

HILLCREST HOSPITAL

165 TOR COURT
PITTSFIELD, MA 01201
(413) 443-4761

November 21, 1990

Christopher J. Eckert
Health Physicist
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Re: Docket No. 030-08788
License No. 20-15240-01

Dear Mr. Eckert:

After your inspection of our Nuclear Medicine Department on November 19, 1990 and the discussion that followed pertaining to our deficiencies, the following corrections are submitted for your review:

1. Dose Calibrator Test Log now includes model number and serial number.
2. Linearity Check now includes dose calibrator serial number and RSO signature.
3. Daily Room Survey now includes specific mr/hr.
4. Instrument accuracy for dose calibrator now includes RSO signature.
5. Survey meter calibration, physicist's procedure.
6. Geometry test for the dose calibrator including model number, serial number and RSO signature.
7. Syncor unit doses now include date of expiration and time.

In addition, the next swipe test due January, 1991 will include units of uci, serial number of the source, RSO signature.

A yearly detailed written review of policies will be conducted by the RSO and the hospital's assistant administrator.

9102270042 910211
REG1 LIC30
20-15240-01 PDR



Christopher J. Eckert, Health Physicist
U.S. Nuclear Regulatory Commission

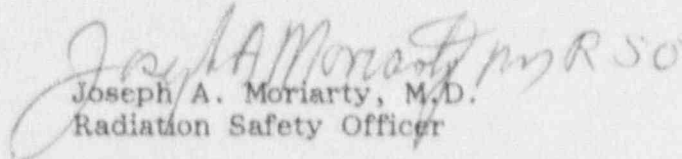
-2-

November 21, 1990

We sincerely hope that the corrections on the above deficiencies meet with your approval and we look forward to your response.

Thank you again for all your assistance in the above matters.

Respectfully,

 JAM
Joseph A. Moriarty, M.D.
Radiation Safety Officer

JAM:jmz
Enc. (7)

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG, JR DAILY Cs-137 SOURCE VALUE AT Tc-99m SETTING

Week of	'Tc99m uCi'	Min.	Max.	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
7/9/90	329	312	345	330	330	330	330	330	328	
7/16/90	328	312	345	329	329	329	329	330		
7/23/90	328	312	345	330	330	330	328	328		
7/30/90	328	312	344	328	328	328	329	328		
8/6/90	328	312	344	328	328	328	328	328		
8/13/90	328	311	344	328	329	328	328	327		
8/20/90	328	311	344	327	327	327	329	328		
8/27/90	327	311	344	328	328	328	328	327		
9/3/90	327	311	344	327	327	326	326	326		
9/10/90	327	311	344	327	329	328	328	326		
9/17/90	327	311	343	328	328	328	328	327		
9/24/90	327	311	343	330	329	328	327	327		
10/1/90	327	310	343	327	327	326	326	327		
10/8/90	327	310	343	325	326	325	327	327		
10/15/90	326	310	343	329	328	328	327	327		
10/22/90	326	310	343	327	328	326	326	328		
10/29/90	326	310	342	326	323	323	326	321		
11/5/90	326	310	342	320	324	326	325	326		
11/12/90	326	310	342	* 325	325	325	326	325		
11/19/90	326	309	342	326	324					
11/26/90	326	309	342							
12/3/90	325	309	342							
12/10/90	325	309	342							
12/17/90	325	309	341							
12/24/90	325	309	341							
12/31/90	325	309	341							

BT/KC/IL
 BT/KC
 KC/IL/BT
 BT/IL
 BT
 KC
 KC/IL
 BT
 BT
 BT
 BT
 KC
 IL
 BT
 IL BT
 KC BT
 BT

* Red = Starting date of CRC-4 -
 loaner from Neil

✓ = CRC-6 returned - Linearity in Book 11/6

Corrected copy

DOSE CALIBRATOR Model No. CRC-5 Serial No. 51469 D.O.C. 10/31/90

Cs-137 Source s/n 3560382A-44 Label: 214 uCi, 3/29/82 If readings outside limits, call Neil Gaeta @ (617)488-7081 NOW!

