



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

MAR 13 1985

License No. 20-19130-01
Docket No. 030-17013
Control No. 03070

Massachusetts Materials Research, Inc.
ATTN: Wesley C. Nickle
Radiation Safety Officer
241 West Boylston Street
West Boylston, Massachusetts 01583

Gentlemen:

This is in reference to your application dated October 29, 1984, to renew License No. 20-19130-01. In order to continue our review, we need the following additional information:

Item 1 In Attachment 1 of your application, you do not include 165 millicuries of Cesium 137 to be used in the Tech/Ops Calibrator. However, in item 3.4.1 of your Radiation Safety Manual there is a procedure to calibrate your meters with this calibrator. Please explain how you can calibrate your meters without having a source to calibrate them against.

Item 2 In item 3.4.1(G) of your Radiation Safety Manual, you specify that 20% is considered to be satisfactorily accurate in the calibration of your survey meters. Instruments not calibrated to $\pm 10\%$ of the actual values of the range of the instrument must have a chart or graph showing that the calibration is within $\pm 20\%$ of the actual value for a given reading. Please modify your procedure to reflect the $\pm 10\%$ of the actual value or have a chart or graph attached to the meter showing $\pm 20\%$ of the actual value for a given reading.

Item 3 In item 3.4.1 of your Radiation Safety Manual, you specify the calibration and maintenance of meters at "Lehigh" is the responsibility of the Assistant RSO. If this is a typographical error, please correct this procedure to MMR.

Item 4 In the Sample Examination Questions For Radiographers that you provided with your Radiation Safety Manual, answers to questions 26, 39, and 48 are incorrect. Please modify your answers to have the correct answers.

Item 5 In item 1.7.0 of your Radiation Safety Manual, you state there is no permanent shielded facility for performing radiography at MMR. But according to item 1.8.1(A) radiography is being performed at MMR. It appears that you have facility designed or intended for radiography and one in which radiography is regularly performed. It does not appear that this facility is shielded or provided with a radiation alarm to signal the radiographer when the source is exposed and an individual approaches the entrance area. This positive signal

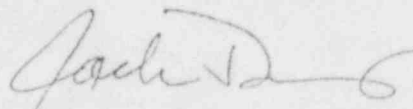
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Massachusetts Materials Research, Inc.-2-

Item
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is another redundant system used to protect the radiographer from receiving excessive radiation exposure. Since it appears that your facility is a permanent installation, please explain how you will comply with the requirement in 10 CFR 34.29(b), that each entrance that is used for personnel access to the high radiation area in a permanent radiographic installation be equipped with a visible and audible signal to warn of the presence of radiation.

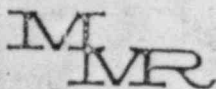
We will continue our review upon receipt of this information. Please reply in duplicate to my attention at the Region I office and refer to Mail Control No. 03070.

Sincerely,



Jack Davis, Health Physicist
Nuclear Materials Safety Section A
Division of Radiation Safety
and Safeguards

Enclosure:
10 CFR Part 34



RADIATION SAFETY MANUAL

3.4.1 Calibration of Survey Meters (cont'd)

- (D) Once the meter has been placed at the proper distance from the unit the operator exposes the source by pulling the source control rod up. The resultant beam of radiation, which shall be aimed directly at the meter in a horizontal plane, is collimated by a 60 degree conical port at the side of the unit. The operator should stand far enough from the meter so that unnecessary personnel exposures are avoided.
- (E) After waiting fifteen seconds, read the position of the needle on the meter. Immediately return the source to the storage position by pushing the source control rod down to its original position.
- (F) If necessary, adjust the meter to the known value and repeat the test. Then set the meter at the next calibrating distance/dose level.
- (G) The meter is considered to be satisfactorily accurate if, after adjustment and retest, it indicates within $\pm 10\%$ of the actual dose level at a minimum of two points in each range.

