Research Medical Center

2316 East Meyer Boulevard
Kansas City, Missouri 64132

816/276-4000

May 9, 1985

B. J. Holt
Material Licensing Section
United States Nuclear Regulatory Commission
Region 3
799 Roosevelt Road
Glen Ellyn, IL 60137

Dear Ms. Holt:

I have been asked to respond to your request for additional information and clarification of portions of our application to renew and amend NRC license number 24-18625-01.

1. Physician Users

There was an oversight in requesting Group VI for Drs. Dukstein and White. Please authorize them for Groups of I through V. We will also be requesting Groups IV and V for Dr. Paradelo, but in the interest of time, this will be handled through a future amendment request. Please authorize Dr. Paradelo for Group VI only.

2a. Materials

Thank you for the information concerning possession of depleted uranium. We have reviewed our needs and would like to request the same possession limits as in our old license, 180 kilograms.

2b. We are requesting that our gamma survey instrument calibrator containing 120 mCi of Cesium 137 be placed in storage. The source is stored in our long term stores facility located on B level of the hospital. The storage has limited access through a locked door with keys available only to nuclear medicine personnel, security and plant operations. In addition, the source is locked in the closed position with the key in the possession of the nuclear medicine nuclear physicist.

3. Facilities

See Item 2b.

4. Therapeutic use of Iodine 131

In those rare instances when an open delivery system must be used, the vial

containing liquid Iodine 131 will be opened in a chemical hood and prepared for administration. The therapy will then be given to the patient in one of two rooms in the department of nuclear medicine where the airflow is at least 1,000 cfm.

5. Sealed Sources

The Brachy Therapy work station is located in the radiation oncology department. Access to the work station is through a locked door located off of the physics laboratory. All Brachy sources are stored in this locked area well away from any unrestricted area.

The handling of all Brachy sources is done behind an Atomic Products Radium and Cesium Shield work station. Handling of sources is done with forceps and/or tongs. In general, the handling of Brachy sources is done by either the departmental medical physicist or the chief technologist.

6. Xenon 133

Xenon 133 studies are performed in one of two imaging areas only. Each area has a Xenon exhaust port with airflow rates, for the entire system, of 3,250 cfm. The Pulmonex unit is constantly attached to the Xenon exhaust port. Hence, there is no need to handle saturated filters or monitor the Xenon release. The exhaust port is vented through the roof of the hospital.

Airflow measurements will be performed on a semiannual basis.

7. Gadolium-153

7a. Drs. Dukstein and White will be the physicians who will use and supervise the use of bone mineral analyzer.

7b. The medical physicist for the department of nuclear medicine or the service personnel from Lunar Radiation Corporation will be responsible for exchanging sources. Both of these individuals are badged for whole body and extremity monitoring. The manufacturer's procedure for installing and removing sources will be followed (enclosed).

7ci.The bone mineral analyzer will be used in Imaging Room 1. This is in a restricted area and is controlled through locked doors.

ii. Changed sources will be shipped back to the manufacturer. The source will be stored in our long term storage area while waiting for shipment.

7d. Lunar Radiation Corporation will be responsible for service of the bone mineral analyzer. We anticipate purchasing a service contract from them.

If you require additional information or clarification please do not hesitate to contact me.

Sincerely,

Robert A Morgan

Robert A. Morgan
Medical Physicist

RAM:dmg
Encl.

12. Screw arbor into the scanner and be sure it is properly seated. Be sure the lead shutter can swing freely over the arbor.

13. Replace the top and lock into position.

14. Plug the power cord in and turn scanner on.

If the Atomic Energy of Canada Limited (AECL) sources are used in AECL holder C236, then an additional source collimator is used in the arbor. This can be inserted in the arbor prior to insertion of the source holder. Use of this additional collimator reduces the beam size at the table thereby lowering radiation exposure and scattered radiation. The SRC-0100-1 source holder does not require the extra collimator since the source holder itself provides sufficient collimation.

Once the old source is removed, the protective cap must be screwed onto the top of the old source holder. The old source should then be packed into the original shipping container. Send the depleted source in the source holder back to the supplier of that source using the recommended shipping procedures for this type of material.

