



Cook County Hospital

1835 W. Harrison St., Chicago, Illinois 60612 Telephone 312 333 6000

Code 13
030-01357
12-00010-05

June 29, 1982

Bruce Mallet, Ph.D.
 Medical Licensing
 U.S. Nuclear Regulatory Commission
 799 Roosevelt Road
 Glen Ellyn, Ill. 60137

RE: AMENDMENT TO LICENSE #12-00010-05

Dear Doctor Mallet:

RECEIVED BY LFMB	
Date..	<i>2/12/82</i>
Log.	<i>July 8/11/82</i>
By..	<i>[Signature]</i>
Orig. To.	<i>[Signature]</i>
Action Compl.	<i>7/12/82</i>

This is a request for an amendment to make explicit our compliance with the requirements of Part 20.105 "Permissible levels of radiation in unrestricted areas" of 10 CFR Part 20 for the vicinity of brachytherapy patients only. We propose to make explicit our compliance with paragraph "a" of section 20.105. Prior to your recent inspection of this facility, we had been told by your office, Medical Licensing, that we did meet the conditions of paragraph "a" by virtue of our statements on the survey form which had been submitted to your agency at the most recent renewal. Unfortunately for us, the assurances from your agency were in verbal form and not accepted by your Technical Inspection Branch. Thus, we would like to have this in writing.

In support of being permitted to return to our previous practice, we present the following arguments: First, paragraph "b" standards are a catch-all for all unspecified situations. The standards for such catch-all situations should only be rarely applied as a blanket restriction to specific situations which have been carefully analyzed. An insistence on paragraph "b" compliance is analogous to a speed limit on city expressways of 30 m.p.h. Second, although issuing a "Level IV violation (Supplement IV)" during the recent inspection referenced above, neither the inspector at the site nor the letter of January 29, 1982 of Mr. Gregor, suggested any scenerio resulting in a technical overexposure (greater than 500 mrem/yr) as a consequence of our then current practices. We propose to maintain the limits of paragraph "a" by our prior practice of analysis of surveys.

We survey each patient. This survey is conducted by a professional certified by the American Board of Radiology. The survey results are evaluated by an individual certified in a branch of radiation physics, including therapy, by the American Board of Radiology. The evaluation consists of an estimate of the number of hours of occupancy needed to reach the MPD levels. This is compared to the treatment time and occupancies given on the survey form or standard values recommended by the NCRP. Problems have never been observed at this stage, but if they are, remedial action will be taken based on professional judgement.

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 REG3 LIC30
 12-00010-05 PDR

JUL 2 1982

FEE EXEMPT

70.1(a)(9)

Control No. 06593

We will address three locations and then the three types of potentially exposed individuals.

Doorway This is a marginally "uncontrolled area" since the door is usually open but the door is posted with the standard $8\frac{1}{2}$ X 11 inches² magenta on yellow sign. Persons of all sorts rarely lean against such signs for prolonged periods of the order of hours. If the exposure rate were as high as 10 mR/hr in the door-way, a person would still have to be in the door-way ten hours to exceed 100 mrem/case. Such loitering on the part of staff, patients or visitors would hardly be tolerated, even if the door were not posted.

Hall The hall (18" from the wall) will be considerably less than the doorway both because of the added distance and the shielding afforded by the structural concrete, plaster, etc. Exceeding 4 mR/hr is most unlikely. In this case, individuals might spend longer periods sitting in chairs which are in the hall, but not normally placed adjacent to the treatment room walls. Even with the chair present, it is unlikely that anyone would sit for more than eight hours per day each day of treatment to be present for an excess of 25 hours per treatment.

Adjacent Room Here an occupancy of one for a patient is reasonable if there is a bed present. Other rooms such as a cryosurgery room, toilet, etc. will have much lower occupancy. Occupancy for staff or visitors in patient rooms would be much less. Here it is rather obvious whether the MPD's will be approached or not.

Nurses and other Staff These personnel will receive the bulk of their exposure within the patient room while delivering medical care. Since the patient's room is a controlled area, it is not pertinent to this request. The amount of time a nurse spends in the doorway is at most a few minutes a day while asking the patient questions. A nurse or other staff member may sit and talk for a few minutes in the corridor with ambulatory patients or other staff. But the staff does not spend prolonged periods sitting in the corridor. Also, nurses and staff rarely spend long periods in the adjacent rooms as this is primarily a cancer ward for patients undergoing testing and treatment.

