses' notes.

APPROVED BY

DELNOR HOSPITAL

ST. CHARLES, ILLINOIS

PROCEDURES FOR SAFE HANDLING OF BODIES CONTAINING RADIOACTIVE MATERIALS

TERMS & SYMBOLS

Tracer amounts of radioactive isotopes(hereafter called "isotopes") are expressed in microcuries(uCi)
The symbol for radioactive Gold is Au198
The symbol for radioactive Iodine is I 131
The symbol for radioactive Phosphorus is P32
Other isotopes may be used. If so, consult the hospital's Radiologist.

"Contamination" is the term used refering to the presence of radioactive material where it is not wanted.

Half life is the time required for one-half of the radioactive atoms in a given quantity of isotope to disintegrate. In a second equal time, half of the remaining atoms will disintegrate. After seven half lives, less than 1% of the original amount will remain.

A "Survey" means a direct physical measurement of the radioactivity or radiation present at the position in question.

PROCEDURES WITH TRACER AMOUNTS

No special procedures for either autopsy, embalmimg or cremation need to be taken with bodies containing up to 300 microcuries(uCi) of any isotopes.

PROCEDURES WITH THERAPEUTIC AMOUNTS

Embalming

No special procedures are rquired with bodies containing less than 30 millicuries(mCi) of any isotope provided that the embalming is done without openingbody cavities and with standard aspiration and injection methods.

Bodies containing less than 30 millicuries (mCi) of any isotopes may be released to the funeral director without consultation with the hospital's Radiologist.

Cremation

No special procedures as of this date.

Autopsy

Procedure will depend on the amount of isotope present in body at time of autopsy. Charts accompanying body should include data giving specific isotope administered and dates and hour of administration. It Is desirable that this information be on a plastic wrist band, which is placed on the wrist of the patient at the time of administration of the isotope. On the basis of the above information the maximum amount of isotope remaining in the body at the time of autopsy may be determined from Table I.

Less than 5millicuries (mCi) o any isotopein the body at time of autopsy:

NO SPECIAL PROCEDURES ARE REQUIRED

MORE THAN 5 MILLICURIES (mCi) of any isotope in the body:

1. The hospital's Radiation Safety Officer, or his deputy,is required to be present at opening of body.

2. General Procedures:
   a. If possible, cover all except working areas with a 4mm. thick sheet of plastic,such as vinyl, polyethylene or the like.
   b. Always use goggle or eye glasses.
   c. Never work with bare hands. Wear double thick autopsy gloves unless deliacy of procedure prohibits this,then wear double surgical gloves.
   d. Whenever possible work with long handeled instruments to keep hands as far as possible from radioactive areas.
   e. Separate organs should be promptly removed from the main mass and detailed dissection carried out at a distance.
   f. Active tissues to be retained should be stored in separate containers, properly labeled with the name of specific isotope contained therein, the approximateamount of same and the date. This container should be stored in compliance with advice from the hospital's RSO.
3. Special Procedures with IODINE-131
   a. Remove body fluids being especially careful with urine which will be very radiactive in cases where the patient has expired within twenty-four hours after administration of the IODINE-131.
   b. Remove thyroid with long instruments.
   c. For storage , or disposal of gland, consult with the hospital's RSO.

4. Contamination
   a. Instrumentscan, in general, be satisfactorily decontaminated by thorough washing with a detergent and rinsing in running water. It is suggested that presumably decontaminated instruments be surveyed by the hospital's RSO for the first two or three autopsiesof this kindthat are done, in order to test the adequacy of the decontamination procedure.
   b. If gowns or other clothing have been splashed by body fluids, or otherwise suspected of being contaminated, they should be surveye by the hospital's RSO and disposed of in accordance with his advi

Director
Office of Nuclear Materials and Safeguards
United States Nuclear Regulatory Commission
Washington, D.C. 20555

DELNOR HOSPITAL
[illegible] North Fifth Avenue
St. Charles, Illinois 60174
(312) 584-3300

January 31,1984

Dear Sirs,

I hereby submit our NRC license(#12-15842-01) for amendment to include two(2) items of Group VI, Iridium 192 and Iodine 125, for interstitial treatment of cancer.
Users will be Geoffrey L. Smoron,M.D.and James B. Gagnon, M.D. licensed under NRC # 12-06593-01.

The following is a description of special procedures for patients treated with byproduct materials as referenced to Item 20 of Regulatory Guide 10.8 for preparation of application for Medical Programs(Oct. 1980). We have followed instructions for Item 20, lettered a. thru g. as listed in the following paragraphs with the appropriate attachments.

Please find our check attached for amendment f[illegible].

Sincerely,

John A. Taft, Jr.
President

ATT. 20

DELNOR HOSPITAL
ST. CHARLES, IL. 60174

THERAPEUTIC USE OF SEALED SOURCES- IRIDIUM 192 & IODINE 125

a) The Sealed Sources are placed in a decay area, surrounded by lead brick, which is located in our not lab. Refer to diagram attached-item #11. Unrestricted areas are about 7-8 ft from the storeage area and the radiation level around is less than 0.5 MR/hr

b) 12" long forceps are used in handling sealed sources. 5 cm thick lead shield L-block is kept between the source and the personnel handling. Sources are grabbed at the ends only while handling.

c) All personnel handling sealed sources wear TLD ring badges to monitor radiation to extremities.

d) Applicators with sources are kept in a lead container and 2 cm thick lead sheet is kept around the container . The whole set-up is carried by a four wheel cart to the place of use.

e) A log book is kept for source accountability. Periodic source inventory is done whenever sources are taken out for treatment and returned to Source after treatment. To comply with 10CRFR35.14(B)(5)(vii), the Sources are accounted for in the patient room itself right after treatment. If the sources are not accounted for, the patients are kept in the hospital until the sources are accounted. (see attached sheets)

