Medical Center

American Lake
Tacoma, WA 98493

Veterans Administration

June 9, 1982

License Management Branch
Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

THRU: Director, Nuclear Medicine Service (115)
VA Central Office
810 Vermont Avenue, N.W.
Washington, D. C. 20420

SUBJ: License Amendment

Gentlemen:

Enclosed is an application for an amendment to our License #46-19584-01, with an expiration date of 6/30/86.

The 200 mCi I^{125} sealed source for the Bone Densitometer Machine used to monitor the osteoporosis patients was inadvertently left off the license. We are asking that this be included on the license.

We have purchased a new machine from Norland Cameron to replace the one which was moved to California with Dr. Baylink. Until this amendment is approved we cannot purchase the source for the machine and it is therefore unavailable for patients. Your earliest attention in this matter would be greatly appreciated.

Sincerely,

William E. Claypool

WILLIAM E. CLAYPOOL
Medical Center Director

Enclosure

James J. Smith M.D.

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

In Reply Refer To: 505/00

EXHIBIT A

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

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

1.a. NAME AND MAILING ADDRESS OF APPLICANT *(Institution, firm, clinic, physician, etc.)* INCLUDE ZIP CODE	1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED *(If different from 1.a.)* INCLUDE ZIP CODE
Veterans Administration Medical Center 98493 TELEPHONE NO.: AREA CODE( ) ____ _____	American Lake, Tacoma, WA 98493
2. PERSON TO CONTACT REGARDING THIS APPLICATION Gary B. Robnett, M.D. TELEPHONE NO.: AREA CODE 206) 582-8440 Ext 6610	3. THIS IS AN APPLICATION FOR: *(Check appropriate item)* a. ☐ NEW LICENSE b. ☒ AMENDMENT TO LICENSE NO. 46-19584-01 c. ☐ RENEWAL OF LICENSE NO. _____
4. INDIVIDUAL USERS *(Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)* Gary B. Robnett, M.D. (Information submitted with original application dated Oct. 24, 1980).	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.)* Same as 4

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		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP II		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP III		
10 CFR 35.100, SCHEDULE A, GROUP IV		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI		

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

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
I^{125}	Sealed source	300 mCi	Bone density gauging machine)

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

U.S. NUCLEAR REGULATORY COMMISSION

TRAINING AND EXPERIENCE
AUTHORIZED USER OR RADIATION SAFETY OFFICER

1. NAME OF AUTHORIZED USER OR RADIATION SAFETY OFFICER	2. STATE OR TERRITORY IN WHICH LICENSED TO PRACTICE MEDICINE
LEONARD P. ELIEL, M. D., FACOS/R	WA

3. CERTIFICATION

SPECIALTY BOARD A	CATEGORY B	MONTH AND YEAR CERTIFIED C
Internal Medicine		Sept 1952 Recertified Oct. 1977

4. TRAINING RECEIVED IN BASIC RADIOISOTOPE HANDLING TECHNIQUES

FIELD OF TRAINING A	LOCATION AND DATE(S) OF TRAINING B	TYPE AND LENGTH OF TRAINING: LECTURE/LABORATORY COURSES (Hours) C	TYPE AND LENGTH OF TRAINING: SUPERVISED LABORATORY EXPERIENCE (Hours) D
a. RADIATION PHYSICS AND INSTRUMENTATION	1946-1948 Boston Children's Medical Ctr. Mem.-Sloan Kettering, N.Y. 1948-1951		72 72
b. RADIATION PROTECTION			
c. MATHEMATICS PERTAINING TO THE USE AND MEASUREMENT OF RADIOACTIVITY			
d. RADIATION BIOLOGY			
e. RADIOPHARMACEUTICAL CHEMISTRY			

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
^{22}Na	µci quantities	Boston Childrens Hosp.	2 years	animal
^{22}Na	mci "	Mem.Sloan-Kettering	3 years	animal/human
^{32}P	mci "	Okla. Medical Rsc. Found.	14 years	animal/in-vitro
^{28}Mg	mci "	" " " "	14 years	" "
^{45}Ca	µci "	" " " "	14 years	" "

On License No. 46-00990-01 as a user from 1975 through 1980. Seattle VA Medical Center License.