Patients These will receive most of their exposure in bed in an adjacent room or in the hall. Since patients are assigned an MPD of 200 mrem/case, their times would be very long in any of the uncontrolled areas. For example, exposure times in the hallway would approach the total time of treatment; i.e. exceeding the MPD would require sitting nearly 24 hours/day during the treatment. For patients in nearby beds, the calculations are straightforward, and no patient would be allowed to remain where they might exceed the MPD of 200 mrem.

Visitors These are, unfortunately, very few and far between. They do not spend time on the order of hours in the ward, and certainly not in the hallways of the ward. Furthermore, their assigned MPD of 500 mrem/case is virtually impossible to reach even by 24 hour/attendance by day attendance.

Thus, we feel that no one will be exposed to above our MPD values in uncontrolled areas. Since the number of cases is only about one every two weeks, it is unlikely that those exposed below the set MPD's would reach 500 mrem/yr of total exposure. In order to exceed 500 mrem/yr a visitor would have to be maximally exposed to more than one case/year, a patient to more than 2½ cases and a nurse five cases; all very unlikely.

Sincerely,



Elliott C. Roberts, Sr.
Director of Cook County Hospital

ECR/hs1

Enclosures

cc: Marion Magalotti, M.D.
Lincoln Hubbard, Ph.D
R. H. Brown, M.D.

§ 20.104 Exposure of minors.

(a) No licensee shall possess, use or transfer licensed material in such a manner as to cause any individual within a restricted area who is under 18 years of age, to receive in any period of one calendar quarter from radioactive material and other sources of radiation in the licensee's possession a dose in excess of 10 percent of the limits specified in the table in paragraph (a) of § 20.101.

(b) No licensee shall possess, use or transfer licensed material in such a manner as to cause any individual within a restricted area, who is under 18 years of age to be exposed to airborne radioactive material possessed by the licensee in an average concentration in excess of the limits specified in Appendix B, Table II of this part. For purposes of this paragraph, concentrations may be averaged over periods not greater than a week.

(c) The provisions of §§ 20.103(b)(2) and 20.103(c) shall apply to exposures subject to paragraph (b) of this section except that the references in §§ 20.103(b)(2) and 20.103(c) to Appendix B, Table I, Column 1 shall be deemed to be references to Appendix B, Table II, Column 1.

§ 20.105 Permissible levels of radiation in unrestricted areas.

(a) There may be included in any application for a license or for amendment of a license proposed limits upon levels of radiation in unrestricted areas resulting from the applicant's possession or use of radioactive material and other sources of radiation. Such applications should include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The Commission will approve the proposed limits if the applicant demonstrates that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.

(b) Except as authorized by the Commission pursuant to paragraph (a) of this section, no licensee shall possess, use or transfer licensed material in such a manner as to create in any unrestricted area from radioactive material and other sources of radiation in his possession:

(1) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour, or

(2) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days.

(c) In addition to other requirements of this part, licensees engaged in uranium fuel cycle operations subject to the provisions of 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," shall comply with that part.

§ 20.106 Radioactivity in effluents to unrestricted areas.

(a) A licensee shall not possess, use, or transfer licensed material so as to release to an unrestricted area radioactive material in concentrations which exceed the limits specified in Appendix "B", Table II of this part, except as authorized pursuant to § 20.302 or paragraph (b) of this section. For purposes of this section, concentrations may be averaged over a period not greater than one year.

(b) An application for a license or amendment may include proposed limits higher than those specified in paragraph (a) of this section. The Commission will approve the proposed limits if the applicant demonstrates:

(1) That the applicant has made a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas; and

(2) That it is not likely that radioactive material discharged in the effluent would result in the exposure of an individual to concentrations of radioactive material in air or water exceeding the limits specified in Appendix "B", Table II of this part.