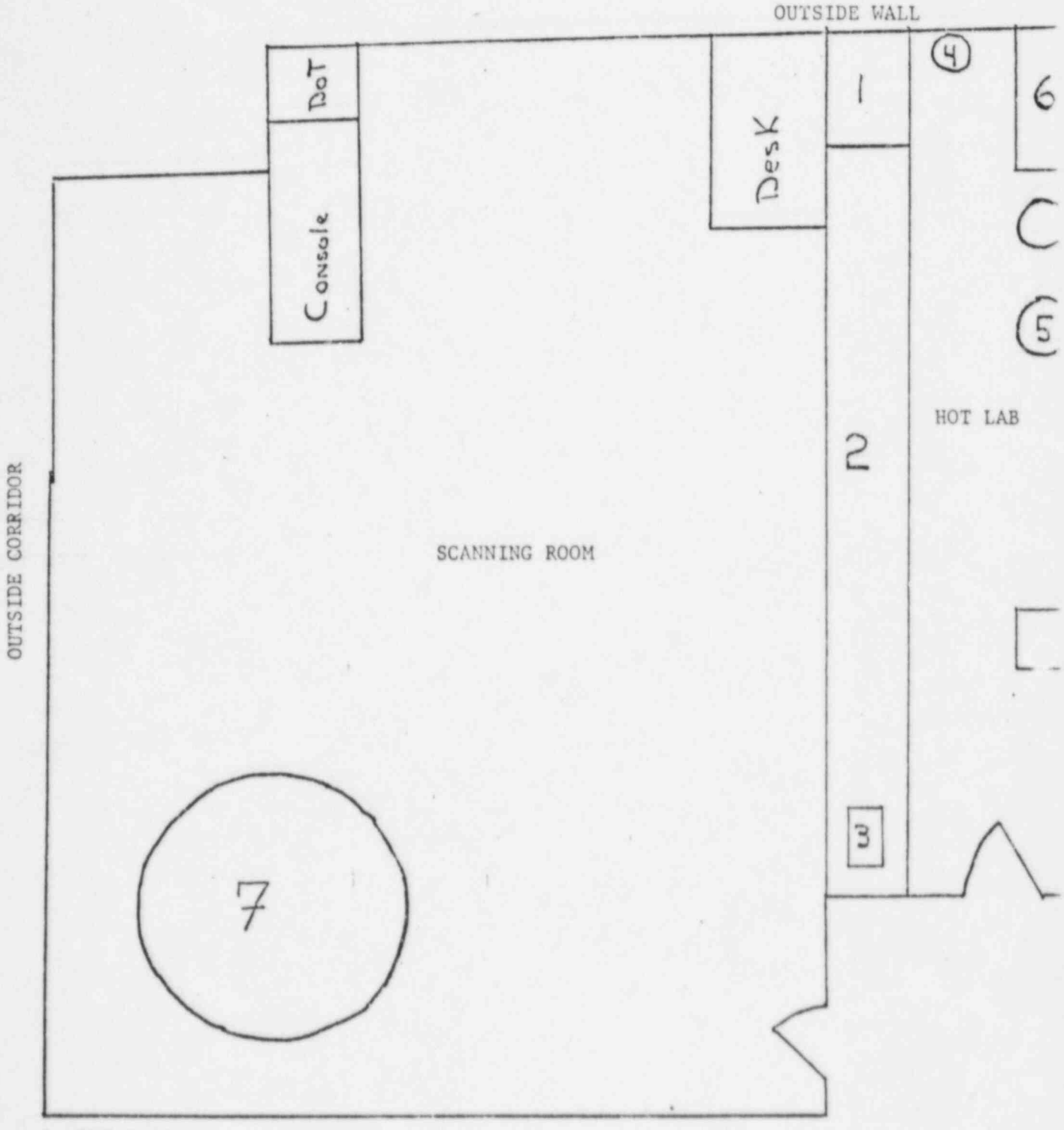
f) Surveys are done with Victoreen #498 or Victoreen #6-A CDV-700, during the course of treatment and after treatment. . See attached sheet

g) Appendix L to this guide will be followed. Necessary additionalsheets are attached.

Item 20

Date 1-31-84

DELNOR HOSPITAL
DEPT. OF NUCLEAR MEDICINE



1. DECAY AREA
2. COUNTER
3. SINK
4. WASTE CAN
5. WASTE CAN
6. DOSE AREA
7. GAMMA CAMERA

ATTACHMENT #11

DELNOR HOSPITAL

ST. CHARLES, ILLINOIS

BRACHYTHERAPY SOURCE INVENTORY

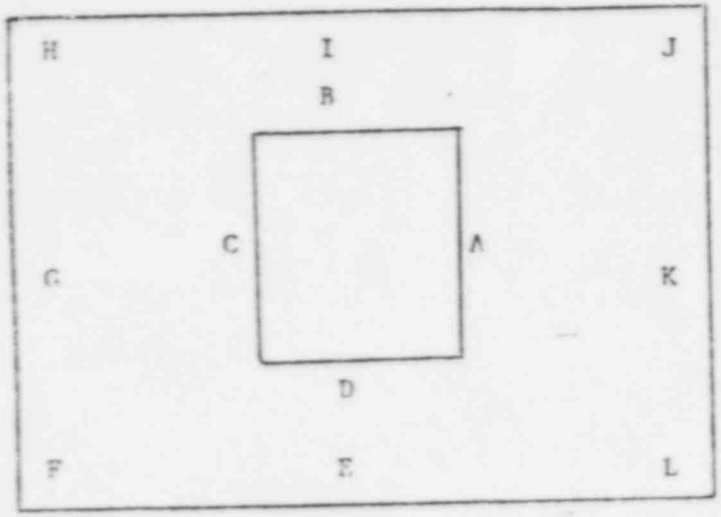
Nuclide	Form	Length		Nominal Strength	Filtration	Total number	Person perform inventory
		Total	Active				

Date_____ Signature_____

OPERATING ROOM #_____

Date:_____ Time:_____

Patient Name:_____



Room Survey in mR/Hr

A._____ G._____

B._____ H._____

C._____ I._____

D._____ K._____

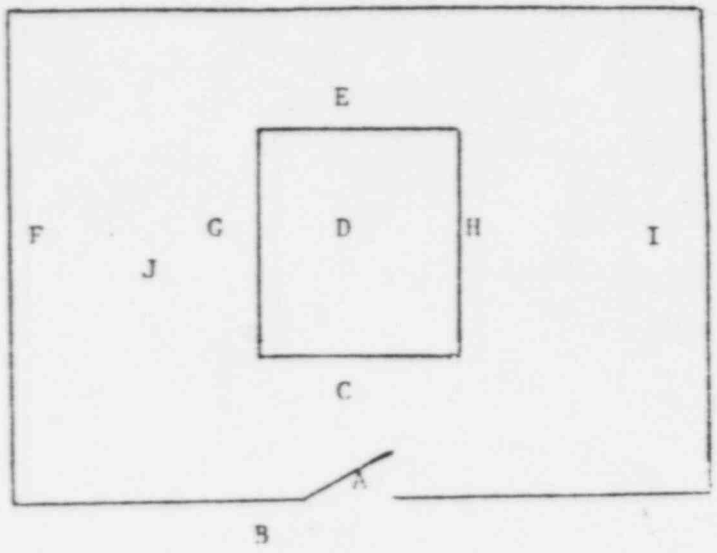
E._____ L._____

F._____

COMMENTS:

PATIENT'S ROOM #_____

Date:_____ Name:_____



Room Survey in mR/Hr

A. Doorway (open)_____
B. Doorway (closed)_____
C. Head of bed_____
D. Area above patient_____
E. Foot of bed_____
F. Left side of bed by wall_____
G. 1 ft. from bed_____
H. 1 ft. from bed_____
I. Right side of bed by wall_____
J. 3 ft. from patient_____

APPENDIX L

RADIATION SAFETY PROCEDURES FOR THERAPEUTIC USE OF SEALED SOURCES*

1. All patients treated with brachytherapy sources will be placed in a private room that has a toilet.

2. The patient's room will be properly posted or attended in accordance with §§ 20.203 or 20.204 of 10 CFR Part 20.

3. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after sources are implanted. Exposure rate measurements will be taken at 3 feet (or 1 m) from the patient with sources implanted, at the patient's bedside, at 3 feet (or 1 m) from the bed, and at the entrance to the room. The Radiation Safety Officer or his designee will then determine how long a person may remain at these positions and will post these times and the exposure rate at 3 feet (or 1 m) from the patient on the patient's chart.

4. Immediately after sources are implanted, the form "Nursing Instructions for Patients Treated with Brachytherapy Sources" will be completed and attached to the patient's chart.

5. Radiation levels in unrestricted areas will be maintained less than the limits specified in paragraphs 20.105(b)(1) and (b)(2) of 10 CFR Part 20.

6. Nurses caring for brachytherapy patients will be assigned film or TLD badges. TLD finger badges will also be assigned to nurses who must provide extended personal care to the patient. Pocket dosimeters may be assigned in addition to a film or TLD badge.

7. At the conclusion of treatment, a survey will be performed in accordance with paragraph 35.14(b)(5)(vii) of 10 CFR Part 35 to ensure that all sources other than permanent implants have been removed from the patient and that no sources remain in the patient's room or in any other area occupied by the patient. At the same time, all radiation signs will be removed and all film and TLD badges assigned to nurses will be collected. If the patient is to be discharged, the final survey will also include a notation on the patient's chart that the activity remaining in the patient meets conditions for release from the hospital.