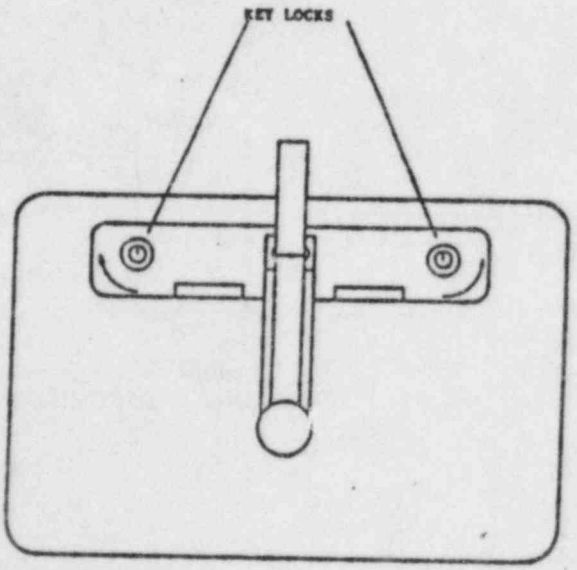


FIGURE 6
UNLOCKING SP2 TOP

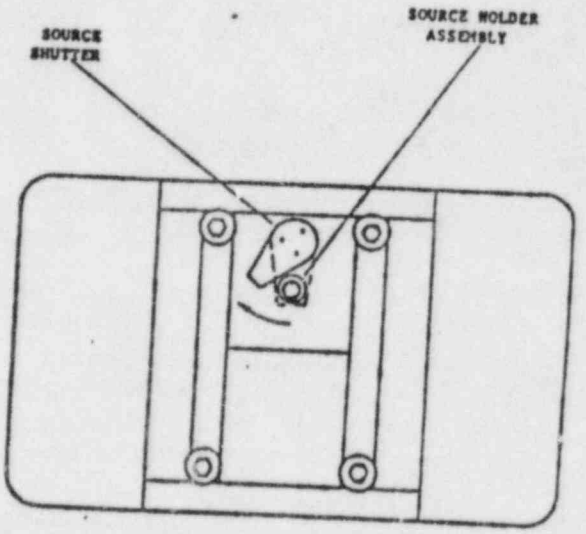


FIGURE 7
SOURCE LOCATION & REMOVAL
NOTE: "DASHED" lines refer to shutter in "occluded" position.

C. DETAILED OPERATING PROCEDURES

C.1 INSTALLING AND REMOVING THE SOURCE

CAUTION: Only personnel trained in the principles of radiation safety and protection should conduct these procedures. The technician should study the following procedures before attempting an actual source transfer. The press-on label with the warning "CAUTION - RADIOACTIVE MATERIALS" should be affixed to the table of the scanner in a location where it can be seen by the operator, patients, and/or visitors to the area where measurements are done.

All steps should be conducted without tools. Do not use pliers, clamps, etc. to parts. The "source" consists of a capsule containing 125-I in solid form. This source is located in a brass source holder (Figure 5). Sources are not supplied by LRC.

PROCEDURE

1. Have container that he source is shipped in nearby.
2. Turn off SP2.
3. Unplug SP2 power cord.
4. Unlock the locks that hold down the top (FIG 6).
5. Remove top, do not bump the detector.
6. Turn shutter to open position and hold there. Avoid beam if a source has been installed earlier.
7. Turn source holder arbor counterclockwise to remove. (Avoid beam if source was attached previously).

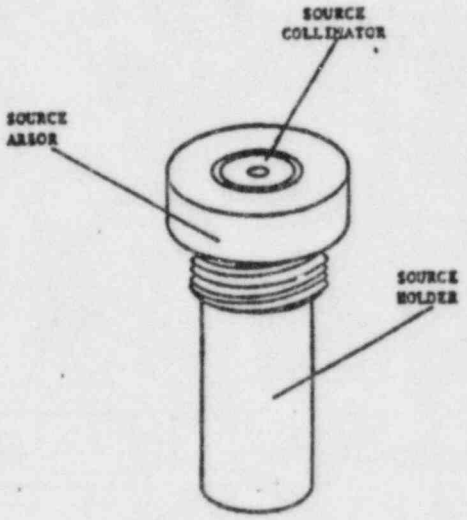


FIGURE 5
SOURCE HOLDER ASSEMBLY

8. Remove old source holder from arbor.
9. Screw protective cap (supplied with each source holder) onto old source holder. If a new source holder is not to be installed, screw the arbor back into the plate to avoid loss. Follow standard procedures for source disposal.
10. Unscrew cap from new source holder.
11. Screw source holder into the arbor.

