Rod Wimmer, Ph.D.
1149 Yellowstone Ave.
Billings, MT 59102

United States Nuclear Regulatory Commission
Region IV
611 Ryan Plaza, Suite 100
Arlington, TX 76011

Dear Mr. Everett:

Dr. John Hanson applied to the NRC in 1983 to be listed as an authorized user of radioisotopes at St. Vincent Hospital in Billings, MT. At that time, Dr. Hanson's request for licensure was rejected by the NRC because he lacked the radioisotope training required by the commission for an authorized user. Because Dr. Hanson has had 100 of the 200 hours of basic radioisotope handling experience, it was decided in consultration with Mr. Jack Whitten of our office that perhaps Dr. Hanson could complete his basic radioisotope handling training here at St. Vincent Hospital under my direction.

Dr. Hanson has followed my curricula (Appendix B) and listened attentively to my lectures and solved numerous problems and I believe that he has fulfilled the requirements for licensure.

The lecture materials used by me came from the books suggested by me for Dr. Hanson. Following the tutorials Dr. Hanson was required by me to solve selected problems out of the AAPM and ACR publication "Problems in Physics for Radiology Residents". This book was selected by me because of its familiarity within the radiology community and its availability.

To adequately assess Dr. Hanson's understanding of the materials presented to him, I had him solve many problems from the ACR booklet. The problem sections assigned and solved are given in Appendix A.

In those circumstances where I felt Dr. Hanson's answers were insufficient, I discussed his result and corrected any misconceptions he may have had.

I have kept a log as to the number of hours (Appendix C) we have spent together on this project and I feel that his has made up his basic physics deficiencies and should be placed on the license of St. Vincent Hospital. I have included a signed preceptor statement. I have discussed my tutorial with the Radiation Safety Committee and I have included their endorsement of this project.

I have included a copy of my American Board of Radiology Certification as proof of my training and experience for conducting these tutorials.

If there are any questions, please feel free to contact me at St. Vincent Hopsital. I have included a statement certifying the number of hours Dr. Hanson spent on his supplement training and experience.

Sincerely,

Rod Wimmer

Rod Wimmer, Ph.D., D.A.B.R.

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APPENDIX A

Section 1 - All problems except the G section (this section deals primarily with electrical production of x-ray). Section 1 was designed to teach the student about simple mathematics, graphs, trigonometry, atomic and nuclear physics. The total number of problems solved was 45.

Section 3 - All problems. This section deals with radiation absorption and measurements. A total of 62 problems.

Section 5 - This section deals with radionuclides. All 100 problems.

Section 8 - Radiation protection. All 36 problems.

APPENDIX B-1

Course Outline

Radiation Physics and Instrumentation

Reading materaial: Medical Radiation Physics by William Hendee
Chapters 1-3, 7, 9, 12, 18 and 20.

Topics

Photon & particle radiation:

Electrons, neutrons, alpha particles, positrons, protons, gamma rays, x-rays, pair production, Auger electrons.

Ionization:

W/e, LET, quench, electron, roentgens, Kerma

Decay spectra:

Atomic number, atomic mass, conservation of mass, conservation of charge, mass number, alpha decay, positron emission, electron capture, gamma emission, energy levels, decay diagrams, isomeric transitions, half life, internal conversion, specific gamma ray constant.

Theory and operation of spectrometers:

NaI, photomultipliers, light production and absorption, scaling circuitry, dead time, resolving time, pulse formation, energy discriminators.

Gamma cameras:

NaI, resolution-spatial and time, photomultiplier tube arrays, energy discrimination network, collimators, temperature and shock sensitivity, large and small camera characteristics, crystal aging.

Survey instruments:

Ionization, GM, limits of both types, film as a dosimeter, geometrical sensitivity, energy sensitivity, calibration.

Dose calibrator:

Operational theory, calibration, accuracy, NRC requirements.

Statistics of Nuclear counting:

Poission statistics, Gaussian statistics, Chi square, counting above background, check sources, count rate.

Instrumentation quality control:

Need for QC, methods, camera tests, dose calibrator, survey instruments, computer quality, control assistance.