8. Instructions to Nurses

   a. Special restrictions may be noted on the precaution sheet on the patient's chart. Nurses should read these instructions before administering to the patient. The Radiation Safety Officer should be contacted to answer any questions about the care of these patients in regard to radiation safety precautions.

   b. Nurses should spend only the minimum time necessary near a patient for routine nursing care. Obtain and wear a film or TLD badge or a pocket chamber as instructed by the Radiation Safety Officer.

   c. When a nurse is assigned to a therapy patient, a film or TLD badge should be obtained immediately from the Radiation Safety Officer or his designee. The badge shall be worn only by the nurse to whom it is issued and shall not be exchanged among nurses.

   d. Pregnant nurses should not be assigned to the personal care of these patients.

   e. Never touch needles, capsules, or containers holding brachytherapy sources. If a source becomes dislodged, use long forceps and put it in the corner of the room or in the shielded container provided; contact Radiation Therapy, the Radiation Safety Officer, or the Nuclear Medicine Department at once.

   f. Bed bath given by the nurse should be omitted while the sources are in place.

   g. Perineal care is not given during gynecologic treatment, the perineal pad may be changed when necessary unless orders to the contrary have been written.

   h. Surgical dressings and bandages used to cover the area of needle insertion may be changed only by the attending physician or radiologist and MAY NOT BE DISCARDED until directed by the radiologist. Dressings should be kept in a basin until checked by the Radiation Safety Officer or his designee.

      Special orders will be written for oral hygiene for patients with oral implants.

   i. No special precautions are needed for sputum, urine, vomitus, stools, dishes, instruments, or utensils unless specifically ordered, but these items should be saved for a check with a radiation survey meter to ensure that no sources have been inadvertently displaced into them.

*Be sure to submit complete responses to Items 20a through 20f in addition to referencing procedures in Appendix L.

j. All bed linens must be checked with a radiation survey meter before being removed from the patient's room to ensure that no dislodged sources are inadvertently removed.

k. These patients must stay in bed unless orders to the contrary are written. In any event, patients will remain in their assigned rooms during the treatment period.

l. Visitors will be limited to those 18 years of age or over unless other instructions are noted on the precaution sheet on the patient's chart.

m. Visitors should sit at least 3 feet (or 1 m) from the patient and should remain no longer than the time specified on the form posted on the patient's door and on his chart.

n. No nurse, visitor, or attendant who is pregnant should be permitted in the room of a patient while brachytherapy sources are implanted in the patient. Female visitors should be asked whether they are pregnant.

o. Emergency Procedures

(1) If an implanted source becomes loose or separated from the patient, or

(2) If the patient dies, or

(3) If the patient requires emergency surgery, immediately call _____

_____

Telephone No. (days) _____

(nights) _____

p. At the conclusion of treatment, call the Radiation Safety Officer to (1) survey the patient and room, (2) count the radiation sources to be sure that all temporary implants have been removed prior to discharging the patient, and (3) record a summary of the final survey results on the patient's chart. If any permanent implants are to remain in the patient, the Radiation Safety Officer will brief the patient on precautions for minimizing radiation exposure to others after discharge from the hospital.

RADIOACTIVE MATERIAL PACKAGE

RECEIVING AND SHIPPING

SURVEY RECORD

Date: Time:

From:

Isotope:

Amount:

Activity:
Number of Sources:

Radiation Survey:

Surface:

3 ft. Dist.:

Empty Package:

Surveyor:_____

Date:_____

Date: Time:

Ship To:

Isotope:

Amount:

Activity:
Number of Sources:

Radiation Survey:

Surface:

3 ft. Dist.:

Surveyor:_____

Shipping Date:_____

Shipping Company:_____

Shipper:_____

_____ HOSPITAL

PATIENT'S NAME _____ UNIT NUMBER _____

CAUTION

RADIOACTIVE MATERIAL

PERMANENT IMPLANT OR INTERNAL DOSE

Radionuclide _____ mCi _____

Administered _____
(DATE)

Initial Exposure Rate at 1 Meter _____ mR/h

(SIGNATURE) _____

INSTRUCTIONS:

Patient must remain in hospital until _____
(DATE)

"Radioactivity Precautions" tag may be removed _____
(DATE)

The Radiation Protection Office (Ext. _____) must be notified before discharge or removal of patient.

For further information call Radiation Protection Office. In case of an emergency, the telephone operator has a call list for use when the Radiation Protection Office is not open.

Date _____ Signature _____
RADIATION PROTECTION SUPERVISOR

09-488 Printed in U.S.A.

_____ HOSPITAL

RADIOACTIVITY

PRECAUTIONS

RADIONUCLIDE _____ mCi _____

DATE _____

See Nursing Station for Instructions.

Tag is not to be removed until:

1) Radioactive material is removed from patient, or
2) Authorization is received from Radiation Protection Supervisor.

Signature _____

09-884

NUCLEAR [illegible]

CAUTION
RADIOACTIVE
MATERIAL

Isotope
Amount
Date

_____ HOSPITAL

Patient's Name _____ Unit Number _____

CAUTION

RADIOACTIVE MATERIAL

TEMPORARY IMPLANT

Radionuclide _____ mCi _____
Inserted _____
(DATE)

Initial Exposure Rate at 1 Meter _____ mR/h

(SIGNATURE) _____

To Be Removed _____
(DATE)

INSTRUCTIONS:

Patient must remain in hospital until implant is removed. When implant is removed, "Radioactivity Precaution Tags" may also be removed.

For further information call Radiation Protection Office (Ext _____).

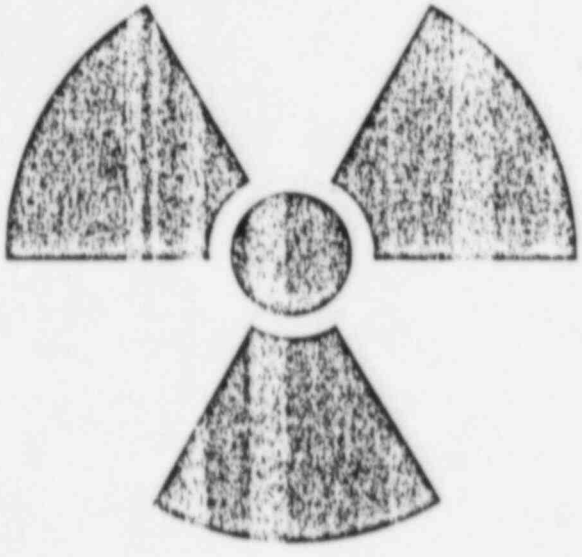
In case of emergency, the telephone operator has a call list for use when the Radiation Protection Office is not open.

Date _____ Signature _____

RADIATION PROTECTION SUPERVISOR

[illegible] CORP. Center Moriches, N.Y. 11934

CAUTION



RADIOACTIVE MATERIALS

PATIENT _____

RADIOISOTOPE _____ AMOUNT _____ DATE _____

IN AN EMERGENCY CALL _____ _____
PHYSICIAN TEL. NO RADIATION SAFETY OFFICER TEL. NO

09-587 BRUCE MEDICAL ASSOCIATES, Inc. • Glen Cove, N.Y. PRINTED IN U.S.A.

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH BRACHYTHERAPY SOURCES

Patient's Name: _____

Room Number: _____ Physician's Name: _____

Isotope and Activity: _____

Date and Time of Administration: _____

Date and Time Sources Are To Be Removed: _____ Isotope: _____

Exposure Rates in mR/hr

Bedside	3 feet from bed	10 feet from bed

(Comply with all checked items.)

