



MOUNT AUBURN HOSPITAL

330 Mount Auburn Street
Cambridge, Massachusetts 02238
Tel: (617) 492-3500

030-15175

X

November 27, 1989

U.S. Nuclear Regulatory Commission
Region I
Nuclear Material Section B
475 Allendale Road
King of Prussia, PA 19406

Gentlemen:

This letter and attachments constitute our request for renewal of the Teletherapy License No. 20-12063-02. The supporting information requested in Section 2 of Appendix L of the Teletherapy Guide and in Enclosure 1 to your Notice of Expiration dated September 1, 1989 is attached.

Sincerely,

Francis P. Lynch
Francis P. Lynch
President

I

License	Dec 11
Expiry	
Track No.	111322
Amount	\$350
Category	2A
Fee or Fee	REN
Expiry Date	12/13/89
Date Received	11/23/89
Signature	<i>eur</i>

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PDR FOIA
STOLL92-58 PDR

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Established in 1871

111696

DEC 01 1989

11/10/286

SUPPORTING INFORMATION FOR RENEWAL OF
MATERIALS LICENSE NO. 20-12063-02

- a. This is an application for the renewal of materials license No. 20-12063-02.
 - b. Mount Auburn Hospital
Department of Radiology
 - c. 330 Mount Auburn Street
Cambridge, MA 02138
 - d. Department of Radiology
Mount Auburn Street
Cambridge, MA 02138
Department of Radiology
Ground Floor
Therapy Treatment Room
 - e. Location of teletherapy unit is the same as that described in original license application dated April 2, 1979. No changes have been made that affect radiation levels in surrounding areas or that affect the patient viewing system. (See Survey Report dated November 26, 1986.)
 - f. Electrical or mechanical stops that limit use of the primary beam of radiation are still installed and continue to operate as described in the last survey report of November 26, 1986 submitted to the NRC.
 - g. Sealed Sources: (A) Cobalt-60
Neutron Products, Inc.
NPI No. 20-7000W; S/N T-841
Maximum activity per source - 7800 curies
Maximum Number of sources - two

(B) Uranium 238
Neutron Products, Inc.
No source model number
Material used for trimmer bars, source shielding and source drawer. Maximum activity and number of sources not specified by manufacturer; maximum weight is specified as 80 lb (36.4 Kg).
- Teletherapy Unit: Atomic Energy of Canada Ltd.
Theratron 80.
- This unit is used for the treatment of humans.
- h. Licensed material shall be used by, or under the supervision of, Chan Hyuk Choi, M.D.

- i. The Radiation Safety Officer is Merrill Johnson, M.D.
- j. Item 8--Training for Individuals Working in or Frequenting Restricted Areas. We, Mount Auburn Hospital, Department of Radiology, shall follow the training program described in Appendix D of Draft Regulatory Guide FC 414-4.

Item 10.5--Operating Procedures (See attached Appendix).

Item 10.6--Emergency Procedures. We, Mount Auburn Hospital, Department of Radiology, will follow the emergency procedures described in Appendix I of Draft Regulatory Guide FC 414-4.

- k. Item 10.1--Personnel Monitor Program. We, Mount Auburn Hospital, Department of Radiology, have a program which follows the criteria specified in Item 10.1.2 of Draft Regulatory Guide FC 414-4.

Item 10.2--Instrumentation. We, Mount Auburn Hospital, Department of Radiology, will have available for use from the time we begin operation the instrumentation specified in Item 10.2.2 of Draft Regulatory Guide FC 414-4.

Item 10.3--Calibration of Portable Survey Instruments. We, Mount Auburn Hospital, Department of Radiology, will calibrate our own survey instruments in accordance with written procedures that include as requirements the criteria described in Item 10.3.4 of Draft Regulatory Guide FC 414-4.

- l. There has been no change in the information previously submitted to NRC regarding other aspects of the radiation protection program or the teletherapy program.
- m. Radiation Safety Committee--The RSC's responsibilities, duties and meeting frequency will be as described in Appendix K of Draft Regulatory Guide FC 41404.
- n. We, Mount Auburn Hospital, Department of Radiology, have adopted the model ALARA program described in Appendix J of Draft Regulatory Guide FC 414-4.
- o. Survey report for source change performed on November 13, 1986 was submitted.
- p. We, Mount Auburn Hospital, Department of Radiology, do not wish to make any other changes in the teletherapy program.