(c) An application for higher limits pursuant to paragraph (b) of this section shall include information demonstrating that the applicant has made a reasonable effort to minimize the radioactivity discharged in effluents to unrestricted areas, and shall include, as pertinent:

(1) Information as to flow rates, total volume of effluent, peak concentration of each radionuclide in the effluent, and concentration of each radionuclide in the effluent averaged over a period of one year at the point where the effluent leaves a stack, tube, pipe, or similar conduit;

(2) A description of the properties of the effluents, including:

(i) chemical composition;

(ii) physical characteristics, including suspended solids content in liquid effluents, and nature of gas or aerosol for air effluents;

(iii) the hydrogen ion concentrations (pH) of liquid effluents; and

(iv) the size range of particulates in effluents released into air.

(3) A description of the anticipated human occupancy in the unrestricted area where the highest concentration of radioactive material from the effluent is expected, and, in the case of a river or stream, a description of water uses downstream from the point of release of the effluent.

(4) Information as to the highest concentration of each radionuclide in an unrestricted area, including anticipated concentrations averaged over a period of one year:

(i) In air at any point of human occupancy; or



February 22, 1982

L.R. Greger, Acting Chief
Technical Inspection Branch
U.S.N.R.C. - Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

RE: LICENSE #12-00010-05

Dear Mr. Greger:

This refers to your letter reporting the inspection of Messrs J.R. Madera and D.R. Gibbons on January 7th and 8th, 1982, of activities regulated under license #12-00010-05. The following items refer specifically to your four non-compliance items of the Appendix.

- #1 In the short run we will, by specific survey, assure that we do not exceed 2 mR/hr in an adjacent noncontrolled area (of which the corridor has been the only example exceeding 2mR/hr). We will attempt to achieve this by strategies such as moving the patient's bed, but if all else is inadequate we will reduce the "loading" of the treatment. We feel that this substandard treatment is unwarranted on the basis of safety, since the exposures in the corridor, cannot, in fact, be large. Our R.S.O. has talked with the Medical Licensing staff at your office and in Washington and they indicate that an amendment authorizing our previous practice may be possible. As such we intend to request such an amendment later.
- #2 The accuracy and linearity checks will be carried out in the near future, certainly before March 1, 1982.
- #3 An appropriate sign has been prepared and will be mounted in the near future; certainly before March 1, 1982.
- #4 We are currently surveying outgoing radioactive waste shipments, and will continue to do this in the future.

We trust that these responses are adequate and you may know that they will all be fully implemented by March 1, 1982.

Submitted under oath or affirmation.

Sincerely,

Elliott C. Roberts, Sr.
Director

ECR/df

cc: R. H. Brown, M.D.
L.B. Hubbard, Ph.D. ✓

NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXPIRES JUNE 15 1985
ISSUED THROUGH ILLINOIS NOTARY ASSOC.

8203230029

Control No. 06593



BRACHYTHERAPY ROOM SURVEY

SURVEY DATE: 5-21-81

ROOM NUMBER: 4007

SOURCE TYPE: Cs-137

TOTAL SOURCE STRENGTH: 140 mgy Ra eq.

INSERTED ON: 5-21-81 10³⁰ AM

PLANNED REMOVAL:

PATIENT NAME:

PLANNED HOURS:

RESULTS

Position	Occupancy Type	Time	MPD (mrem)	Readings mrem/hr	MPD* hours	Remarks
1 meter	N	-	100	75 (†)	1.33	Enter 1/3 of this on nurse inst
Chair (2m)	V	-	500	7	> 40	Enter 1 hr on nurse inst
Doorway	N	1/12	100	7	14	
ADJ. WALLS						
N				1	> 40	
E NA				2	> 40	
W HALL					> 40	
S				1		
Floor						
Ceiling						

CHECK LIST	MPD's TYPE mrem/case	OCCUPANCY FACTORS
Warning on door ✓		Adj. Pt. = 1
Warning on chart ✓	N (Nurse) 100	Most others = 1/3 of usual values to account for an eight hour work day.
Nurse Inst. in chart ✓	P (Adj. Pt.) 200	
	V (Visitor) 500	

NOTES: *Excluding occupancy factors

†Calculated on the assumptions of a bare source

SPECIAL INSTRUCTIONS, COMMENTS OR OBSERVED PROBLEMS:

Control No. 06593

B
GYL 40

Survey by

MF Magalad, mp

Review by

7/11/81 Dr. ...