C.2 INSTALLING AND REMOVING THE SOURCE

WARNING: Only personnel trained in the principles of radiation safety and protection should conduct these procedures. The technician should study the following procedures before an actual source transfer is attempted. The press-on lablel withe the warning "CAUTION - RADIOACTIVE MATERIALS" should be affixed to the table of the scanner in a location where it can be seen by the operator, patients and/or visitors to the area where measurements are done.

All steps can be conducted without tools. Use of pliers, clamps, etc. in the procedures may cause damage to parts. The "source" consists of a capsule containing gadolinium in solid form (FIG 9). This source is encapsulated in a lead-lined (4mm) brass source holder (FIG 10).

C.2.a. Removing the Source

PROCEDURE

1. Remove pad (if any) and the lucite insert from the table.

2. Use OPTION 5 (Static Counter, User Manual) of the CLUNAR program to position the arm and source at the center of the window.

3. Place a lead source holder cap onto the source collimator (FIG 11).

4. Use the "shutter open" command of OPTION 5. Alternatively the shutter can be manually opened. Be careful to keep hands and other body parts clear of the actual radiation beam. If the shutter is opened manually, do not force the shutter blade to swing more than 35 degrees; then tape the shutter in this (open) position.

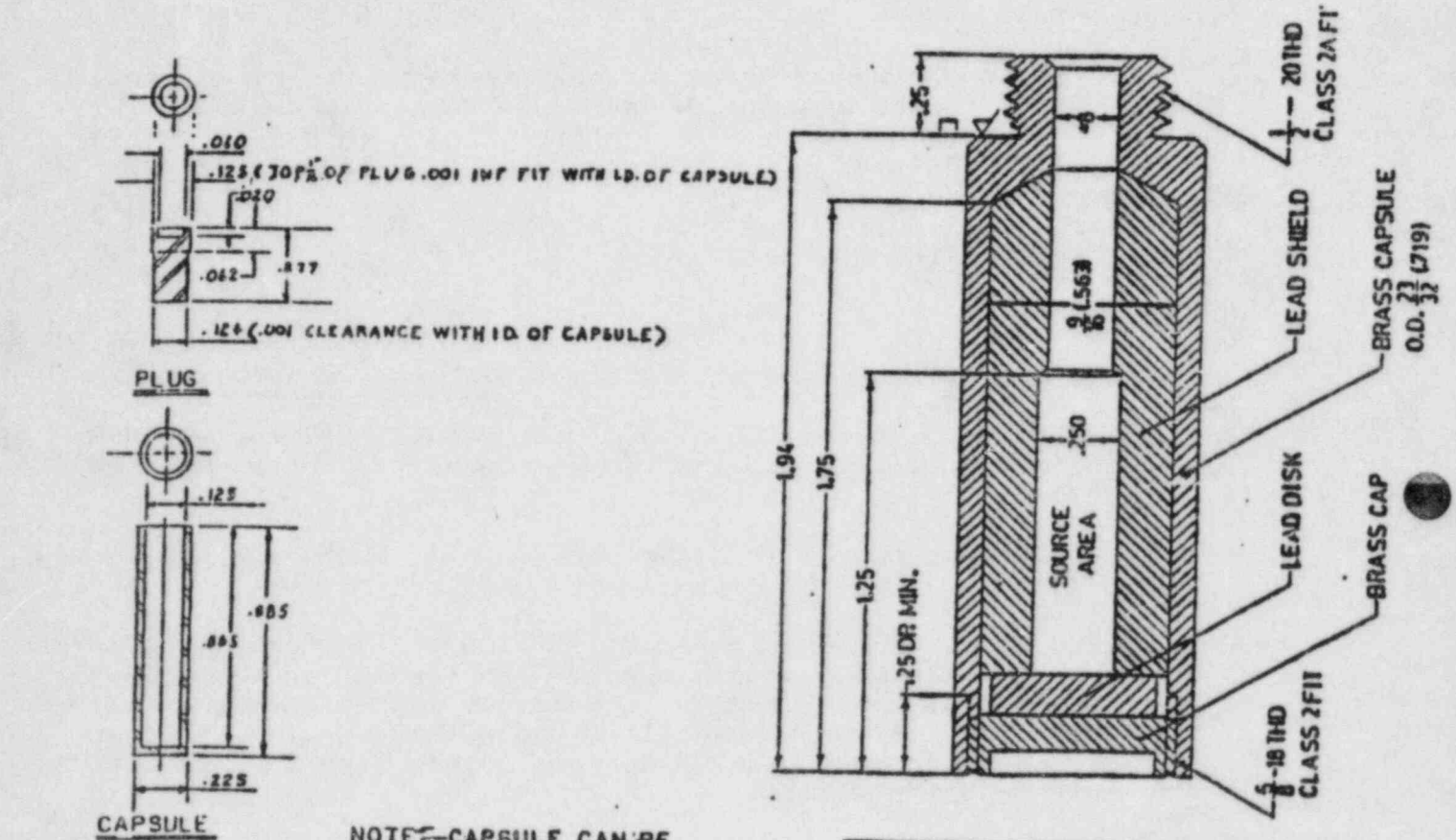
5. Turn the chuck ring (FIG 12) counterclockwise until the collimator is loose in the chuck. Do not completely loosen the chuck ring.