_____ 1. Wear film or TLD badge.

_____ 2. Wear pocket chambers for supplementary personnel monitoring of individual tasks.

_____ 3. Wear rubber gloves.

_____ 4. Tag the following objects and fill out the tag:

_____ door _____ chart

_____ bed _____ wrist

_____ 5. Place laundry in linen bag and save.

_____ 6. Housekeeping may not enter the room.

_____ 7. Visiting time permitted: _____

_____ 8. Visitors must remain _____ from patient.

_____ 9. Patient may not leave the room.

_____ 10. Patient may not have visitors.

_____ 11. Patient may not have pregnant visitors.

_____ 12. Patient may not have visitors under 18 years of age.

_____ 13. Patient must have a private room.

_____ 14. A dismissal survey must be performed before the patient is discharged.

_____ 15. All items must remain in the room until approved for disposal by the Radiation Safety Officer or his designee.

_____ 16. Contact the Radiation Safety Office when temporary sources (nonpermanent implants) are removed to perform a survey to be sure all sources are removed from the patient, to do a physical source count, and to be sure no sources remain in the room.

_____ 17. Contact the Radiation Safety Office when the patient is discharged to survey the room prior to its assignment to another patient.

_____ 18. Other instructions.

RSO

Name On-duty/Off-duty Telephone Numbers

Saint Joseph Hospital
Regional Cancer Care Center

77 North Airlite Street
Elgin, Illinois 60120
Telephone 312 695-3200

A Division of the
Franciscan Sisters
Health Care Corporation

Radiation Therapy
Chemotherapy
Surgery

GUIDELINE FOR EXPOSURE LIMIT FOR NURSES

TENDING BRACHYTHERAPY PATIENTS

Maximum Allowable Yearly Exposure for Radiation Workers = 5,000 mrem

Largest number of days in a year in which sources were utilized in patients (recorded in 1979) was 120 days. (Average for 1980-82 was only 28 days/year).

Assuming the same nursing staff is allocated to brachytherapy patients for a whole year, maximum allowable daily exposure is 5,000/120 = 40 mrem/day.

(In effect this includes a safety factor of 2-4 based on recent usage).

Thus, total hours allowed by the bedside are obtained from measured dose rate at bedside:

$$\text{Hours at bedside/day} = \frac{40}{\text{Dose rate at bedside (mrem/hr)}}$$

Ivan Rosenberg 9-19-83
Radiation Safety Officer

DELNOR HOSPITAL

ST. CHARLES, ILLINOIS

RADIATION SURVEY

PATIENT'S NAME ______________________________

NURSING FLOOR ________________ ROOM NO. ________

DATE ________________ TIME ________________

Note: Write down the pen-dosimeter readings when you enter the patient's room and when you leave the room.

NAME	Readings		NAME	Readings	
	In	Out		In	Out

SJN-188

SAINT JOSEPH HOSPITAL
ELGIN, ILLINOIS

RADIUM NEEDLES / CESIUM TUBES / RADON OR I-125 SEEDS DATA SHEET

Name _____ Age _____ Unit _____

Address _____

_____ Phone _____

Diagnosis _____

Previous X-Ray Rx. _____

Previous Surgical Rx. _____

_____

COLPOSTAT CAPS:
TOTAL AMOUNT:
DIAGRAM:

To Be Removed On:

Day: _____

Date: _____ at _____ AM/PM

By: _____ M.D.
(Physician)

Patient and patient room were surveyed and no/some residual activity was noticed

_____

Radiation Safety Officer

Applicator: _____ Time Inserted: _____ at _____ AM/PM

Contents Each: _____ Time Removed: _____ at _____ AM/PM

Filter: _____ Total Time (Hours): _____

Total Amount: _____ Milligram Hours: _____

Points of Interest	Dose Rate (rads/Hr)	Total Dose (rads)
Vaginal Surface		
Cervical Os		
Point A		
Point B		
Bladder		
Rectum		
Other		

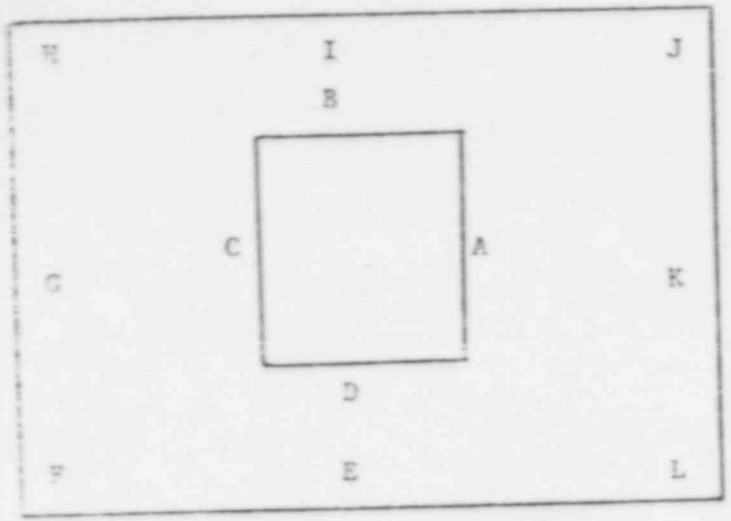
_____ M.D.
(Attending Physician)

SJR-7 (10/78)

OPERATING ROOM #_____

Date:_____ Time:_____

Patient Name:_____



Room Survey in mR/Hr

A._____ G._____

B._____ H._____

C._____ I._____

D._____ K._____

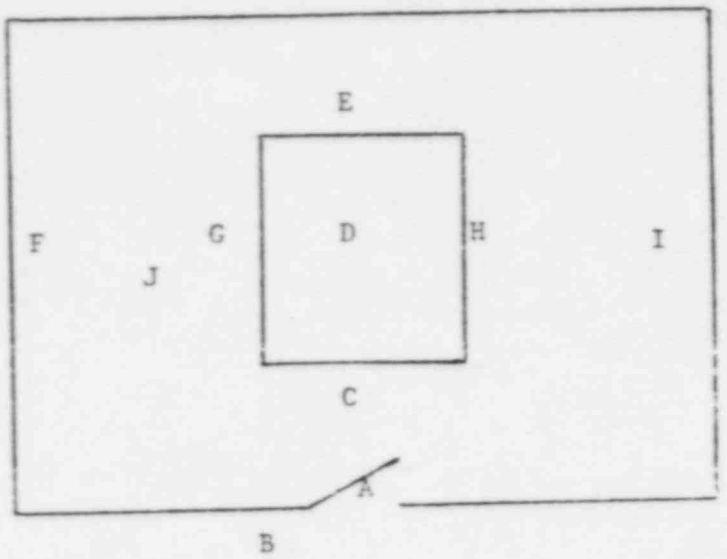
E._____ L._____

F._____

COMMENTS:

PATIENT'S ROOM #_____

Date:_____ Name:_____



Room Survey in mR/Hr

A. Doorway (open)_____
B. Doorway (closed)_____
C. Head of bed_____
D. Area above patient_____
E. Foot of bed_____
F. Left side of bed by wall_____
G. 1 ft. from bed_____
H. 1 ft. from bed_____
I. Right side of bed by wall_____
J. 3 ft. from patient_____

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RADIATION SAFETY PRECAUTIONS

Patient Name _____ Radioactive Material _____

Amount _____ mg Ra. Eq./mCi Applicator _____

Attending Physician _____ Phone _____

Date/Time of Insertion _____

THIS PATIENT IS IN RADIATION ISOLATION UNTIL THE RADIOACTIVE MATERIAL IS REMOVED. THE PATIENT IS NOT ALLOWED TO LEAVE THE ROOM UNLESS OKAYED BY RADIATION SAFETY OFFICER/IN CHARGE.

