



## Main Medical Imaging Center

Services Provided:

Cat Scan • Mammograms • Diagnostic X-Rays  
Sonograms • Echograms • Nuclear Medicine

1011 Main Avenue  
Clifton, N.J. 07011  
(201) 777-6661  
Fax: (201) 777-1311

March 19, 1997

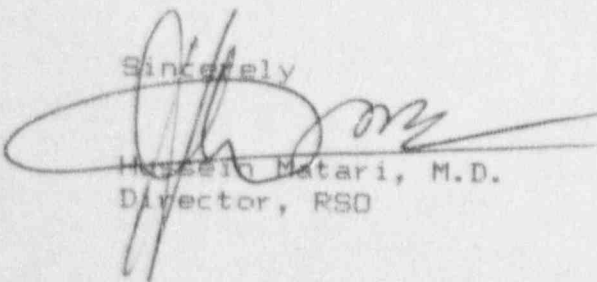
Attention : Mr. James M. Bondick  
Health Physicist  
US NRC, Region 1  
475 Allendale Rd  
King of Prussia, PA 19406

Dear Mr. Bondick

This is a follow-up on your request today for additional information in relation to our facility inspection. I had our technologist and medical physicist visiting this afternoon and they were able to locate the accuracy records for the second source and explain the survey results, as follows:

1. The survey meter calibration for 1995 was with the other calibration certificates for 1994 and 1996. Copies of 94/95/96 are attached.
2. The dose calibrator accuracy test using the Ba-133 as second source was inadvertently placed with the source original certificate and other papers instead of being placed with the dose calibrator records. Copies of the test for 94/95/96 are attached. The results are now properly placed.
3. The area survey results in question for the period of 2-4/1996 were in fact followed by a wipe test, although on a day or two later. Copies of wipe tests and survey results for that period are attached. We acknowledge that both tests should have been done on the same day, and as you noticed this has been the case after that period.
4. As to the waste disposal chart, the figure mentioned of 600 CPM was corrected to 60 CPM to be in agreement with the BG level measured outside the hot lab. I would like to emphasize that all waste survey results prior to disposal showed only BG readings. Thank you for giving us the chance to explain these findings. please let me know if you have any other questions.

Sincerely

  
Hussein Matari, M.D.  
Director, RSO

RETURN ORIGINAL TO  
REGION I

MAR 24 1997

9704150034 970408  
PDR ADOCK 03033370  
C PDR

# MAIN MEDICAL IMAGING

## NUCLEAR MEDICINE DAILY RADIATION LEVEL SPOT CHECK

IF READING EXCEEDS TWICE THE BACKGROUND, THERE IS A POSSIBILITY OF CONTAMINATION: CPM(400

| AREA         | DATE    | ME/h | BY | DATE    | ME/h | BY | DATE    | ME/h | BY |
|--------------|---------|------|----|---------|------|----|---------|------|----|
| Stenose      | 2-22-96 | .02  | RB | 2-26-96 | .02  | RB | 2-29-96 | .02  | RB |
| De. well     |         | .02  |    |         | .02  |    |         | .02  |    |
| ink          |         | .02  |    |         | .02  |    |         | .02  |    |
| st Lab       |         | .03  |    |         | .02  |    |         | .03  |    |
| cor          |         | .02  |    |         | .02  |    |         | .02  |    |
| unex cabl    |         | .02  |    |         | .02  |    |         | .02  |    |
| medle        |         | .02  |    |         | .02  |    |         | .02  |    |
| any my       |         | .02  |    |         | .03  |    |         | .02  |    |
| room         |         | .02  |    |         | .03  |    |         | .02  |    |
| ASHA         |         | .02  |    |         | .03  |    |         | .02  |    |
| ashc         |         | .02  |    |         | .02  |    |         | .03  |    |
| Shield       |         | .03  |    |         | .02  |    |         | .02  |    |
| De Cal.      |         | .02  |    |         | .02  |    |         | .02  |    |
| De. m. h. i. |         | .02  |    |         | .02  |    |         | .02  |    |