6. Pull the source collimator (which will have the source holder attached to the end of it) out of the chuck. The source collimator and holder can now be handled as a unit.

8. Holding the source collimator and souce-holder upright (as they were positioned in the scanner), unscrew the source-holder from the collimator. Put a lead cap on the source holder.

   CAUTION: RADIATION PRESENT! After the collimator is removed a broad beam of high intensity radiation projects from the top of the source-holder. Exercise due caution.

FIGURE 10
Source Holder for 153-Gd Capsule



MODEL. GD-1

NOTE—CAPSULE CAN BE EITHER 17-4PH S.S. OR 2024-T4 ALUMINUM

REVISIONS			GULF NUCLEAR, INC.		
NO.	DATE	BY	GADOLINIUM CAPSULE		
1			DRAWN BY FGI	SCALE NONE	MATERIAL 17-4PH SS
2			CHK'D	DATE 4-3-72	DRAWING NO. A-120
3			TRACED	APP'D	
4					
5					

LUNAR RADIATION CORP. of MADISON, WISCONSIN		
TITLE GADOLINIUM 153 SOURCE HOLDER		
PART	MATERIAL BRASS & LEAD	
FOR ASSEMBLY	TOLERANCES (UNLESS OTHERWISE SPECIFIED) .00±.01 .000±.001	
SCALE 2:1	DIMENSIONS ARE IN INCHES	BREAK ALL EDGES AND CORNERS
DESIGNED H. RAINER 2/72	DRAFTSMAN B. FUSCH 2/72	CHECKED DATE