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

LEONARD P. ELIEL, M. D.

STREET ADDRESS

Veterans Administration Med. Ctr.
American Lake, Tacoma, WA 98493

CITY	STATE	ZIP CODE
Tacoma,	WA	98493

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		No human diagnostic studies
	DETERMINATION OF BLOOD AND BLOOD PLASMA VOLUME		
	LIVER FUNCTION STUDIES		
	FAT ABSORPTION STUDIES		
	KIDNEY FUNCTION STUDIES		
	IN VITRO STUDIES		
OTHER			
I-125	DETECTION OF THROMBOSIS		
I-131	THYROID IMAGING		
P-32	EYE TUMOR LOCALIZATION		
Se-75	PANCREAS IMAGING		
Yb-169	CISTERNOGRAPHY		
Xe-133	BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		
OTHER			
Tc-99m	BRAIN IMAGING		
	CARDIAC IMAGING		
	THYROID IMAGING		
	SALIVARY GLAND IMAGING		
	BLOOD POOL IMAGING		
	PLACENTA LOCALIZATION		
	LIVER AND SPLEEN IMAGING		
	LUNG IMAGING		
	BONE IMAGING		
OTHER	Na-space measurements	6	

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		No treatments
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		
Sn-113/ In-113m	GENERATOR		
Tc-99m	REAGENT KITS		
Other			

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

Dr. Eliel has had experience in the handling, dilution, use in experimental studies and counting of these isotopes.

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

a. NAME OF SUPERVISOR

b. NAME OF INSTITUTION

c. MAILING ADDRESS

d. CITY

5. MATERIALS LICENSE NUMBER(S)

6. PRECEPTOR'S SIGNATURE

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

8. DATE

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

APPENDIX J

WASTE DISPOSAL

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

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

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

_____ Other (specify): _____

_____

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

_____ Returned to the manufacturer for disposal.

_____ Held for decay until radiation levels, as measured with a low-level survey meter and with all shielding removed, have reached background levels. All radiation labels will be removed or obliterated and the generators disposed of as normal trash. (Note: This method of disposal may not be practical for generators containing long-lived radioactive contaminants.)

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

_____ Other (specify): _____

_____

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

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

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

_____ Other (specify): _____

_____

4. The commercial waste disposal service used will be

Ralph M. Baltzo Seattle, WA
(Name) (City, State)

NRC/Agreement State License No. WN-L041-1

APPENDIX A: RADIATION DOSE INFORMATION

Although the radiation produced by the sources used in this instrument is highly localized and of low energy, it is quite intense in the primary beam path and should be treated with due respect. The dose rate at the deck surface with a new 200 mCi source of I-125 is approximately 9 mR/sec. The beam is highly collimated and is scanned across the deck in the path indicated by the black plastic insert. At the deck the beam is 4.5 mm in diameter and at the detector head it is 4 cm in diameter. The beam is completely absorbed by the detector assembly. Additionally, a shutter mechanism absorbs the beam almost completely except when the instrument is in the process of a measurement or when the BEAM ON button is pushed.

PATIENT DOSE

A complete measurement consists of a search scan, in which the desired bone is located, followed by a measurement scan, during which counts are accumulated which form the data that the instrument will use for calculations.

The speed of the search scan is varied according to the activity of the source in order to get sufficient but not excessive counting statistics. The following table gives the relevant data, including patient dose, for the search scan at various activity (I-125) ranges:

ACTIVITY	SCAN SPEED	DOSE RATE (MAX)	SEARCH SCAN DOSE* (MAX)
8-20 mCi	0.1 cm/sec.	0.9 mR/sec.	27 mR
20-38	0.2	1.7	25
38-66	0.5	3.0	18
66-100	1.0	4.5	14
100-200	1.0	9.0	27

*For 3cm Search Scan

The measure scans are always at 0.1 cm/sec. For a typical bone width of 1.5 cm., the measure scan dose will be 180 mR with a 200 milliCurie source, and proportionately less as the source activity diminishes.

Thus, for a typical 1% measurement of the radius, the maximum patient dose will be 207 mR and will decrease for sources under 200 mCi. For users purchasing sources at the 100 mCi level, the maximum dose is 117 mR; decreasing proportionally with the age of the source.