# MAIN MEDICAL IMAGING

## NUCLEAR MEDICINE DAILY RADIATION LEVEL SPOT CHECK

IF READING EXCEEDS TWICE THE BACKGROUND, THERE IS A POSSIBILITY OF CONTAMINATION: CPM(400

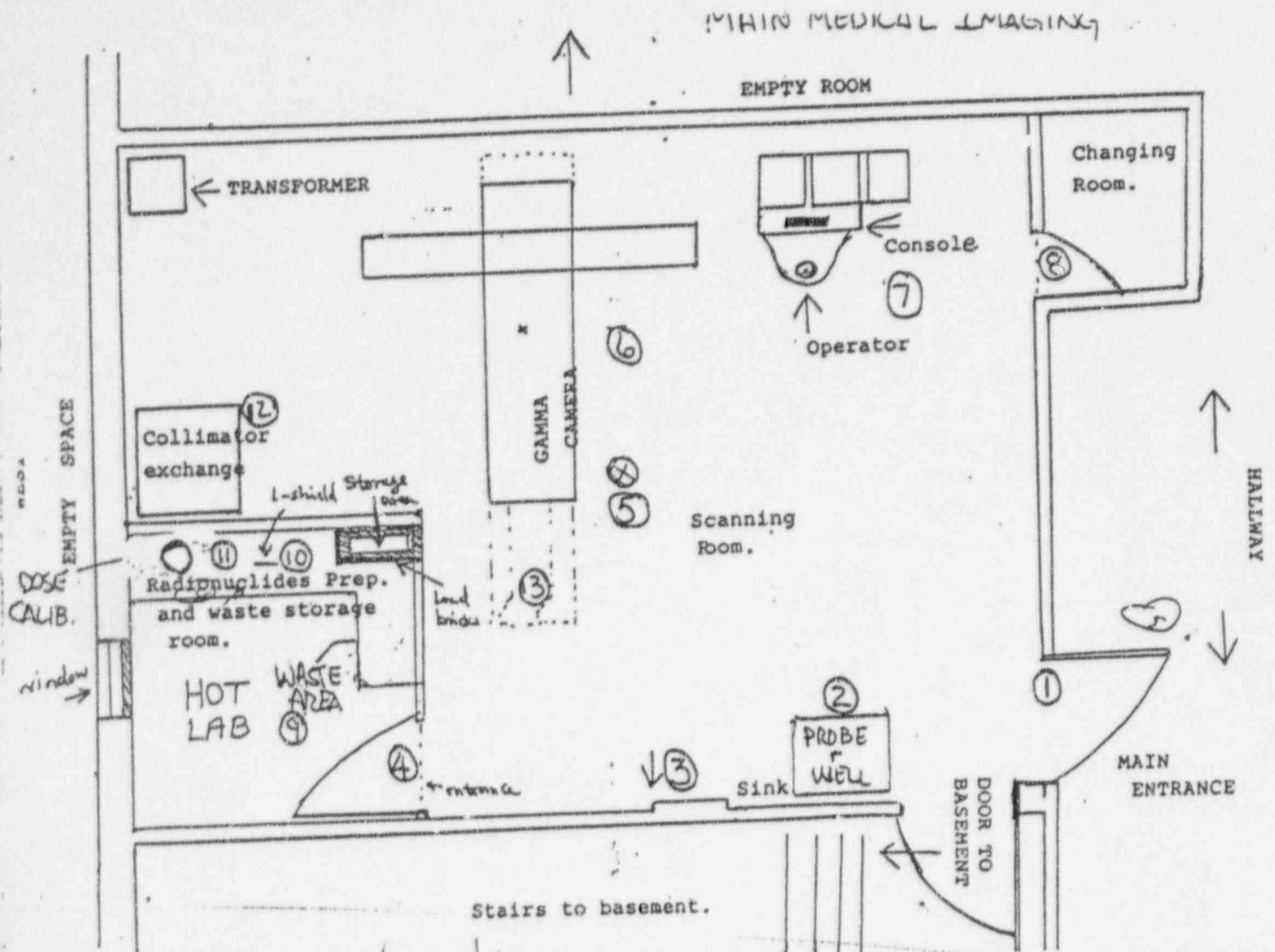
| AREA        | DATE    | cpm<br>mcp/h | BY | DATE    | cpm<br>mcp/h | BY | DATE    | cpm<br>mcp/h | BY |
|-------------|---------|--------------|----|---------|--------------|----|---------|--------------|----|
| staircase   | 3-11-96 | .02          | RS | 3-11-96 | .03          | RS | 3-14-96 | .03          | RS |
| be well     |         | .02          |    |         | .03          |    |         | .02          |    |
| ink         |         | .02          |    |         | .02          |    |         | .02          |    |
| Lab         |         | .02          |    |         | .03          |    |         | .03          |    |
| cor         |         | .02          |    |         | .02          |    |         | .02          |    |
| meas cab    |         | .02          |    |         | .02          |    |         | .02          |    |
| medic       |         | .02          |    |         | .02          |    |         | .02          |    |
| anying room |         | .02          |    |         | .02          |    |         | .02          |    |
| note        |         | .03          |    |         | .03          |    |         | .02          |    |
| ACCA        |         | .03          |    |         | .03          |    |         | .02          |    |
| sheld       |         | .03          |    |         | .03          |    |         | .02          |    |
| Cal         |         | .03          |    |         | .03          |    |         | .02          |    |
| ll. make    |         | .02          |    |         | .02          |    |         | .02          |    |