FIGURE 11
Source Collimator/Holder Assembly

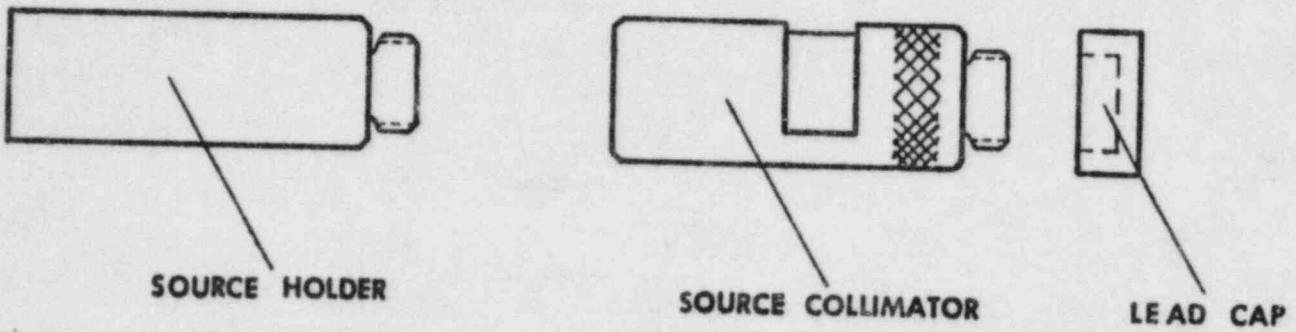


FIGURE 12
Side View of Transverse Carriage

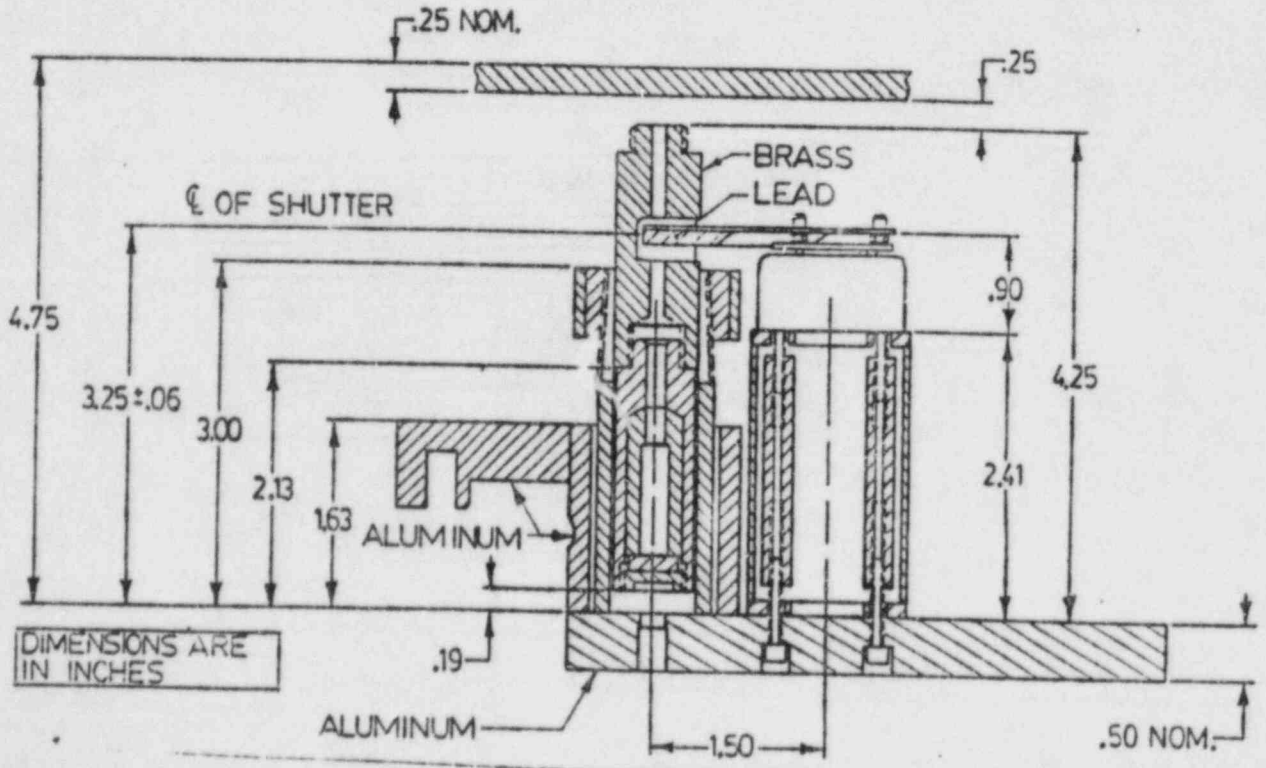
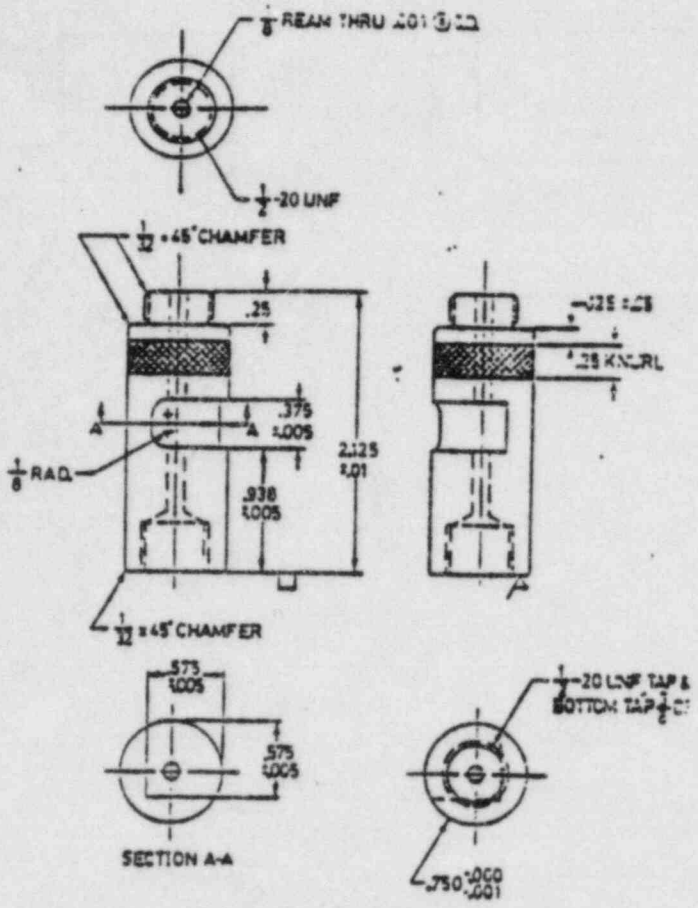