NURSING:

1. No pregnant employee nor employee under 18 years shall attend the patient.
2. Nurses shall spend only the minimum time necessary near the patient for routine nursing care. Limit the time to _____ hours per day.
3. Perineal care shall not be given during gynecological treatment. Perineal pad may be changed when necessary unless orders to the contrary have been written.
4. All attendants shall wear the radiation monitoring device.
5. Never touch sources with hands If the source becomes dislodged, use long forceps and put it in the lead container provided. Contact Radiation Safety Officer/Radiotherapist.
6. In the event of death, contact Radiotherapist and Radiation Safety Officer.

VISITORS:

No pregnant visitor or visitors under 18 years are allowed. Visitors shall sit _____ feet from the patient and limit their stay to _____ hours per day.

HOUSEKEEPING:

1. No pregnant employee nor employee under 18 years shall attend the patient.
2. Provide services as usual and limit the time to _____ minutes per day.
3. Dispose trash as usual unless otherwise instructed by your Supervisor or Radiation Safety Officer.

1. Ni una empleada "A" que este en cinta, o menor de 18 años, atenderá al paciente.
2. Limpiar como siempre, pero limitando, el tiempo a _____ minutos al día.
3. Se tira la basura como siempre a no ser que reciban, otra instrucción de la supervisora o un oficiál del departamento de radiación.

Conducted by the Franciscan Sisters Health Care Corporation

COLORADO GENERAL HOSPITAL
COLORADO PSYCHIATRIC HOSPITAL
CHILDREN'S DIAGNOSTIC CENTER
SCHOOL OF MEDICINE
SCHOOL OF NURSING
SCHOOL OF DENTISTRY

CARE OF PATIENTS TREATED WITH SEALED SOURCES OF RADIONUCLIDES

I. Visitors

A. No one under 18 years of age permitted in the room.

No pregnant visitors are allowed in the room.

II. Nursing Service

A. Nursing personnel caring for patients will be supplied with a room survey showing radiation exposure rates within and surrounding the patient's room. The closer to the patient and the longer with the patient, the higher your exposure will be.

B. Pregnant personnel shall not participate in direct care of patient.

C. Patients of childbearing age should not be housed in adjoining rooms.

D. Radiation monitoring devices will be supplied to nursing personnel whose exposures might reach measurable levels.

E. A "Caution: Radioactive Materials" sign stating "Unauthorized Entrance Not Permitted" will be posted on the outer surface of the room door.

F. Any misunderstandings by either patient or relatives of the nature of the treatment and/or of the necessity of isolation should be referred to the physician performing the treatment.

G. The patient should be housed in as isolated a room as possible.

III. Radiation Safety

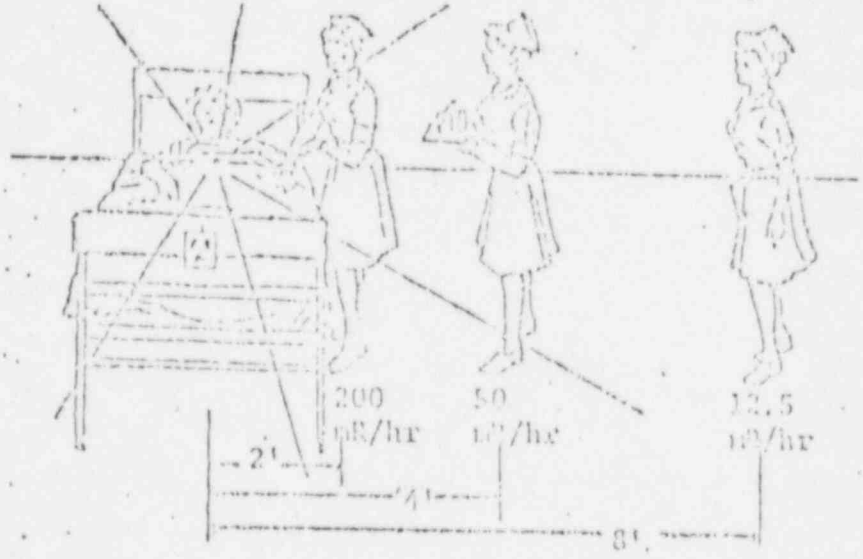
Sealed sources of radium or cesium are encased in special substances which confine the radioactive material. These radiation sources or implants, which may be prepared in a variety of shapes and sizes, are used for the gamma rays they emit. But, because the penetrating gamma radiation is not confined to the patient's body, it presents an external hazard to personnel attending the patient.

Time, distance, and shielding are the factors to be considered in establishing protective procedures to reduce exposure to external radiation. The time factor is used by the nurse who plans her work at the bedside so carefully that essential care is given in a minimum length of time. If she accomplishes her task in half the usual period of time,

III. Radiation Safety (cont.)

she is reducing her exposure by one half. With thought and planning, the length of time spent with the patient often can be reduced considerably without sacrificing the quality of care.

Using distance to reduce radiation is not always possible in a crowded hospital. A patient being treated with a radioactive source should be placed in a single room with an outside wall. Most implants are in place for only two to three days. In addition to considering the levels of radiation in any room adjoining the patient's, exposure levels above and below the patient's room are also considered. Elderly patients, or at least those beyond the child-bearing years, should be selected to occupy beds adjacent to the room of the patient being treated.



The nurse nearest the source of radioactivity (the patient) is more exposed; at 2 feet exposure is almost 15 times that at 8 feet. Lead shielding will further reduce the exposure shown.

Time and distance are not always sufficient to reduce radiation exposure to acceptable levels. In such instances shielding will be added. Lead serves as an effective shield and may be used in the form of heavy movable sections. Portable lead shields will be provided that can be raised or lowered at the bedside to the height needed for the type of activity being carried out. Although lead aprons and lead gloves provide effective protection during radiographic and fluoroscopic examinations, they do not provide adequate protection against the more penetrating gamma-emitting sources such as radium or cesium; heavier lead shields are needed.

Under no circumstances should a radioactive source be picked up by hand. If an implant has been removed or dislodged inadvertently, please contact the doctor in charge of the implant procedure (Radiation Therapy ~~304-2810) or~~ the Radiation Safety Office ~~(304-2906)~~. In case of emergency, home phone numbers can be obtained by calling the ~~University Medical Center~~ operator. Unusual situations or death of the patient should be referred immediately to the same persons.

Once treatment is completed and the sealed radioactive source removed, the patient no longer presents a hazard to others; they are not radioac-

RADIATION SAFETY OFFICER

Saint Joseph Hospital
77 N. Airlite St. • Elgin, Illinois 60120 312/695-3200

PROTOCOL FOR PERMANENT INTERSTITIAL IMPLANTATION WITH I-125 SEEDS

A. Preoperative Orders

1. Check the activity of the seeds with dose calibrator and load the seeds in the Mick Applicator Magazines. (This shall be done by the physicist the day before the application date.)
2. Arrange to have I-125 seeds for gas sterilization and delivered to O.R. prior to procedure.
3. Preoperative medication (ordered by Anesthesiologist)
4. Medical clearance obtained if indicated.
5. Consent for implant procedure.
6. Other preoperative orders as per Urologist.

B. Equipment required for interstitial implant

1. Mick Applicator (complete set)
2. Template (if needed)

C. Retropubic exposure and bilateral pelvic node dissection (by Urologist)

D. Interstitial implantation of prostate (by radiotherapist)

1. The prostate gland is examined utilizing sterile O'Connors drape for rectal evaluation of prostate gland. Measurements are then taken of length and width of prostate gland by use of steel calipers and are recorded on Implant worksheets. Next, the third dimension (depth) is determined by placing a #17 gauge steel needle 15 cm long into the prostate gland at its thickest portion until the needle point can be sensed by the examining finger in the rectum. Then the length of the 15 cm needle extending above prostate gland is measured with calipers and/or steel ruler; this value is subtracted from the total length of the needle. The difference obtained will be the depth of the gland.
2. During the procedure, a careful record is kept of the number of I-125 seeds implanted.
3. Monitoring devices will be given to concerned personnel in the room for personnel exposure readings.
4. Operating room survey will be done during procedure.
5. Surgical incision is closed (by urologist).