# MAIN MEDICAL IMAGING

## NUCLEAR MEDICINE DAILY RADIATION LEVEL, SPOT CHECK

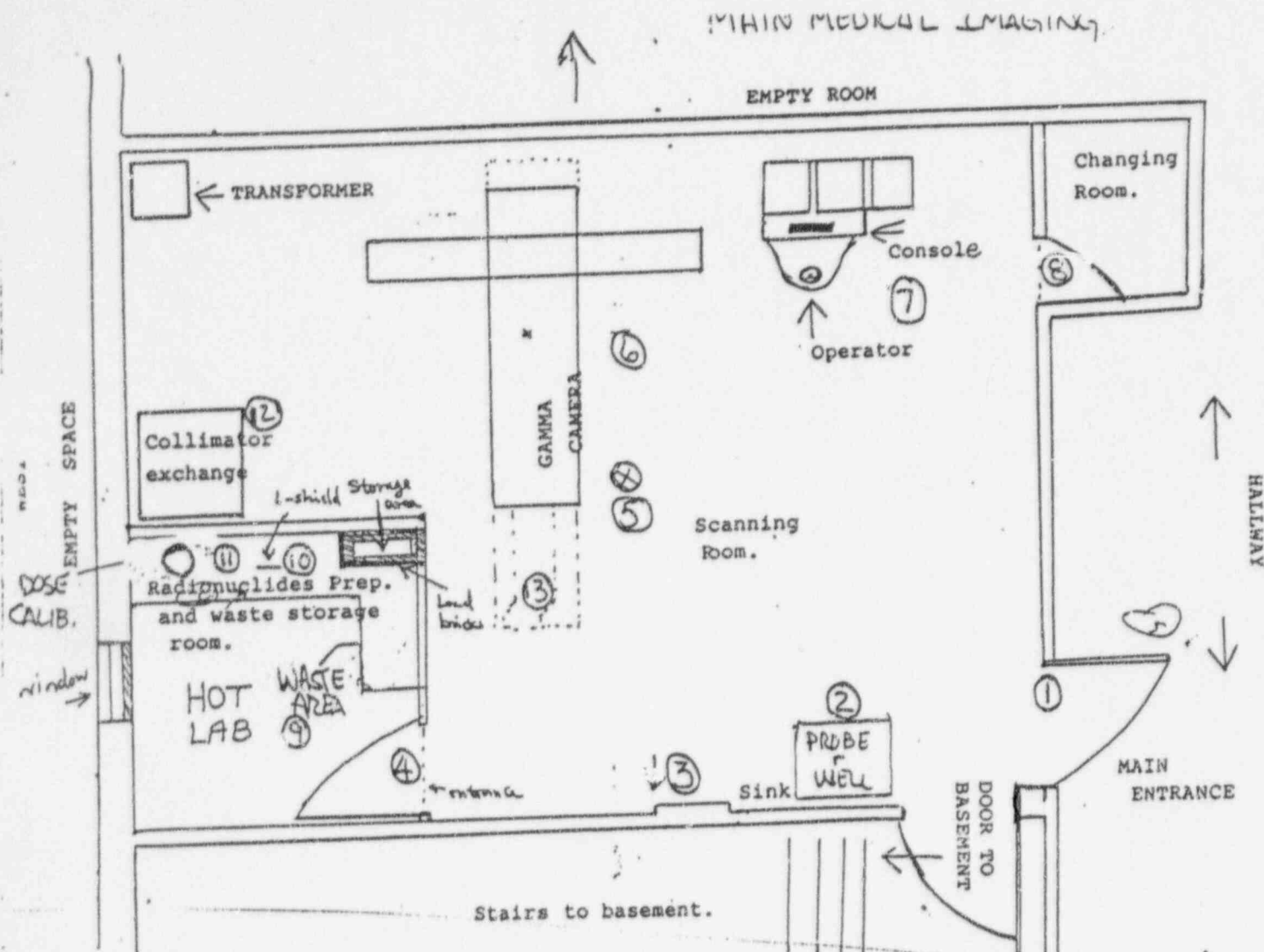
IF READING EXCEEDS TWICE THE BACKGROUND, THERE IS A POSSIBILITY OF CONTAMINATION. CPM(400