FIGURE 13
Collimator Details



LUNAR RADIATION CORP. of MADISON, WISCONSIN		
TITLE DP3 SOURCE COLLIMATOR (REVISED)		
PART	MATERIAL BRASS	
FOR ASSEMBLY	TOLERANCES (UNLESS OTHERWISE SPECIFIED) .00 ±.01 .000 ±.001	
SCALE NONE	DIMENSIONS ARE IN INCHES	BREAK EDGES AND CORNERS
DESIGNED DCIB H NCE LDNER 2/82	DRAFTSMAN DCIB B RUSCH 2/82	CHECKED DCIB

C.2.b Installing a Source

1. Use the "shutter open" command of OPTION 5. Alternatively the shutter can be manually opened. Be careful to keep hands and other body parts clear of the actual radiation beam. If the shutter is opened manually, do not force the shutter blade to swing more than 35 degrees; then tape the shutter in this (open) position.

2. For new scanners the source holder is provided with the source. The collimator will not have a cap Remove the collimator from the scanner.

3. Place the lead cap on the source holder onto the brass collimator provided with the scanner. Thread the source holder onto the base of the collimator. Do not force the collimator onto the source holder or it may cross-thread. The source collimator and holder can now be handled as a unit.

4. Slide the source collimator-holder into the source chuck (Fig. 12) so that the pin on the bottom fits into the notch on the source chuck. The collimator shoulder should rest on the top of the chuck (not the chuck ring).

5. Use the "shutter close" command of OPTION 5 or remove the tape if the shutter is held open manually.

6. Verify that the shutter can swing into the notch on the collimator (Fig. 12).

7. Turn the chuck ring clockwise until the collimator is held firmly in the chuck.

8. Remove the source holder cap from the top of the collimator.

   CAUTION: A narrow beam of intense radiation is now projected upward from the collimator aperture.

9. Check the shutter for proper operation (User Manual - Standard Scan and QA).

10. Replace the lucite insert (and place the pad on the table). Be sure the lucite insert is placed properly.

11. Monitor radiation levels around the table to insure operator safety.

This completes the source installation procedure.