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PROTOCOL FOR PERMANENT INTERSTITIAL IMPLANTATION WITH I-125 SEEDS

Continued - Page 2

E. Postoperative Orders

1. All orders as per urologist.
2. No recovery room precautions are necessary.
3. Patient shall be kept in private room.
4. All pertinent radioactive signs, labels, tags shall be used for patient room.
5. Monitoring devices shall be provided to nurses taking care of those patients.
6. Radiation survey of the patient room shall be done by the physicist.

F. Localization Films

1. Order stereo-graphic films of the prostate for following day or two whenever the patient's condition is stable.
2. Stereo-graphic films with tube shift will be checked by the physicist. (These films are for computer-dosimetry plan)

Saint Joseph Hospital
77 N. Airlite St. • Elgin, Illinois 60120 312/695-3200

PROTOCOL FOR TEMPORARY IMPLANTATION WITH Ir-192 SEEDS

A. External irradiation to have been completed prior to Ir-192 seed implant.

B. Preoperative Orders

1. Patient to be scheduled by radiation oncologist.
2. Preoperative orders (by Anesthesiologist)
3. Obtain medical clearance by primary care physician (if appropriate)
4. Have patient sign consent form for implant.
5. Write preop note.

C. Equipment required for implant

1. Afterloading kit (complete set)
2. Have afterloading kit autoclaved and delivered to O.R. (This shall be done the day before the application date)

D. Ir-192 Seeds

1. Make sure the Ir=192 seeds are in the hospital at least the day before the scheduled date. (checked by physicist)

E. Surgery - OR

1. In surgery, afterloading equipment to be inserted by the radiation oncologist.

F. Postoperative orders

1. Routine postop orders.
2. Patient shall be kept in private room.
3. All pertinent radioactive signs, labels, tags shall be used for patient room.
4. Monitoring devices shall be provided to nurses taking care of those patients.
5. Radiation survey of the patient room shall be done by the physicist.

Saint Joseph Hospital
77 N. Airlite St. • Elgin, Illinois 60120 312/695-3200

PROTOCOL FOR TEMPORARY IMPLANTATION WITH Ir-192 SEEDS

Continued - Page 2

G. Localization Films

1. Order stero-graphic films with dummy seeds after patient goes to private room.

2. Stereo-graphic films with tube shift will be checked by the physicist. (These films are for computer-dosimetry plan)

H. Insert Ir-192 seeds in the afterloading equipment by physicist and radiation oncologist.

I. Sources to be removed at proper time according to the plan by radiation oncologist, physicist, or designate.

J. Ir-192 seeds will be shipped back to the company.

1. X3--133 Delivery/Trapping Unit, Model Xe--400A

ADC Medical (see Appendix A)

A scale drawing of our facilities found in Appendix B. Xe--133 gas will be stored in its original lead shipping container within a storage area (2 inch lead bricks) located in the hot lab. A detailed description of the hot lab including safety equipment is found in the original license submission. Air can enter the area through a ceiling vent and is exhausted via a ceiling vent. The air flow volume of this room is 300 ft^3/min. The maximum concentration of Xe-133 over 40 hours in seven consecutive days for this Restricted Area is,assuming a leakage factor of 25%, calculated to be 0.123×10^{-5}uCi/ml (See Appendix C) which is below the NRC MPC of 1×10^{-5}uCi/ml as stated in Section 20.103 CFR Part 20 and Schedule B Table 1 of Part 20.

In case of the inadvertant release of Xe-133 within the hot lab area, the following emergency procedure will be implemented. All personnel will leave the room and the door will beclosed, sealing the room. The hot lab will be sealed for 25 minutes thus allowing ten complete changes of room air (See Appendix C)

All Xe-133 lung ventilation studies will be performed in the imaging room (See Appendix B). Air enters and exits this room through two ceiling vents.This exhaust duct combines with the exhaust duct of the hot lab. The maximum concentration

Item 21

License #12-15842-01

Information for the Use of Radioactive Gases (Xenon - 133)

AMENDMENT #7

Please amend our NRC license number 12-15842-01 to include Xenon - 133 gas,which will be used to perform pulmonary ventilation studies. We request a possession limit of 100 mCi of Xe-133. A maximum of 5 patients will be studied weekly using an average dose of 10 mCi per procedure. Higher doses will be used only when professional medical judgement indicates it to be necessary.

All doses for patients use will be checked prior to administration using a Mediac dose calibrator. All personnel working in the department will carry whole body film badges. Existing radiation safety precautions will be followed for Xe-133 in addition to the special procedures described in this submission.

Only NDA approved Xe-133 will be utilized for all ventilation procedures. In addition, the following equipment will be utilized in conjunction with our Siemens LFOV camera.

Item #21

Date: 7-21-80

of Xe-133 over 40 hours in seven consecutive days for this restricted area is calculated to be 0.115 X 10^{-5}uCi/ml (See Appendix **D**) which is below the NRC MPC of 1 X 10^{-5}uCi/ml as stated in Section 20.103 10CFR Part 20 and Schedule B Table 1 of Part 20.

In the event of an inadvertent release of Xe-133 in the imaging room, the following emergency procedures will be implemented. The door to the imaging room will be closed, sealing the room, for a period of 90 minutes. This will allow a tenfold complete change of air within the imaging room (See Appendix **D**).

All of the exhausted air from both the imaging room and the hot lab is released into an unrestricted area located on the roof of the hospital. The release point is isolated from all air intakes and adjacent buildings. The maximum concentration of Xe-133 averaged over a period of one year for the unrestricted area is calculated to be 4.38 X 10^{-8} uCi/ml (See Appendix **E**) which is below the NRC MPC of 3 X 10^{-7}uCi/ml as stated in Section 20.106 10CFR Part 20 and Schedule B Table 2 of Part 20 and complies with section 20.1(c) of 10CFR.

The Xe-133 gas will be utilized in the following manner after measuring the dose using a dose calibrator. The patient will be instructed on the details of the procedure. Just prior to the study, one or two practice runs will be performed with

the patient. The Xe-133 will be dispensed using a syringe with appropriate shielding or a Xe-133 dispensing unit. After calibrating the dose, the Xe-133 will be taken to the imaging room using lead shielding. The Xe-133 will then be administered to the patient via an ADC Delivery/Trapping system (See Appendix A). Nose clamps will be used to prevent the patient from exhaling the Xe-133 gas into the room. Upon completion of the study, the used Xe-133 gas will be drawn directly into an ADC Delivery/Trapping system.

In order to insure the minimum leakage of Xe-133 from all phases of use, the following procedures will be followed:

1. The lung ventilation unit will be checked weekly by filling it with oxygen and checking for leakage. The manufacturers instruction will be followed and the carbon dioxide absorber replaced as needed.
2. The efficienty of the Xe-133 trap will be checked periodically by collection exhaust air in a polyethylene bag and counting this under a gamma scintillation camera and recording the counts.(See Appendix A--Instructions) The trap cartridge will be replaced whenever there is a significant increase in the activity in the polyethylene bag.
3. All tubings on the ventilation unit and trap will be checked prior to initiation of the Xe-133 procedure
4. The exhaust vents will be checked at least once a year to confirm their efficiency.
5. A daily check is made to see if system is working

APPENDIX A

ADC Medical

Instruction Manual

Model No. Xe-400A

XENON DELIVERY/TRAPPING SYSTEM

- Operating
- Service

Read Rules for Operation and Instructions Carefully

WARRANTY

ADC products are warranted to be free from defects in material and workmanship for one year from date of shipment. ADC will repair or replace at its option any product that proves to be defective during the warranty period provided that it has received normal use. If product is damaged in transit, you must file claim with the carrier.