It may be asked whether this dose is harmful and/or how it compares to the dose delivered in a conventional forearm x-ray. All radiation is harmful to

some extent, but for the small doses from diagnostic tools such as the Bone Densitometer or x-ray machines, the benefits usually outweigh the dangers.

Because of the localized nature of the delivered dose (due to the tight collimation of the source) it is very difficult to state the dose in terms familiar to the radiologist. The dose to which the patient is exposed when a radiograph is made involves a large area of the patient's body (e.g., most of an entire limb or the whole chest). In contrast, the Bone Densitometer exposes a section of tissue about five millimeters wide and typically three centimeters long.

The most meaningful comparison of administered dose would involve calculation of the number of ionizations produced in various tissues for a typical radiograph and for a typical scanning procedure. Such a calculation would be very tedious and would only be strictly valid for a given x-ray tube and exposure setting for a particular limb. A crude comparison can be made by comparing the relative radiation fields, the exposure times, the areas exposed, and thereby deriving for comparison an ionization index for a typical radiograph and for a typical bone mineral analysis. If such a comparison is constructed, the "ionization dose" due to a set of four scans of the patient is found to be about 1/100 of the dose delivered to a patient for a radiograph of the forearm.

OPERATOR DOSE

The manufacturing process used to make ^{125}I entails the production of a certain amount of ^{126}I as a contaminant. ^{126}I emits several high energy gamma rays which are thousands of times more penetrating than the radiation from ^{125}I. These radiations penetrate the shielding of the source holder and the walls of the scanner with little attenuation. However, the ^{126}I activity is kept low--less than 0.2% of the ^{125}I activity. Thus the intensity of the radiation which escapes the scanner is low.

The maximum radiation dose rate at a distance of one foot from the scanner module is about 16 mR/hr and decreases with a half life of 13 days as the ^{126}I decays. Thus, over the six month useful lifetime of the source, the average dose rate at one foot is 2.5 mR/hr. The Nuclear Regulatory Commission maximum permissible dose to the gonads for a radiation worker is 5,000 mR/year or 13.7 mR/day. Thus, a technician could safely work within one foot of the instrument 5 1/2 hours a day for the rest of his life. A radiation field falls off rapidly with distance, so that at two feet the technician could work safely 22 hours a day. The maximum permissable dose for the general population is set at 5,000 mR/30 years, or .019 mR/hr. The average dose rate from the scanner is reduced to below this value everywhere beyond a distance of seven feet.

The Bone Densitometer machine will be installed by a representative of the Norland Cameron Company. He will instruct the personnel involved in using the machine in the correct procedure to install the source, which will not be purchased until the license has been amended. The person(s) operating the machine will be fully informed in all the precautions and procedures to be met in using the machine during the monitoring of patients.

The attached pages explain how the machine will be operated.

4. OPERATION

4.1 SETTING UP THE INSTRUMENT

Choose a location for use of the instrument where there is enough room for a patient to be comfortably seated in a standard chair at a desk or table. Do not set up instrument on a bench without knee room or on a hospital cart. The patient should be able to sit in a relaxed position so that he will not have a tendency to move, fidget, or even tremble during the measurement. A minimum of extraneous activity is helpful in keeping the patient still.

Connect the power cord to the back of the computer module and to a grounded (three-wire) outlet. Do not substitute a two wire cord or use a "cheater" adapter on a two wire power outlet. Connect the two cables provided--the short one from the scanner arm to the scanner base and the long one between the scanner and computer modules.

Powering up the instrument should result in the message "SELF-TEST COMPLETE: NO ERRORS." See section 5.3 for details of this test.

4.2 INSTALLING A SOURCE

To install the source in the scanner, proceed as follows: Turn off the power. Remove the thumb screws holding the limb holder and deck to the scanner base (two in front and one in back). Disconnect the cable from the back of the scanner. Using the deck key, unlock the deck from the base. This lock is a screw type. Turn it counter-clockwise several turns until the deck is free. Be sure that no persons are in the area indicated by the diagram in Figure 4-1.