Appendix: Operating Procedures

1. Receipt and Disposal of Radioactive Materials. Radioactive materials shall always be handled by licensed source handlers for receipt and disposal.
2. Use of the Teletherapy Unit. Only certified radiation therapy technologists and certified radiation therapists may operate the unit to treat patients. In addition, radiation therapy physicists perform monthly and annual checks on this unit. The unit may be operated in any gantry orientations provided the primary beam is intercepted by the beam stop. A 'search button' is installed in the treatment room. To turn the unit on, this button has to be pressed and the room door has to be closed within a preset time period (~30 sec). This therefore requires the operator to enter the room for a survey each and every time the unit is to be turned on. A daily check in accordance with section 35.615 is performed each day by the technologist before patients are treated.
3. Safety Device Checks. All safety devices are checked daily, monthly and annually. Any malfunctions are to be reported to a certified physicist and the use of the unit is to be discontinued until either the problem is corrected or a backup safety device is put into operation.
4. Personnel Dosimetry. All personnel who work full-time in the radiation area shall wear film badges. These are whole body film badges and should be worn at chest level. In the event that a person receives or suspects that he/she received a high exposure, the incident is to be reported to the Radiation Safety Officer.
5. Procedure for Securing the Teletherapy Unit. When the unit is unattended, the unit is locked and the keys kept in a secured place.
6. Instrument Calibration and Checks. Calibration of instruments is carried out and/or supervised by certified physicists. Full calibration dosimetry system are calibrated by NBS or AAPM accredited calibration laboratory within the last twenty-four months. Spot check dosimetry systems are calibrated using the full calibration dosimetry system bi-annually. Beam-on monitor and survey meter are checked daily with a ~10 μ Ci Cs137 source. Survey meters are calibrated annually.
7. Full Calibration of Teletherapy Units. Full calibration is carried out at intervals not exceeding one year by certified physicists according to 35.632 using the instruments described in Item 6 above.
8. Monthly Spot-check Measurements of Teletherapy Units. Spot checks are carried out once in each calendar month according to 35.634 using the instruments described in Item 6 above.

9. Leak Test. Leak test is performed biannually in accordance to Item 10.4 of Draft Regulatory Guide FC 414-4. See attached procedure.

10. Inspection and Servicing of the Teletherapy Unit. The unit shall be fully inspected and serviced during source change or at intervals not to exceed 5 years by licensed source handlers.

11. Limitations on Work Done on Teletherapy Unit. All work performed on the unit that involves the source, source drawer, shutter or other mechanism that could expose the source, reduce the shielding around the source or compromise the safety of the unit and result in increased radiation levels is carried out by a licensed source handler.

12. Survey Reports. A radiation survey shall be performed whenever a source is changed, changes are made to the treatment room shielding, the location of the unit within the room is changed or the use of the teletherapy unit is changed such that radiation levels outside the room is altered. A report of the survey shall be submitted to the NRC within 30 days following these changes.

13. Relocation of Teletherapy Unit. A relocation of the unit shall require an amendment to the license and also approval by the NRC.

14. Recordkeeping. The following records shall be maintain to comply with NRC regulations.

- (i) Copies of the NRC licenses.
- (ii) License applications.
- (iii) Correspondence with the NRC in support of a license request.
- (iv) Daily safety device checks.
- (v) Daily beam-on monitor checks.
- (vi) Survey instrument calibrations.
- (vii) Calibrations of dosimetry systems.
- (viii) Results of spot-checks and full calibrations.
- (ix) Results of leak tests.
- (x) Records of full inspections and servicing of unit.
- (xi) Radiation survey reports.
- (xii) Personnel dosimetry records.
- (xiii) Records of training of new personnel and annual refresher training of personnel.
- (xiv) Records of receipt and disposal of radioactive materials.

15. Emergency Procedures. Emergency procedures shall be posted in the vicinity of the teletherapy machine control. Refer to Item 10.6 of Draft Regulatory Guide FC 414-4.