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APPENDIX B-2

Radiation Protection

Reading material: Radiation Protection by Shapiro
ALARA agreement by USNRC
NCRP 33 & 34

Topics

Methods of radiation protection:

Time, distance, shielding, radiation penetration, internal exposure protection, primary barrier, secondary barrier, uncontrolled space, controlled space.

Dose limits:

Occupationally and non-occupationally exposed personnel, lifetime body burden, rational for MPD, background levels, qualtiy factor, RBE

Sources of radiation exposure:

Patient, syringe, vials, waste, spills, gases, generator elution, background.

Estimating exposure:

MIRD, CRC handbooks, drug inserts

APPENDIX B-3

Interaction of Radiation with Living Systems

Reading material: Radiobiology by William Fabricont

Topics

Target theory:

Sensitive volume, direct action, target size, single hit, multi hit, logrithmic response, survival data.

Oxygen effect:

Decreased survival with oxygen, LET, greater free radicals, peroxide formation, antioxidants.

Review of molecular biology:

DNA, base pairs, chromosomes, radiation and the cytoplasm, radiation and the nucleus, basis for genitic damage, mutation, cell sensitivity.

Radiation effects-cellur and whole body:

Direct effect on chromosome, chromosome fragmentation, dose effect, LET effect, effect of stage of cell life cycle, nucleus is sensitive volume, total body radiation, heiarchy of radiation sensitivity: hemopoietic, gastrointestinal, CNS.

APPENDIX B-4

Radiopharmaceuticals

Biological pathways for unlabelled radioisotopes:

I-131, P-32, Tc-99m, Xe-133, Xe-137, I-125, In-111 others, chemical state, metabolic pathways.

Biological pathways for bound radioactive tracers:

Tc-MDP, microspheres, bone agents, kit safety and quality control, biological half lives.

Requirements for Radiopharmaceuticals:

Pyrogen testing, sterility testing, isotonicity, shipping, shelf life, labelling requirements, generator construction.

Adverse reactions to radiopharmaceuticals:

Package inserts, labelled and unlabelled substances.

Dosimetry for radiopharmaceuticals:

MIRD calculations for liver, thyroid, lung, bone, bran and fetal dose for pregnant patients.

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APPENDIX C

Educational Log for Dr. John Hanson
Prepared by Rod Wimmer, Ph.D.
Start: June, 1984 to September, 1985

SUBJECT	HOURS
Radiation physics and instrumentation	90
Radiation proection	45
Mathematics of radioisotopes	15
Radiation biology	30
Radiopharmaceuticals	40
Number of hours	220
Number of hours from previous training	100
Total number of hours	320

Supplemental training given by Rod Wimmer, Ph.D., under the direction of Dr. Jon A. Anderson, M.D., listed as an authorized user on license number 25-07553-01.

Rod Wimmer

Rod Wimmer, Ph.D.

Jon A. Anderson

Jon A. Anderson, M.D.

NRC FORM 313M SUPPLEMENT A
(9-81)

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
Dr. Jon A. Anderson, M.D.	Montana

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Radiology		

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	6/84 to 9/85	80	10
b. RADIATION PROTECTION	6/84 to 9/85	40	5
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	6/84 to 9/85	10	5
d. RADIATION BIOLOGY	6/84 to 9/85	30	
e. RADIOPHARMACEUTICAL CHEMISTRY	6/84 to 9/85	30	10

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
TMC^{99} Xe^{133}	1 curie 20 min.	Elution Kit preparation Pulmonary function	9/85 9/85	Human

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NATIONAL NAVAL MEDICAL CENTER

BETHESDA, MARYLAND - 20014

IN REPLY REFER TO

25 November 1977

Dr. John V. Hanson
O.S.C. 135
Walter Reed Army Medical Center
Washington, D. C. 20012

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	19 Sept to 7 Oct 1977	45	6
b. RADIATION PROTECTION	19 Sept to 7 Oct 1977	4	
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY	19 Sept to 7 Oct 1977	16	3
d. RADIATION BIOLOGY	19 Sept to 7 Oct 1977	13	
e. RADIOPHARMACEUTICAL CHEMISTRY	19 Sept to 7 Oct 1977	3	

The training and experience indicated above was obtained under the supervision of:

Richard F. Kloepfer, CDR, MC, USN
Head, Nuclear Medicine Branch

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

John V. Hanson, M.D.