Lift the source holder arm as shown in Figure 4-2a. Holding the source in the position illustrated in Figure 4-2b, remove the source holder cap and proceed with installation of the source as demonstrated in Figure 4-2c. Lower the source holder arm back into the carriage assembly and screw the source holder cap onto the stud provided on the carriage assembly (Figure 4-2d) to store it for later use. Keep fingers away from the exposed end of the source holder at all times and do not point the exposed source toward anyone.

When removing the source from the scanner, reverse the above sequence. Be sure to replace the cap on the source holder before transporting the source anywhere.

DANGER

THERE SHALL BE NO PERSONS IN THIS AREA

WHILE A SOURCE IS BEING LOADED INTO THE INSTRUMENT

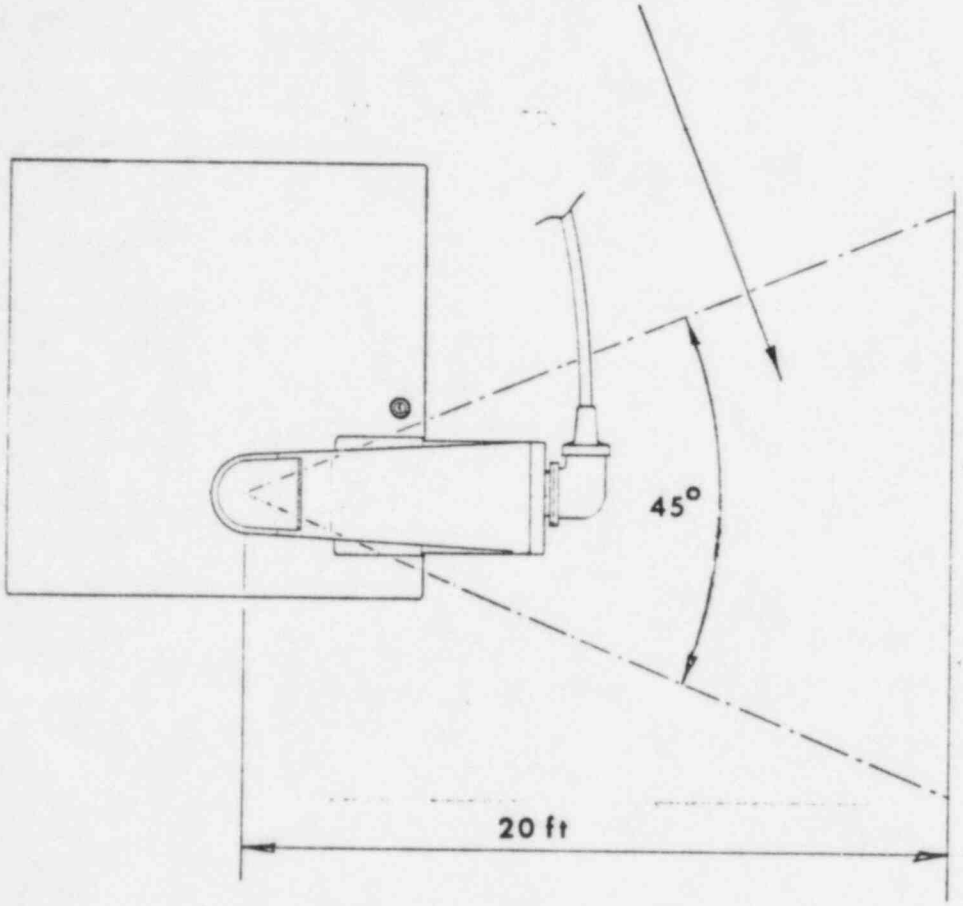


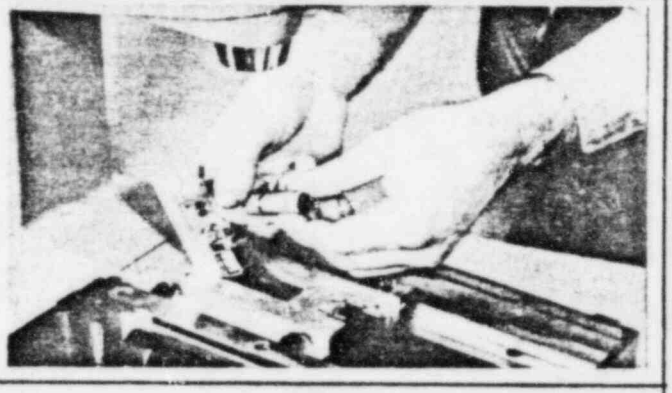
Figure 4-1. Sketch showing radiation hazard area during source loading and unloading.