| AREA        | DATE    | <del>cpm</del> <sup>mR/h</sup> | BY | DATE    | <del>cpm</del> <sup>mR/h</sup> | BY |
|-------------|---------|--------------------------------|----|---------|--------------------------------|----|
| at house    | 3-15-96 | .02                            | BS | 3-22-96 | .02                            | BS |
| the well    |         | .02                            |    |         | .02                            |    |
| sink        |         | .02                            |    |         | .02                            |    |
| at Lab      |         | .03                            |    |         | .03                            |    |
| door        |         | .02                            |    |         | .02                            |    |
| area with   |         | .02                            |    |         | .02                            |    |
| outside     |         | .02                            |    |         | .02                            |    |
| mainly room |         | .02                            |    |         | .02                            |    |
| back        |         | .02                            |    |         | .02                            |    |
| AREA        |         | .02                            |    |         | .02                            |    |
| shield      |         | .02                            |    |         | .02                            |    |
| the Cal     |         | .02                            |    |         | .02                            |    |
| the meter   |         | .02                            |    |         | .02                            |    |



| DATE             | 1/18/95            | 1/21/95        | 1/30/96            | 2/3/96         | 2/24/96        | 3/2            | 3/9            |
|------------------|--------------------|----------------|--------------------|----------------|----------------|----------------|----------------|
| BACKGROUND       | <del>DPM</del>     | <del>DPM</del> | <del>DPM</del>     | <del>DPM</del> | <del>DPM</del> | <del>DPM</del> | <del>DPM</del> |
| 1 ENTRANCE       |                    |                |                    | 0.0            | 15             | 12             | 13             |
| 2 PROBE+ WELL    | 68                 | 63             |                    | 0.0            | 15             | 12             | 13             |
| 3 SINK           | ↑                  | ↑              |                    |                | 15             |                | 13             |
| 4 HOT LAB ENTR.  |                    |                |                    |                | 15             |                | 13             |
| 5 FLOOR          |                    |                |                    |                | 15             |                |                |
| 6 CAMERA CONTROL |                    |                |                    |                |                |                |                |
| 7 CONSOLE        | 99                 |                |                    |                |                |                |                |
| 8 CHANGING ROOM  |                    | 101            |                    |                |                |                |                |
| 9 WASTE AREA     | Range for all Area |                | Range for all Area |                |                |                |                |
| 10 L-SHIELD      |                    |                |                    |                |                |                | 18 dps         |
| 11 DOSE CAL      |                    |                |                    | 0.0            |                |                | 0.0            |
| 12 COLLIMATORS   |                    |                |                    | no counts      | 15 dpm         | 12 dpm         | 0.0            |
| 13               |                    |                |                    |                |                |                |                |