STREET ADDRESS

CITY | STATE | ZIP CODE

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	30	
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME	4	
	LIVER FUNCTION STUDIES	2	
	FAT ABSORPTION STUDIES	--	
	KIDNEY FUNCTION STUDIES	20	
	IN VITRO STUDIES	60	
OTHER	Co-57, Co-58 Diagnosis Pernicious Anemia	5	
I-125	DETECTION OF THROMBOSIS	--	
I-131	THYROID IMAGING	5	
P-32	EYE TUMOR LOCALIZATION	--	
Se-75	PANCREAS IMAGING	1	
~~XXXXX~~	CISTERNOGRAPHY (In-111)	2	
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES	30	
OTHER	Ga-67 Tumor and Abscess Imaging	30	
Tc-99m	BRAIN IMAGING	200	
	CARDIAC IMAGING	20	
	THYROID IMAGING	50	
	SALIVARY GLAND IMAGING	2	
	BLOOD POOL IMAGING	7	
	PLACENTA LOCALIZATION	--	
	LIVER AND SPLEEN IMAGING	200	
	LUNG IMAGING	35	
	BONE IMAGING	200	
OTHER		--	

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PRECEPTOR STATEMENT *(Continued)*

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

ISOTOPE A	CONDITIONS DIAGNOSED OR TREATED B	NUMBER OF CASES INVOLVING PERSONAL PARTICIPATION C	COMMENTS *(Additional information or comments may be submitted in duplicate on separate sheets.)* D
P-32 (Soluble)	TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA, AND BONE METASTASES	--	
P-32 (Colloidal)	INTRACAVITARY TREATMENT	--	
I-131	TREATMENT OF THYROID CARCINOMA	--	
	TREATMENT OF HYPERTHYROIDISM	--	
Au-198	INTRACAVITARY TREATMENT	--	
Co-60 or Cs-137	INTERSTITIAL TREATMENT	--	
	INTRACAVITARY TREATMENT	--	
I-125 or Ir-192	INTERSTITIAL TREATMENT	--	
Co-60 or Cs-137	TELETHERAPY TREATMENT	--	
Sr-90	TREATMENT OF EYE DISEASE	--	
	RADIOPHARMACEUTICAL PREPARATION	--	
Mo-99/ Tc-99m	GENERATOR	4	
Sn-113/ In-113m	GENERATOR	--	
Tc-99m	REAGENT KITS	8	
Other			

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

1 July 1977 - 31 August 1977
1 July 1978 - 31 August 1978

640 hours

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

a. NAME OF SUPERVISOR
Robert J. Kaminski, M.D.

b. NAME OF INSTITUTION
Walter Reed Army Medical Center

c. MAILING ADDRESS
6825 16th Street, N.W.

d. CITY
Washington, D.C. 20012

5. MATERIALS LICENSE NUMBER(S)
08-01738-02

6. PRECEPTOR'S SIGNATURE
Robert J. Kaminski

7. PRECEPTOR'S NAME *(Please type or print)*
Robert J. Kaminski, M.D.
LTC, MC
Chief, Nuclear Medicine Service

8. DATE
25 July 1979

FORM NRC-313M-SUPPLEMENT B
(6-78)

The American Board of Radiology

Organized through the cooperation of the
American College of Radiology, the American Roentgen Ray Society,
the American Radium Society, the Radiological Society of North America,
the Section on Radiology of the American Medical Association
and the American Society of Therapeutic Radiologists
Hereby certifies that

Rodney Joseph Wimmer, Ph.D.

Has pursued an accepted course of graduate study
and clinical work, has met certain standards and qualifications and
has passed the examinations conducted under the authority of
The American Board of Radiology
On this seventh day of June, 1980
Thereby demonstrating to the satisfaction of the Board
that he is qualified to practice the specialty of

Radiological Physics

E. Richard Legg
President

C. Allen Good
Secretary

THE AMERICAN BOARD OF RADIOLOGY
INCORPORATED IN THE DISTRICT OF COLUMBIA
1934

AMERICAN BOARD

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