16. Procedures for Notifying the Proper Persons in the Event of

an Accident or Unusual Occurrence. In the event of a teletherapy unit malfunction or therapy misadministration, this shall be reported to the appropriate individuals listed in the machine control area. This list includes the names, addresses and telephone numbers of the radiation safety officer, hospital administrator, teletherapy unit manufacturer, service representative and the NRC.

Item 10.4 Leak Test Program

The leak test procedure is performed by the Chief Nuclear Medicine Technologist under the supervision of the Radiation Safety Officer. Samples are taken using a cotton tipped applicator moistened with distilled water and are obtained by wiping the collimator blades nearest the source. Sampling is performed under the supervision of the therapy technologist and gloves are worn during the procedure. The sample is immediately placed in a plastic counting tube and the gloves are disposed of as contaminated trash.

The sample is counted in NaI (Tl) well crystal connected to a single channel analyzer. Counter efficiency for Cobalt 60 is determined at least semi-annually using a Co-60 calibrated reference standard purchased from DuPont. Results are calculated as follows:

$$\text{Net Sample Counts per Minute (cpm)} = \frac{\text{Sample Counts} - \text{Background}}{\text{counting time}}$$

$$\text{Decays per minute (dpm)} = \frac{\text{Net Sample Counts}}{\text{counter efficiency}}$$

$$\text{Microcuries } (\mu\text{Ci}) = \frac{\text{Decays per Minute}}{2.22 \times 10^6 \text{ dpm}/\mu\text{Ci}}$$

Example Calculation:

Sample Counts	500
Background	200
Count Time	100 Minutes
Counter Efficiency	0.02 (2%)

$$(500 - 200) \div 100 = 3\text{cpm}$$

$$3\text{cpm} \div 0.02 = 150 \text{ dpm}$$

$$150 \text{ dpm} \div 2.220 \times 10^6 = 6.7 \times 10^{-5} \mu\text{Ci}$$

$$\text{Result} = 0.000067 \mu\text{Ci} = < 0.001 \mu\text{Ci}$$

The leak-test procedure is performed by the Chief Nuclear Medicine Technologist, Dean DeMaster. He holds a Master's Degree in chemistry, has twenty years experience in Nuclear Medicine technology, and holds APRT (NM) and NMTCB certification. All results are checked and verified by the Radiation Safety Officer.

Leak-test records are maintained for at least two years after each test and include the source identity (manufacturer's name, model number and serial number) the measured activity of the sample, the test date, and the name of the person who performed the test.

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OFFICIAL RECORD COPY ML1B

LICENSE NO: _____

DOCKET NO. (s) 030-01945

030-15175 ✓

PAGE _____ OF _____

ATTACHED

- ☐ Appendix A
☐ Appendix B
☐ Appendix C
☐ Memo

INSPECTION REPORT NO. 90-001

Mount Auburn Hospital

330 Mt. Auburn Street

Cambridge, Massachusetts 02138

LICENSEE CONTACT: Merrill C. Johnson, M.D.

Telephone No: 617-492-3500

LICENSE NO: 20-12063-01

CATEGORY G

PRIORITY: 3

20-12063-02 ✓

CATEGORY G3

PRIORITY: 1

CATEGORY _____

PRIORITY: _____

INSPECTION DATE (s): October 23, 1990

TYPE OF INSPECTION:

- ☐ SPECIAL ☐ ANNOUNCED
☒ ROUTINE ☒ UNANNOUNCED
☒ DAYSHIFT
☐ OTHER

SUMMARY OF FINDINGS AND ACTION

- ☐ NO NONCOMPLIANCE, CLEAR 591 ISSUED
☒ NO NONCOMPLIANCE, LETTER
☐ NONCOMPLIANCE, APPENDIX A

- ☐ ACTION ON PREVIOUS NONCOMPLIANCE, APPENDIX B
☐ NONCOMPLIANCE, 591 ISSUED
☒ SUPPLEMENTAL INFO, APPENDIX C

RECOMMENDATIONS
SEE BASIS IN APPENDIX C

- ☐ CHANGE CATEGORY TO: _____
☐ NEXT INSPECTION DATE: 10/91

☐ CHANGE PRIORITY TO: _____

PERSONS CONTACTED

Merrill C. Johnson, M.D., RSO

Dean De Musta, CNMT

Timothy A. Neale, V.P. Clinical Services

Joseph J. Leary, Ph.D., Medical Physicist

J. C. Thabault, R.T.T.

Kathy Surles, NMT

INSPECTOR: A. Kirkwood

APPROVED: M. Shaky

92440011

A/36

INSPECTION REPORT 90-01

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787208 - Medical - Teletherapy