4-2a

Lift source/shutter door.

4-2b

Remove source cap, holding in position shown.



4-2c

Screw source into source/shutter door, then close door.

4-2d

Store cap for later use.

Figure 4-2. Procedure for loading source

The source holder (Figure 4-3) absorbs almost all of the radiation from the source when the cap is in place. When the cap is removed (by unscrewing) the beam exits from the exposed end with a total angular spread of approximately 30^{o}. A 200 millicurie source delivers a maximum dose rate of approximately 200 mr/min at a distance of 2.5 cm. The protective cap should be left on the source holder until immediately before installation of the source.

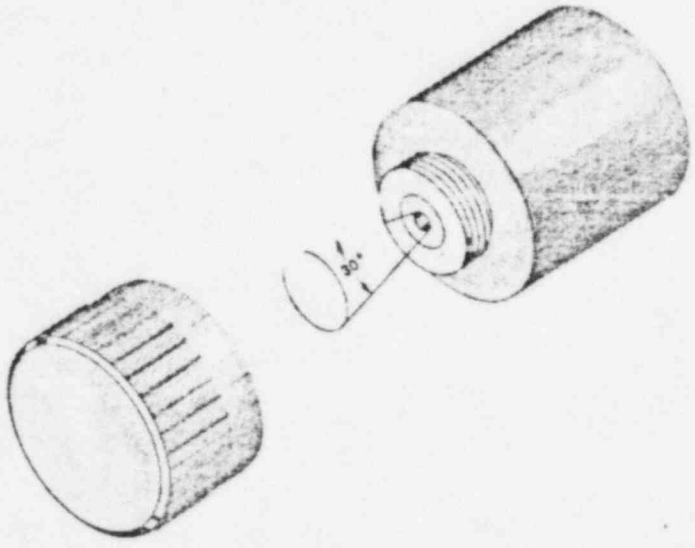


Figure 4-3. Source assembly (178A591A) with shipping cap removed, showing approximate limits of radiation.

4.3 CALIBRATION

Set up the instrument and install a source as described in the previous sections.

Turn on the power and wait 2 minutes while the instrument warms up. During this time an extensive self-check is done by the computer module, and any malfunctions are indicated on the screen. (If it is known that the instrument is sufficiently warmed up, the warmup delay period may be cut short any time after the first 15 seconds by pressing CALIB or MEASURE.)

After the warmup period, or any time that the CALIB button is pressed, the instrument will enter its Calibration Sequence.

The Display presented is shown in Figure 4-4.

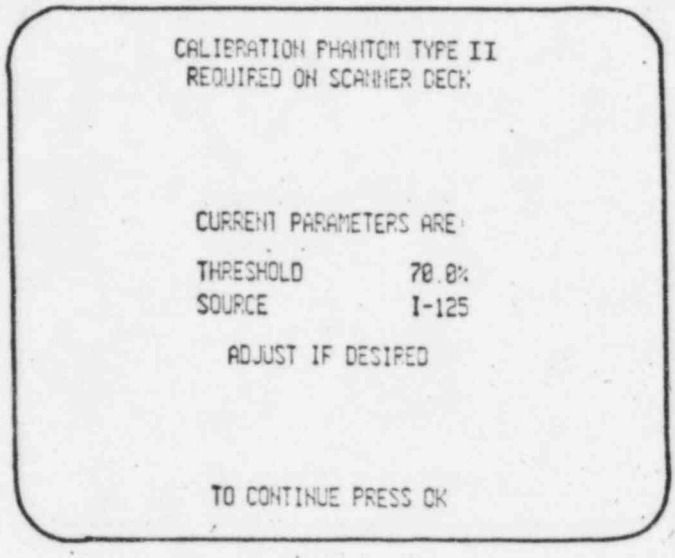


Figure 4-4. Calibration Setup Display

The Type II Calibration Phantom must be placed on the scanner deck such that the "bones" are scanned in the numerical order 1-2-3-4.

