



# IOWA METHODIST MEDICAL CENTER

1200 PLEASANT STREET, DES MOINES, IOWA 50308

TELEPHONE 515-283-5212

MAIN ADULT  
HOSPITAL

YOUNKER MEMORIAL  
REHABILITATION CENTER

RAYMOND BLANK MEMORIAL  
HOSPITAL FOR CHILDREN

HELEN POWELL  
CONVALESCENT CENTER

March 18, 1985

George M. McCann  
Materials Licensing Section  
United States Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Re: Application for an Amendment to Byproduct Material License,  
No. 14-01908-01, for Iowa Methodist Medical Center

Dear Mr. McCann:

The Iowa Methodist Medical Center would like to amend its license to use 153 Gadolinium for dual photon absorptiometry. We would like to acquire 1 curie of 153 Gadolinium from Gulf Nuclear in Webster, Texas. This would be used basically as a source in its own container to be used in association with the dual photon absorptiometry equipment from the Lunar Radiation Corporation of Madison, Wisconsin. It is our understanding that the Gadolinium source will be supplied in an aluminum capsule and shipped in a lead-lined brass holder in accordance with the attached diagram.

The equipment and the Gadolinium source will be used in accordance with the instructions of the Lunar Radiation Corporation regarding their system, DP3 Dual Photon Scanning System. It will be confined to use in our Scan Room A, and we will utilize all of the normal precautions for the use of radionuclide in addition to the limitations imposed by the use of this material in the Dual Photon Scanning System. The material is to be used by or under the supervision of Alexander Ervanian, M.D., Edward F. Loeb, M.D. and Russell H. Mahoney, M.D. Enclosed is the \$120 check for the license amendment.

Sincerely yours,

*Alexander Ervanian*

Alexander Ervanian, M.D.  
Chairman, Radiation Safety Committee  
Head, Nuclear Medicine

AE:kdk  
Enclosure

Applicant	<i>Apr 18</i>
Check No.	<i>79430</i>
Amount	<i>\$120</i>
Type of Fee	<i>7c and</i>
Date Check Rec'd	<i>4/12/85</i>
Received By	<i>see</i>