ADC Medical
400 SMITH STREET, FARMINGDALE, N.Y. 11735 • (516) 752-9686
800-645-9110

Step 1. INSPECTION: After the packing has been removed, inspect the trap to make certain no damage has occurred in shipment. If damage is evident, file claim with carrier and notify manufacturer immediately.

Step 2. Fill both the CO_2 (Soda lime) and moisture (drierite) canisters with the samples provided. The CO_2 canister is plugged into the side. The bacteria filter is plugged into the CO_2 canister and the tube and mouth piece are attached to the bacteria filter.

Step 3. The moisture canister is located on the top. This canister is plugged into the trap #1 when starting, and is plugged into trap #2 on the following day and so on.

Step 4. Plug the system into any 120 Volt 60 H3 wall socket in close proximity to the gamma camera.

Step 5. Place an oxygen tank close to the system. Using tygon tubing, attach one end to the oxygen tank and the other end to the fitting of the system labeled "OXYGEN". This fitting is located on the top of the unit. Open the oxygen tank valve and allow about 10 litres of oxygen to enter the breathing bag.

Caution: Add oxygen if necessary during the study.

Step 6. Seat the patient with his back to the camera while making certain that both his lungs are included in the cameras field of view.

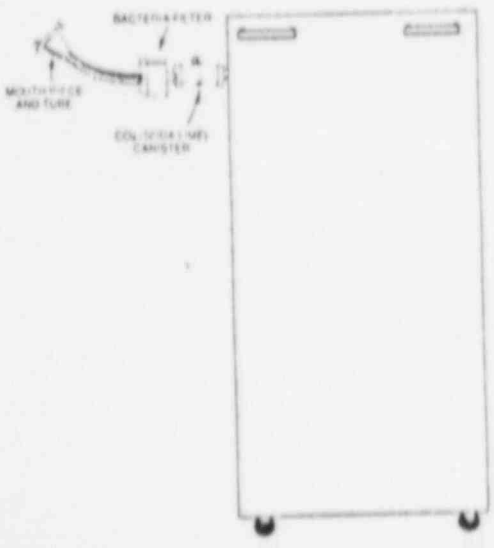
Step 7. Before introducing Xenon into the patient, it is advisable that you acclimate him with the system to gain his confidence.

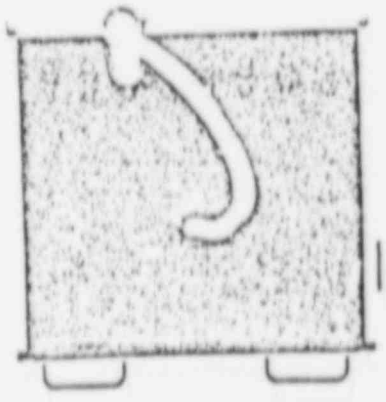
Set the control knob which is located on the back of the unit, to the ACCLIMATE position. Insert the mouthpiece in the patient's mouth and attach a nose-clamp to his nose. Instruct the patient to breathe normally.

At this setting, the patient is breathing room air in and is expiring his breath into the room. This is accomplished through the unique and atuomatic valving arrangement.

Option: A face mask may be used instead of the mouthpiece if preferred.

Only after you are convinced that the patient will cooperate should you proceed with the study.

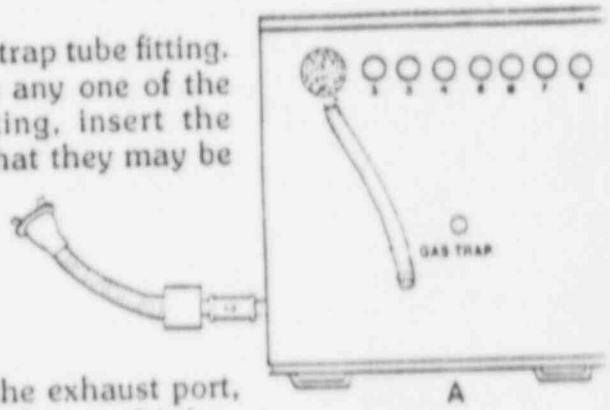




TOP VIEW

PROCEDURE FOR TESTING THE EFFICIENCY OF THE GAS TRAP

Step 1. Disconnect moisture trap tube at the gas trap tube fitting. The moisture trap may be inserted into any one of the eight cartridges. For subsequent testing, insert the moisture trap into other cartridges, so that they may be tested. See figure A.



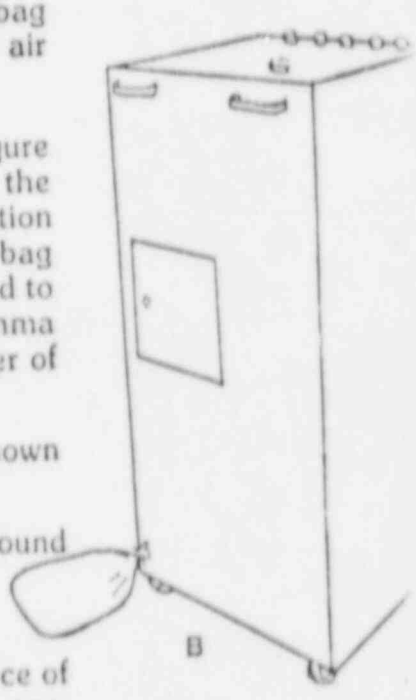
A

Step 2. Attach a soft plastic 10-25 liter bag to the exhaust port, located in the rear lower left hand corner. Secure this bag to the fitting with scotch tape, making the joint as air tight as possible. See figure B.

Step 3. Set the control knob to the evacuate position, (see figure C), to collect filtered air in the attached bag. When the bag is filled, set the control knob to the acclimate position to shut off the vacuum pump. Tie a string around the bag to contain this filtered air. Take this bag, now referred to as bag #1, and place it before the face of your gamma camera. Measure its radiation and record the number of counts. See figure D.

Step 4. Repeat step 2 with a fresh bag and leave it there as shown in figure B. We will refer to this as bag #2.

Step 5. Fill a third bag with air or oxygen and tie a string around it tightly leaving about a 4" long neck. This will be bag #3. See figure E.

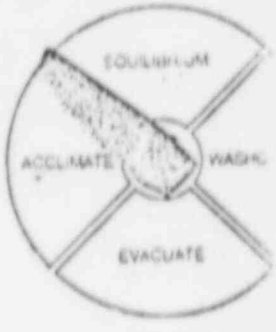


B

Step 6. Inject a bolus of Xenon into this bag and apply a piece of scotch tape over hole after removing the needle to prevent leakage. Place it before the camera to measure its radiation. Record these counts.

Step 7. Attach this bag to the moisture trap tube with tape as you did with bag #1 and untie the string. See figure F.