The calibration and maintenance of radiation survey meters at MMR is the responsibility of the Assistant RSO. Records of meter calibrations shall include the date, the make, model and serial no. of the meter, and all data points checked. If calibrations are performed internally, Form 207 shall be used to record the results. Meter calibration records shall be maintained for at least two years in the Calibration file.

Meters which are awaiting repairs or calibration or which are otherwise not to be used must be tagged or labeled "Out of Service".

3.4.2 Calibration of Pocket Dosimeters

Each pocket dosimeter shall be calibrated by exposure to a radiation source of known intensity at intervals not to exceed twelve months. All calibrations shall be performed by the Assistant RSO using the Dosimeter Calibrator designed for that purpose. This unit contains a sealed source of Cesium-137 (less than 10 milliCuries). The Cesium-137 emits radiation such that, if a dosimeter is placed in one of the eight holes in the outer ring, it should read 50 mR after 24.8 hours. If placed in one of the four holes in the inner ring, it should read 50 mR after 6.2 hours. (Note: these are 1978 values; they should be adjusted according to the decay curve for this source; Ce-137 has a half-life of 33 years).

Results of these calibrations shall be recorded on Form 206 and maintained in the Calibration file. Dosimeters found to be 30% or more inaccurate shall be removed from service and replaced. Should a dosimeter be dropped, it must be removed from service and recalibrated before being used again.

SAMPLE EXAMINATION QUESTIONS FOR RADIOGRAPHERS (cont'd)

MATCHING - Select the BEST answer from the right-hand column for each of the items in the left-hand column

- | | | | |
|----------|--|-----|-------|
| 35. ____ | Attenuation factor for T/O 714 lead mini-collimator | (a) | 2 |
| 36. ____ | Attenuation factor for T/O 654 lead collimator | (b) | 100 |
| 37. ____ | Attenuation factor for T/O 799 tungsten mini-collim. | (c) | 50 |
| 38. ____ | Half-life of Ir-192 (no. of days) | (d) | 1000 |
| 39. ____ | Max. mR/hr @ surface of package for Yellow III label | (e) | 1/160 |
| 40. ____ | Max. mR/hr @ surface of package for Yellow II label | (f) | 75 |
| 41. ____ | Max. allowable mR/hr at any surface of storage valut | (g) | 1.70 |
| 42. ____ | Max. mR/hr at 1 meter from Yellow III package | (h) | 1/200 |
| 43. ____ | Max mR in any 7 days for an unrestricted area | (i) | 52 |
| 44. ____ | No. of milliRems in one Rem | (j) | 1 |
| 45. ____ | Max acceptable mR/hr at surface of 660 with 100 ci | (k) | 1.9 |
| 46. ____ | Max mR/hr at 1 meter from a Yellow II package | (l) | 100 |
| 47. ____ | R/hr for 10 curies of Ir-192 at 1 foot | (m) | 10 |
| 48. ____ | Approx. HVL of solid concrete (inches) for Ir-192 | (n) | 90 |
| 49. ____ | Dosimeters must be recalibrated every ____ day | (o) | 7 |
| 50. ____ | Approximate length of each guide tube section (ft.) | (p) | 200 |

ANSWERS TO SAMPLE EXAMINATION QUESTIONS FOR RADIOGRAPHERS

1. 0.6"
2. 3
3. 21
4. 12.5 curies
5. 5 mR
6. 52 mR/hr
7. 13 mR/hr
8. about 72 feet
9. a
10. c
11. a
12. b
13. b
14. a
15. b
16. d
17. b
18. b
19. b
20. a
21. b
22. a
23. a
24. a
25. a
26. T
27. F
28. T
29. T
30. T
31. T
32. T
33. F
34. T
35. g
36. h
37. e
38. f
39. p
40. c
41. a
42. m
43. 1 or b
44. d
45. p
46. j
47. i
48. k
49. n
50. o

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Original Signed By:

Jack Davis

Jack Davis, Health Physicist
Nuclear Materials Safety Section A
Division of Radiation Safety
and Safeguards

Enclosure:
10 CFR Part 34

RI:DRSS
Davis/djh

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MA MATERIALS RESEARCH INC -

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