*9/19/85 refunded  
combined  
7/16/87*

RECEIVED

APR 03 1985

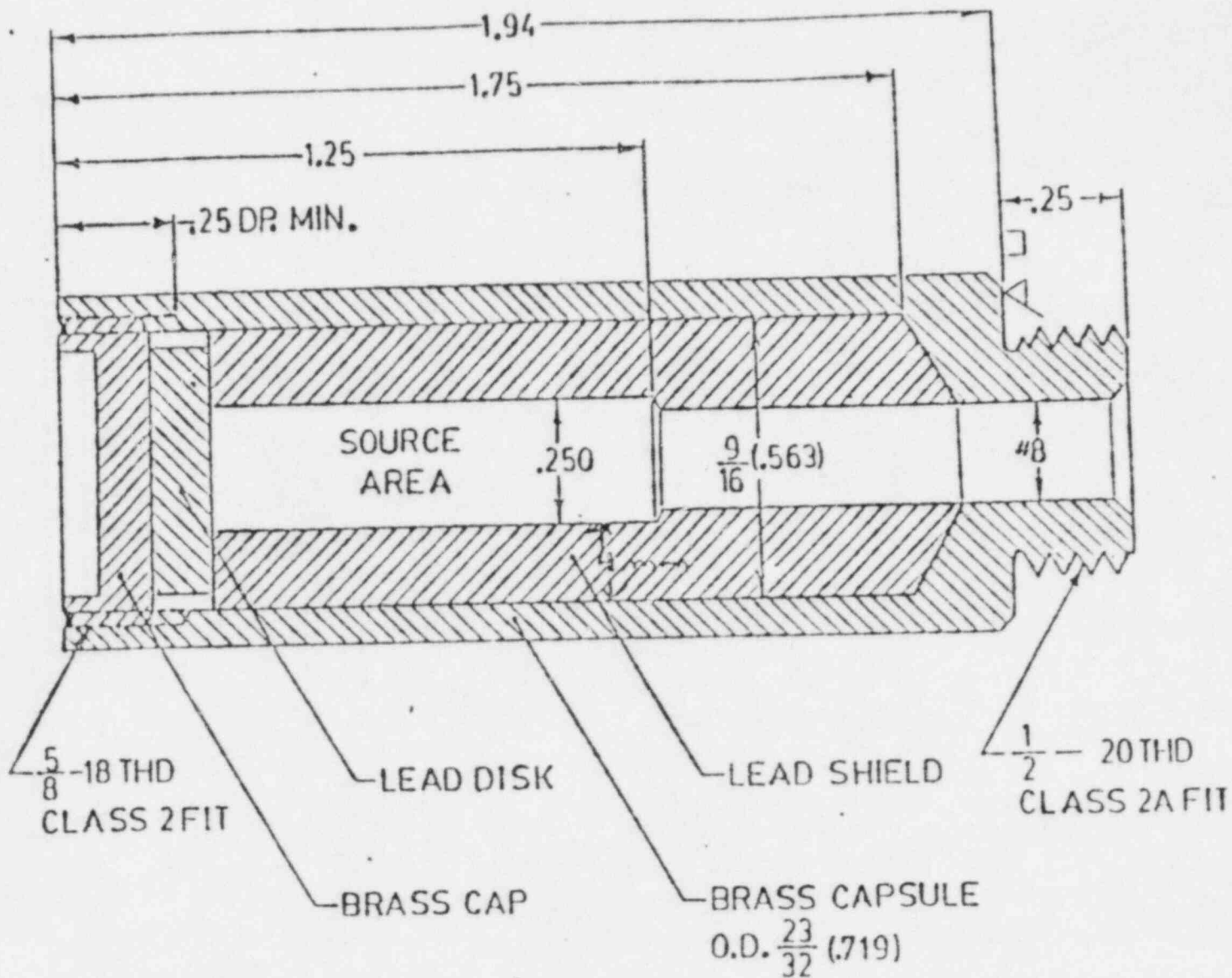
REGION III

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REG3 LIC30  
14-01908-01 PDR

CONTROL NO. 78653

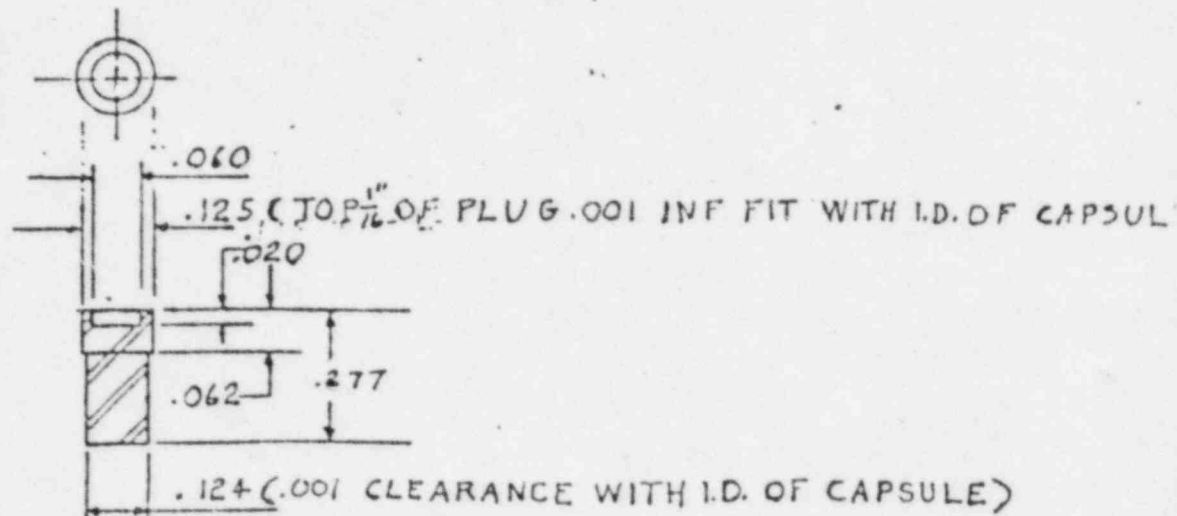
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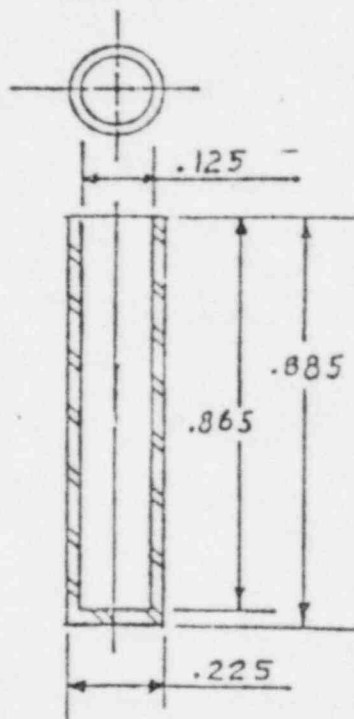