The Phantom should be positioned directly over the scan path and up against the vertical metal fence of the limb holder with Bone 1 closest to the fence.

While the Calibration Setup Display is present, the THRESHOLD parameter may be altered as desired.

The THRESHOLD may be set by repeatedly pushing the THRESHOLD button. The values cycle from 50% to 100% in steps of 5%, cycling back from the highest to the lowest value.

In general, a 70% threshold should be used. In measuring some small bones, such as human phalanges, bones of small laboratory animals, etc., the instrument will be more able to make a successful measurement at a higher threshold setting than 70% for both calibration and measurement.

The source button is at present inoperative. The capability of using other sources may be added to the Bone Densitometer at some future time.

The calibration process consists of 3 steps:

1. The pulse amplifier gain is adjusted so that the peak in the pulse height spectrum is centered in the discriminator window. (This is the process called "Peaking" in the Norland Model 178 Bone Mineral Analyzer.)

2. A special scan is run of the phantom in which all four "Bones" are measured. From these measurements and the known characteristics of the phantom, which are stored in the Model 278's permanent memory, the calibration parameters are computed and stored for future use. At the same time, again using the measurements of four different "Bones", the linearity of measurement is determined and displayed. Linearity should be in the range 0.98 to 1.02.

3. The source output is measured and displayed as a count rate which tells the operator whether his source is still adequately active to make the measurement. (See Figure 4-5)

When the calibration sequence is completed, the display will look similar to that in Figure 4-6.

The values in this table are the source output levels recommended to obtain 1.5% or better precision. The values are approximate. In general, larger more massive bones, as well as greater soft tissue cover thickness, require a greater source output. Source output is indicated in the Bone Densitometer by the (raw) count rate, which is measured and displayed in the Calibrate operation.

BONE	TYPICAL BMC	TYPICAL SOFT TISSUE COVER	REQ'D SOURCE OUTPUT	CORRESPONDING SOURCE ACTIVITY	SOURCE AGE 200 mCi	SOURCE AGE 100 mCi
Adult Radius	1.3 g/cm.	7cm	10,000 cps	40 mCi	140 days	80 days
Adult Ulna	0.6	7	10,000	40	140	80
Child Radius	0.9	5	5,000	20	200	140
Adult Phalanx	0.3	3	3,000	12	240	180

Figure 4-5. Minimum Source Output Recommended for Various Measurements.

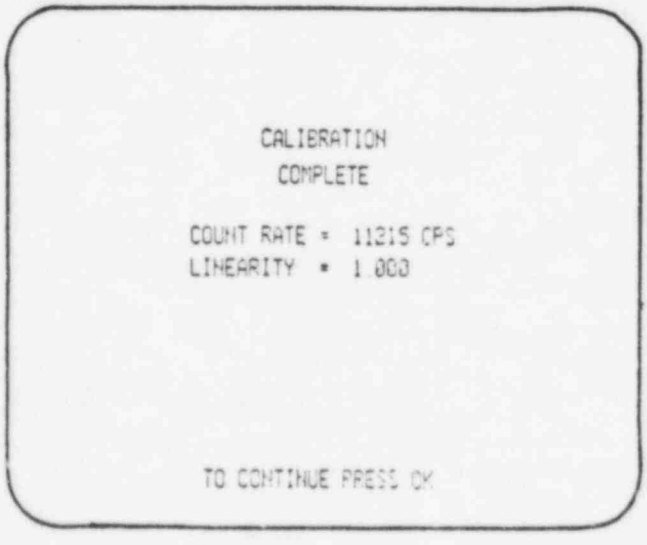


Figure 4-6. Calibration Results Display

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

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

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

24. PERSONNEL MONITORING DEVICES

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

d. OTHER (Specify)

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

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

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

26. CERTIFICATE
(This item must be completed by applicant)

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

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

(1) LICENSE FEE CATEGORY

(2) LICENSE FEE ENCLOSED $ _____

b. APPLICANT OR CERTIFYING OFFICIAL *(Signature)*

(1) NAME *(Type or Print)*

(2) TITLE

c. DATE

FORM NRC-313M (8-78)

11-91