| DATE             | 3/11/96           | 3/23   | 3/30  | 4/20/96          | 4/27 | 5/4 |
|------------------|-------------------|--------|-------|------------------|------|-----|
| BACKGROUND       | <del>20 DPM</del> | DPM    | DPM   | <del>8 DPM</del> | DPM  | DPM |
| 1 ENTRANCE       | 10                | 25     | 8     | 8                |      |     |
| 2 PROBE + WELL   | 10                | 25     | 8     | 8                |      |     |
| 3 SINK           |                   | 25     |       | 8                |      |     |
| 4 HOT LAB ENTR.  |                   |        |       |                  |      |     |
| 5 FLOOR          |                   |        |       |                  |      |     |
| 6 CAMERA CONTROL |                   |        |       |                  |      |     |
| 7 CONSOLE        |                   |        |       |                  |      |     |
| 8 CHANGING ROOM  |                   |        |       |                  |      |     |
| 9 WASTE AREA     |                   |        |       |                  |      |     |
| 10 L-SHIELD      |                   |        |       |                  |      |     |
| 11 DOSE CAL      |                   |        |       |                  |      |     |
| 12 COLLIMATORS   | 10 dps            | 25 dps | 8 dps | 8 dps            |      |     |
| RA               | A.M.              |        |       |                  |      |     |

INSTRUMENT ACCURACY

Department : M. M.

Date: 8/6/76

Instrument : Capentec (RC-7)

S. No. 70205

Predicted Activity of ~~Cs-137~~ source = 0.203 mCi  
BA-133

Actual Activity:

| Test | Activity |
|------|----------|
| 1    | 0.195    |
| 2    | 0.199    |
| 3    | 0.195    |

Average = Total / 3 = 0.198

( Average should be within 5% of predicted activity )

$\frac{\text{Average}}{\text{Predicted}} \times 100 = \frac{0.198}{0.203} \times 100 = 0.98$

< 2% error  
OK

Test Performed by A. M.

Date for next test Aug-87  
6

INSTRUMENT ACCURACY

Department : Nuclear Medicine

Date: July 8, 95

Instrument : Capintec 70605

Predicted Activity of ~~Cs-137~~ source = 0.2157 mci  
Ba-133

Actual Activity:

| Test | Activity |
|------|----------|
| 1    | 0.218    |
| 2    | 0.218    |
| 3    | 0.216    |

$$\text{Average} = \frac{\text{Total}}{3} = \frac{0.217}{3} = 0.0723$$

( Average should be within 5% of predicted activity )

$$\frac{\text{Average}}{\text{Predicted}} \times 100 = \frac{0.0723}{0.2157} \times 100 = 33.5$$

Test Performed by A. W.

Date for next test Aug. 2, 96



INSTRUMENT ACCURACY

Department : Nuclear. Mod.

Date: 8/6/84

Instrument : Capentia 78605 (X)

Predicted Activity of <sup>Ba-133</sup>Cs-137 source = 0.2311

Actual Activity:

| Test | Activity |
|------|----------|
| 1    | 0.234    |
| 2    | 0.233    |
| 3    | 0.230    |

Average = Total / 3 = 0.2315

( Average should be within 5% of predicted activity )

$\frac{\text{Average}}{\text{Predicted}} \times 100 = \frac{0.2315}{0.2311} \times 100 = < 56 \text{ OK}$

Test Performed by A

Date for next test 8/6/95

# Main Medical Imaging

## Survey Meter Calibration Report

Owner: MMI Department: N. Medicine

Manufacturer: Ludlum Type: ☐ Ion Chamber ☒ GM ☐ NaI(Tl) ☐




Meter model: 14C Meter S/N: 110433 Probe model: 44-7 Probe S/N: PR11983

Calibration Source: 12.0 mCi of Cs-137 38.07 mR/hr at 1 m on 5/21, 1996

Instrument checks: Battery check: 6 mR/hr or 3.38 KCPM

Constancy check: ☒ integral check source indicates 6 mR/hr.