LUNAR RADIATION CORP. of MADISON, WISCONSIN	
TITLE GADOLINIUM 153 SOURCE HOLDER	
PART	MATERIAL
FOR ASSEMBLY	BRASS & LEAD
TOLERANCES (unless otherwise specified)	
.00 ± .01 .000 ± .001	
SCALE	DIMENSIONS ARE
2:1	IN INCHES
DESIGNER: CRAFTSMAN	BREAK ALL EDGES
ENGINEER: RUSCH	AND CORNERS
DATE: 2/82	CHUCK
	DATE: 2/82

CONTROL NO. 7 8 6 5 3



PLUG



CAPSULE

MODEL. GD-1

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

REVISIONS			GULF NUCLEAR, INC.		
NO.	DATE	BY			
1			GADOLINIUM CAPSULE		
2					
3			DRAWN BY FGI	SCALE NONE	MATERIAL 17-4PH S.
4			CHK'D	DATE 4-3-77	DRAWING NO.
5			TRACED	APP'D	A-120

CONTROL NO. 78653

# LICENSING INFORMATION

The DP3 scanner has received NRC approval and is a registered device under registry No. NR-430-D-101-S. The unit has also received FDA 510K registration

TABLE 1. CALCULATION OF SPECIFIC GAMMA-RAY CONSTANT FOR  $^{153}\text{Gd}$

Energy (keV)	$A_i (\text{Ci})$	$(\mu_{\text{en}}/\rho)_{\text{air}}$ ( $\text{cm}^2/\text{g}$ )	R/hr/Ci@ 1m
40.9	.286	.0644	.0147
41.54	.556	.0628	.0283
47.0	.202	.0485	.0090
48.3	.049	.0451	.0021
69.68	.038	.0275	.0014
83.39	.004	.0241	.0002
97.47	.509	.0235	.0227
103.0	.374	.0235	.0177
			<u>0.0961</u>

$$(R/\text{hr}/\text{Ci} @ 1\text{m}) = .0195 \cdot h\nu(\text{keV}) \cdot (\mu_{\text{en}}/\rho)_{\text{air}} \cdot A_i$$

$A_i$  = activity at each energy for a 1 Ci source

NOTE: The mass attenuation coefficient for lead at about 100 keV is about 6 and the density is about 11.3; 0.4-cm of lead reduces the beam intensity by about  $2 \times 10^{-12}$ . A 4-mm lead shield effectively eliminates lower energy components and reduces the high energy dose (unattenuated about 40 mR/hr/Ci@1m) to under  $1 \times 10^{-10}$  R/hr/Ci@1m. Unattenuated beam intensity at the table-top (about 10-cm distance) was 4mrem/sec by LiF TLD; theoretical was about 3mrem/sec. With the lead shutter occluding the beam the intensity is under  $1 \times 10^{-8}$  R/hr/Ci.

The 1 Ci source of Gadolinium is available in an aluminum capsule (Gd-1) only from Gulf Nuclear at \$6,000. The sources are shipped in the Lunar Radiation lead-lined brass holder. Contact Gulf Nuclear (713-332-3581) for information.

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