AREAS INSPECTED AND FINDINGS

Licensee: MT. Auburn License No: Amendment No:

INSPECTION ITEM	CRITERIA	FINDING
1. <u>Organization</u>	Lic Cond <u> </u>	<u> </u>
Management organization? <u> </u>		
Radiation protection organization? <u> </u>		
Patient load?		
NOTES & REMARKS:		
<p>Rad Oncology now has member in RSC house attended only 2 out of last 5 meetings. See APPC.</p> <p>Medical Radiology Service group operating out of Mass General Hospital supplies both Radiation Oncologists and technicians as well as Medical Physicists. RSC approval granted 6/7/90 for visiting physicians from this group. Merrill C Johnson, M.D., the Mt Auburn NM physician is the RSC. Dean DeMaster is his assistant and handles all administrative duties. 15/18 patients per day.</p>		
2. <u>Training and Instructions to Employees</u>	Lic Cond <u> </u>	<u> </u>
Training program, scope and frequency, retraining? <u> </u>		
Required tests administered, scores satisfactory? <u> </u>		
Instructions to workers? <u> </u>		
NOTES & REMARKS:		
<p>Technician is certified RTT. Training provided by Mass General.</p>		
3. <u>Radiation Protection Procedures</u>	Lic Cond <u> </u>	<u> </u>
Operating and emergency procedures implemented; interlock failure, handling malfunctions during operations? <u> </u>		
5-year maintenance? <u> </u>		
Emergency Procedures posted? <u> </u>		
Radiation room monitor mounted, operable? <u> </u>		
Tested? Survey meter used when inoperable?		
NOTES & REMARKS:		
<p>all interlocks tested and functioning appropriately.</p> <p>Room monitor operable on AC and D.C.</p> <p>Survey meter, Vic* 740F, S/N 274, "Cutie Pie", alt.</p> <p>11/89. Check source not observed, will be required after renewal approved.</p>		

AREAS INSPECTED AND FINDINGS

Licensee: Mr. Aulden License No: Amendment No:

INSPECTION ITEM	CRITERIA	FINDING
<u>4. Materials, Facilities and Instruments</u>		
Teletherapy unit location, interlock system operational, required tests? (every 6 months, records) <u>C</u>	Lic Cond 10, 17, 19	<u>C</u> Tests conducted more frequently than required Testing as required
Access controls, posting of areas & rooms? <u>C</u>	20.203	
Survey instruments & dosimeters operable, properly calibrated? <u>C</u>	Lic Cond <u> </u>	Survey instrument ready for use
Patient viewing system? <u>C</u>	Lic Cond 13	TV camera provides patient viewing system
NOTES & REMARKS:		

5. Personnel Protection - External

Personnel monitoring control; minimize exposures, control of accumulated dose? <u>C</u>	20.101, 20.102, 20.202	<u>C</u> Personnel badge by Master General Last source change Nov '86
Surveys conducted following last source change? Sent to NRC? Adequate? <u>C</u>	20.201 Lic Cond 18	
Levels in unrestricted areas? <u>N/I</u>	20.1, 20.104	
Stops installed? <u>N/A</u>	Lic Cond 15	
NOTES & REMARKS:		

6. Leak Tests of Sources

Performed by authorized persons & methods:	Lic Cond 14	L/T performed by licensee
Performed at 6-month (or other) interval? <u>17</u>		Last L/T on 2/7 and 7/26/90.
Records maintained; reports submitted of leaking sources; corrective action taken?		Records reviewed are adequate
NOTES & REMARKS:		

AREAS INSPECTED AND FINDINGS

Licensee: Mr. AuburnLicense No: Amendment No:

INSPECTION ITEM	CRITERIA	FINDING
<u>7. Notifications and Reports</u>		
To individuals?	19.13	N/I
Overexposures, excessive levels, incidents?	20.403, 20.405	None
Personnel exposures and monitoring, termination reports?	20.407, 20.408	N/I
Theft or loss of licensed material:	20.402	None
Misadministrations?	35.41 - 35.45	None
NOTES & REMARKS:		
<u>8. Annual Calibration</u>		
At required intervals?	35.21 (a)	Yes Last conducted on 11/16/89
Include all required tests?	35.21 (b)	Yes
Properly calibrated dosimetry system?	35.23 (a)	Yes by M.D. Anderson 8/18/88
Performed by a qualified expert?	35.21 (e), 35.24	Keithley and Ramee Anderson
Decay corrections for interval not exceeding 1 month?	35.21 (d)	Yes Dr. Levy performs full cal.
Records available?	35.25	
NOTES & REMARKS: Decay / output checks are made in comparison with original activity corrected for decay to date.		
<u>9. Spot Check Measurements</u>		
At required intervals?	35.22 (a)	Yes
Include all required tests?	35.22 (b)	Yes
Performed by qualified expert or reviewed by qualified expert within 15 days?	35.22 (c), 35.24	Monthly checks performed by Moss General Hospital students and checked by Physician within 15 days
Properly calibrated dosimetry system?	35.23 (b)	Yes
Records available?	35.25	Annual dosimetry system used for spot checks also
NOTES & REMARKS: Reviewed spot checks for period 12/21/88 to 10/18/90		
<u>10. Posting of Notices</u>		
Part 20, license & documents, procedures, notice of violations?	19.11 (a)	Yes
NRC-37	19.11 (c)	Yes
NOTES & REMARKS: All postings complete.		

INSPECTION REPORT NUMBER 90-001

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787208 - Medical - Teletherapy

AREAS INSPECTED AND FINDINGS

Licensee: Mr. Auburn License No: _____ Amendment No: _____

INSPECTION ITEM	CRITERIA	FINDING
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11. Other License Conditions

N/A

NOTES & REMARKS:

12. Confirmatory Measurements

N/A

Output check?

Confirmation of condition 18 survey?

NOTES & REMARKS:

NRC Instrument: _____ Calibration Due Date: _____

13. Independent Inspection Effort

N/A

NOTES & REMARKS:

REGION I Form 198-E
(July 82)

INSPECTION REPORT NUMBER 90-001

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APPENDIX B - LICENSEE ACTION ON PREVIOUS INSPECTION FINDINGS

Licensee: Mr Auburn

License No: _____

Identification and summary of action taken	Status
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Report No: <u>89-001</u> Type n/c: <u>VIOL</u> Describe: <u>Failure to have on-duty re, on RSC</u>	
Action taken: <u>Rep named, however attended only 2 out last 5 meetings</u>	<input checked="" type="radio"/> OPEN <input type="radio"/> CLOSED

Report No: _____ Type n/c: _____ Describe: _____	
Action taken: _____	<input type="radio"/> OPEN <input type="radio"/> CLOSED

Report No: _____ Type n/c: _____ Describe: _____	
Action taken: _____	<input type="radio"/> OPEN <input type="radio"/> CLOSED

Report No: _____ Type n/c: _____ Describe: _____	
Action taken: _____	<input type="radio"/> OPEN <input type="radio"/> CLOSED

Report No: _____ Type n/c: _____ Describe: _____	
Action taken: _____	<input type="radio"/> OPEN <input type="radio"/> CLOSED

Report No: _____ Type n/c: _____ Describe: _____	
Action taken: _____	<input type="radio"/> OPEN <input type="radio"/> CLOSED

(July 82)

INSPECTION REPORT NUMBER

90-001

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APPENDIX C - SUPPLEMENTARY INFORMATION

Licensee:

M. Autumn

License No:

- ☐ Uncorrected/repeated noncompliance
☐ Unusual occurrence, conditions, etc
☐ Basis for change of Category or Priority

- ☐ Unresolved items
☒ Inspector's comments

Dr. Choi named as oncology rep. on RSC, however he has attended only 2 out of the last 5 meetings. Recommended naming a new rep. or encourage more frequent attendance. Violation of 89-001 remains open.

RSC meetings:

- 9/29/90 Choi absent
- 6/7/90 Choi absent
- 3/26/90 Choi present
- 12/8/89 Choi absent
- 9/29/89 Choi present

Department had 20 patients on this day and only one technician. Physician not on premises on day of inspection but could be reached by phone. Seems like heavy workload for one individual.