☐      mCi of      indicates      mR/hr.

Calibration Geometry: ☒  ☐  ☐  ☐

Window: ☐ open ☒ closed ☐ fixed

| Atten.          | dist<br>( <del>cm</del> ) | mR/hr<br>today | Scale: <u>100</u> |        | Scale: <u>10</u> |        | Scale: <u>1.0</u> |        | Scale: <u>0.1</u> |        |
|-----------------|---------------------------|----------------|-------------------|--------|------------------|--------|-------------------|--------|-------------------|--------|
|                 |                           |                | Rdng              | CorFac | Rdng             | CorFac | Rdng              | CorFac | Rdng              | CorFac |
| 0               | 25                        | 609.3          | 594               | 1.026  |                  |        |                   |        |                   |        |
| 0.25            | 25                        | 150.2          | 144               | 1.04   |                  |        |                   |        |                   |        |
| 0               | 50                        | 151.3          |                   |        | 148.9            | 1.06   |                   |        |                   |        |
| 0.25            | 50                        | 38.2           | "                 |        | 37.1             | 1.03   |                   |        |                   |        |
| 0.1             | 50                        | 15.2           |                   |        |                  |        | 14.8              | 1.03   |                   |        |
| 0.1 + 0.2       | 50                        | 3.74           |                   |        |                  |        | 3.62              | 1.03   |                   |        |
| 0.1 + 0.1       | 50                        | 1.53           |                   |        |                  |        |                   |        | 1.56              | 0.98   |
| 0.1 + 0.1 + 0.2 | 50                        | 0.36           |                   |        |                  |        |                   |        | 0.38              | 0.95   |

Correction Factors: 1.03 1.045 1.03 0.965

Name: Adel Mustafa, PhD.




Date: 5/22/96

next on 5/21/97

S.N. 110433

## Main Medical Imaging Center

## Survey Meter Calibration Report

Owner: Main Medical Imaging Department: N. MedicineManufacturer: Ludlum Type: ☐ Ion Chamber ☒ GM ☐ NaI(Tl) ☐Meter model: MC Meter S/N: 110433 Probe model: 44-7 Probe S/N: PR111983Calibration Source: 120.66 mCi of Cs-137 38.72 mR/hr at 1 m on 5/14, 1995.Instrument checks: Battery check: 1.6 mR/hr or \_\_\_\_\_Constancy check: ☒ integral check source indicates 13.2 mR/hr.☐ \_\_\_\_\_ mCi of \_\_\_\_\_ indicates \_\_\_\_\_ mR/hr.Calibration Geometry: ☒  ☒  ☐  ☐Window: ☐ open ☐ closed ☐ fixed 0.1, 1, 10 Scale

|                  | dist<br>(cm) | mR/hr<br>today | Scale: 100 |        | Scale: 10 |        | Scale: 1.0 |        | Scale: 0.1 |        |
|------------------|--------------|----------------|------------|--------|-----------|--------|------------|--------|------------|--------|
|                  |              |                | Rdng       | CorFac | Rdng      | CorFac | Rdng       | CorFac | Rdng       | CorFac |
| No atten.        | 25           | 620.5          | 60.9       | 0.97   |           |        |            |        |            |        |
| 0.25             | 25           | 154.8          | 148.6      | 0.96   |           |        |            |        |            |        |
|                  |              |                |            |        |           |        |            |        |            |        |
| No atten.        | 50           | 155.1          | "          | 1      | 146.5     | 0.93   |            |        |            |        |
| 0.25             | 50           | 38.8           |            |        | 35.3      | 0.91   |            |        |            |        |
|                  |              |                |            |        |           |        |            |        |            |        |
| 0.1              | 50           | 15.5           |            |        |           |        | 14.49      | 0.935  |            |        |
| 0.1 + 0.25       | 50           | 3.88           |            |        |           |        | 3.53       | 0.91   |            |        |
|                  |              |                |            |        |           |        |            |        |            |        |
| 0.1 + 0.1        | 50           | 1.55           |            |        |           |        |            |        | 1.426      | 0.92   |
| 0.1 + 0.1 + 0.25 | 50           | 0.38           |            |        |           |        |            |        | 0.345      | 0.907  |