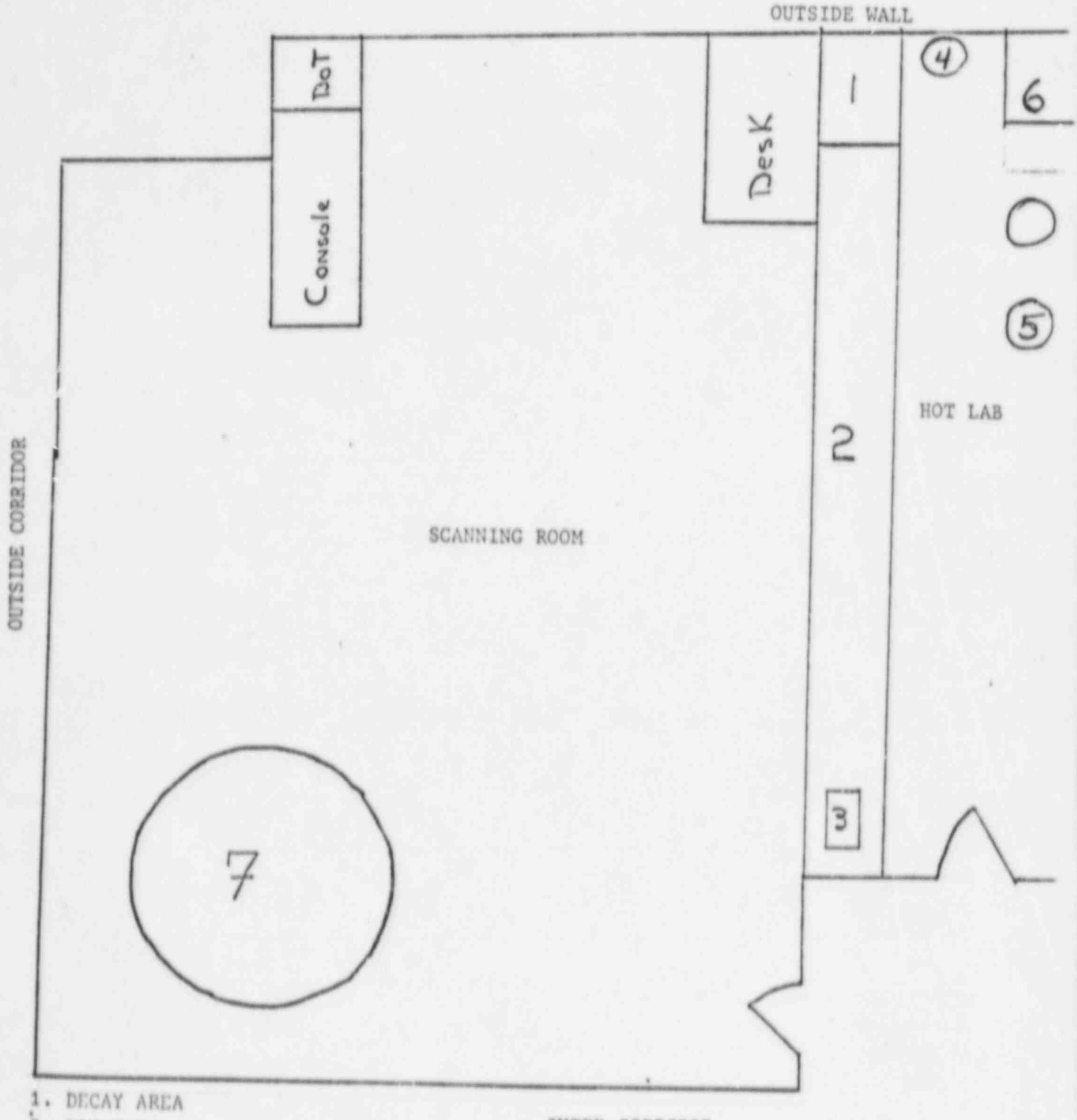
Step 8. Set control knob to evacuate position to allow the air and Xenon to be removed and filtered through the trap and to be collected in bag #2. Set control knob to acclimate after collecting all the contents of bag #3 into bag #2.



C

APPENDIX B

DELNOR HOSPITAL
DEPT. OF NUCLEAR MEDICINE



1. DECAY AREA
2. COUNTER
3. SINK
4. WASTE CAN
5. WASTE CAN
6. DOSE AREA - lead glass L-Block
7. GAMMA CAMERA

INTER-CORRIDOR

Air Exhaust and Input
Lab: cfm 300
Scanning Room : cfm 300

ATTACHMENT #2

APPENDIX C

1. Xe-133 CONCENTRATION FOR STORAGE AREA

A. MAXIMUM AMOUNT OF Xe-133 ACTIVITY PER 40 HOURS IN SEVEN CONSECUTIVE DAYS = 100 mC (Xe TRAP WILL BE SIZED HERE)

B) ESCAPE FRACTION = 0.25

C) AIR FLOW = 300 ft^3/MIN

D) 1 ft^3/MIN = 6.97×10^7 ML IN 40 HOURS

$$C = \frac{A}{V} \times f = \frac{1 \times 10^5 \ \mu C/\text{HR}}{2.039 \times 10^{10} \text{ ml/40 HOURS}} \times 0.25$$

$$= 0.123 \times 10^{-5} \ \mu C/\text{ML}$$

2. CALCULATION FOR INADVERTENT RELEASE OF Xe-13 IN HOT LABS

ROOM = $8' \times 12' \times 8' = 768 \ ft^3$

AIR FLOW = 300 ft^3/MIN

ONE COMPLETE CHANGE OF AIR = $\frac{768 \ ft^3}{300 \ ft^3/\text{MIN}} = 2.56$ MIN

TEN CHANGES OF ROOM AIR = 2.56 MIN $\times$ 10 = 25.6 MI

APPENDIX D

1. Xe-133 CONCENTRATION IN IMAGING ROOM (RESTRICTED AREA)

A) MAXIMUM AMOUNT OF Xe-133 ACTIVITY PER 40 HOURS IN SEVEN CONSECUTIVE DAYS = 100 mCi

B) ESCAPE FRACTION = 0.25

C) AIR FLOW = 320 ft^3/MIN

D) 1 ft^3/MIN = 6.797×10^7 ML IN 40 HOURS

$$C = \frac{A}{V} \times f = \frac{1 \times 10^5\ \mu Ci/mL}{2.175 \times 10^{10}\ ml/40\ HOURS} \times 0.25$$

$$= 0.115 \times 10^{-5}\ \mu Ci/mL$$

2. CALCULATION OF INADVERTENT RELEASE OF Xe-133 IN IMAGING ROOM

ROOM = 20.6' X 16.8' X 8' = 2768.64 ft^3

AIR FLOW = 320 ft^3/MIN

ONE COMPLETE CHANGE OF AIR = $\frac{2768.64\ ft^3}{320\ ft^3/MIN}$ = 8.6 MIN

TEN CHANGES OF ROOM AIR = 8.6 MIN X 10 = 86 MIN

APPENDIX E

Xe-133 CONCENTRATION AT RELEASE POINT ON ROOF TOP (UNRESTRICTED AREA)

A) MAXIMUM AMOUNT OF Xe-133 RELEASED = 1300 mCi BASED ON MAXIMUM LOSS OF 25%

$$100 \frac{mCi}{wk} \times 52 \text{ wks} \times 0.25 = 1300 \text{ mCi/yr}$$
$$= 1.3 \times 10^6 \mu Ci/yr$$

B) ESCAPE VOLUME (TOTAL AIR FLOW) = 2000 ft^3/min

C) ~~1 ft^3/min = 6.79~~

$$C = \frac{A}{V} = \frac{1.30 \times 10^6 \mu Ci/yr}{2.968 \times 10^{13} ml/yr} = 0.438 \times 10^{-7} \mu Ci/ml$$
$$= 4.38 \times 10^{-8} \mu Ci/ml$$

WHERE $V = 2000 \frac{ft^3}{min} \times \frac{1.484 \times 10^{10} ml/year}{(1 ft^3/min)} =$

$$= 2.968 \times 10^{13} ml/year.$$