Correction Factors: 0.965 0.92 0.92 0.915Name: Arce M. ... Ph.D.Date: 5/20/95Next Calib. 5/20/96



Designer and Manufacturer  
of  
Scientific and Industrial  
Instruments

## CERTIFICATE OF CALIBRATION

**LUDLUM MEASUREMENTS, INC.**  
POST OFFICE BOX 810 PH. 915-235-5494  
501 OAK STREET FAX NO. 915-235-4672  
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER SYNCOR ORDER NO. 941880

g. Ludlum Measurements, Inc. Model 14C Serial No. 110433

Mfg. Ludlum Measurements, Inc. Model 44-7 Serial No. PR 111983

Cal. Date 05/25/94 Cal Due Date 05/25/95 Cal. Interval 1 Year Meterface 202-330

Check mark ☒ applies to applicable instr. and/or detector IAW mfg. spec. T. 78 °F RH 60 % Alt 702.8 mm Hg

☒ New Instrument ☐ Instrument Received ☐ Within Toler. +10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair

☒ Mechanical ck. ☒ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity

☒ F/S Resp. ck. ☒ Reset ck. ☐ Window Operation

☒ Audio ck. ☐ Alarm Setting ck. ☒ Batt. ck. (Min. Volt) 2.2 VDC

Instrument Volt Set 900 V Input Sens. 32 mV Del. Oper. 900 V at 32 mV Threshold Dial Ratio = mV

☐ HV Readout (2 points) Ref./Inst. / V Ref./Inst. / V

### COMMENTS:

Cs-137 = 1 µCi check source SN 0734, reads = 13.5mR/hr.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source

| RANGE/MULTIPLIER | REFERENCE<br>CAL. POINT | INSTRUMENT REC'D<br>"AS FOUND READING" | INSTRUMENT<br>METER READING* |
|------------------|-------------------------|----------------------------------------|------------------------------|
| X 1000           | 1500 mR/hr              |                                        | 1.5                          |
| X 1000           | 500 mR/hr               |                                        | 0.55                         |
| X 100            | 150 mR/hr               |                                        | 1.5                          |
| X 100            | 50 mR/hr                |                                        | 0.5                          |
| X 10             | 15 mR/hr                |                                        | 1.5                          |
| X 10             | 5 mR/hr                 |                                        | 0.55                         |
| X 1              | 1.5 mR/hr = 3570 cpm    |                                        | 1.5                          |
| X 1              | 1.0 mR/hr               |                                        | 1.0                          |
| X 0.1            | 357 cpm                 |                                        | 1.5                          |
| X 0.1            | 119 cpm                 |                                        | 0.5                          |

\*Uncertainty within ± 10% C.F. within ± 20%

X0.1 Range(s) Calibrated Electronically

| REFERENCE<br>CAL. POINT | INSTRUMENT<br>RECEIVED | INSTRUMENT<br>METER READING* | REFERENCE<br>CAL. POINT | INSTRUMENT<br>RECEIVED | INSTRUMENT<br>METER READING* |
|-------------------------|------------------------|------------------------------|-------------------------|------------------------|------------------------------|
| Digital<br>Readout      |                        |                              | Log<br>Scale            |                        |                              |
|                         |                        |                              |                         |                        |                              |
|                         |                        |                              |                         |                        |                              |
|                         |                        |                              |                         |                        |                              |
|                         |                        |                              |                         |                        |                              |

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of MIL-STD-45662A and ANSI N323-1978. State of Texas Calibration License No. LO-1963

### Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☒ 1162 ☐ G112 ☐ M565 ☐ S105 ☒ T1008 ☐ T879 ☐ Neutron Am-241 Be S/N T-304

☐ Alpha S/N ☐ Beta S/N ☐ Other

☒ m 500 S/N 63888 ☐ Oscilloscope S/N ☒ Multimeter S/N A32733

Calibrated By: Stephen Benington Date 5-25-94

Reviewed By: Don Tai Date 5-25-94