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG, JR DAILY Cs-137 SOURCE VALUE AT Tc-99m SETTING

Week of	Tc99m uCi	Min.	Max.	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
7/9/90	329	312	345	330	330	330	330	330	328	
7/16/90	328	312	345	329	329	329	329	330		
7/23/90	328	312	345	330	330	330	328	328		
7/30/90	328	312	344	328	328	328	329	328		
8/6/90	328	312	344	328	328	328	328	328		
8/13/90	328	311	344	328	329	328	327	327		
8/20/90	328	311	344	327	327	327	329	328		
8/27/90	327	311	344	328	328	328	328	327		
9/3/90	327	311	344	327	327	326	326	326		
9/10/90	327	311	344	327	327	328	328	326		
9/17/90	327	311	343	328	328	328	328	327		
9/24/90	327	311	343	330	329	328	327	327		
10/1/90	327	310	343	327	327	326	326	327		
10/8/90	327	310	343	325	326	325	327	327		
10/15/90	326	310	343	329	328	328	327	327		
10/22/90	326	310	343	327	328	326	326	328		
10/29/90	326	310	342	326	323	323	326	321		
11/5/90	326	310	342	320	327	326	325	326		
11/12/90	326	310	342	* 325	325	325	326	325		
11/19/90	326	309	342	326	327					
11/26/90	326	309	342							
12/3/90	325	309	342							
12/10/90	325	309	342							
12/17/90	325	309	341							
12/24/90	325	309	341							
12/31/90	325	309	341							

B+ / KC / LL
 BT / KC
 KC / LL / BT
 BT / LL
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 KC
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 LL BT
 KC BT
 BT

* Red = Starting date of CRC-4 -
 loaner from Neil

✓ = CRC-6 returned - Linearity in Book 11/6

original

#1.

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG FOR Cs-137 SOURCE WEEKLY MEASUREMENTS

DATE	Source uCi	Lo Limit	Hi Limit	Reading Wk 1	Reading Wk 2	Reading Wk 3	Reading Wk 4	Done by:
7/1/88	185.2	176	194					
8/1/88	184.8	176	194					
9/1/88	184.5	175	194	9/6 187	9/13 187	(9/19) 187	9/26 186	BT
10/1/88	184.1	175	193	10/3 186.7	10/10 187	10/17 186	10/24 186	BT
11/1/88	183.8	175	193	11/7 186/187	11/14 186/H	11/21 186/186	11/28 187/186	BT
12/1/88	183.4	174	193	12/5 185/185	12/12 186/186	12/19 187/186	12/26 186/186	BT
1/1/89	183.1	174	192	1/5 186/185	1/12 186/186	1/19 185/186	1/26 186/186	U/BL
2/1/89	182.7	174	192	2/9 187/186	2/16 187/186	2/23 186/186	2/29 185/185	U/BL/K
3/1/89	182.4	173	191	3/9 185/185	3/16 185/184	3/23 184/184	3/30 185/185	BT/K
4/1/89	182.0	173	191	4/9 184/185	4/16 185/185	4/23 184/184	4/30 184/184	BT/L
5/1/89	181.7	173	191	5/9 184/184	5/16 184/184	5/23 186/181	5/30 183/185	BT/K
6/1/89	181.3	172	190	6/9 184/183	6/16 183/183	6/23 183/182	6/30 184/183	BT/L
7/1/89	181.0	172	190	7/9 183/183	7/16 184/183	7/23 183/184	7/30 184/182	BT
8/1/89	180.6	172	190	8/9 182/182	8/16 181/182	8/23 182/183	8/30 183/183	U/BL
9/1/89	180.3	171	189	9/9 180/182	9/16 182/182	9/23 182/182	9/30 182/183	BT/K
10/1/89	179.9	171	189	10/9 183/183	10/16 183/183	10/23 182/182	10/30 182/182	U/BL
11/1/89	179.6	171	189	11/9 182/182	11/16 182/182	11/23 183/183	11/30 183/181	K
12/1/89	179.2	170	188	12/9 181/181	12/16 181/181	12/23 181/181	12/30 181/181	U
1/1/90	178.9	170	188	1/9 181/181	1/16 181/181	1/23 181/181	1/30 181/181	BT
2/1/90	178.5	170	187	2/9 180/180	2/16 180/180	2/23 181/181	2/30 181	K
3/1/90	178.2	169	187	3/9 180/180	3/16 179/179	3/23 179/179	3/30 179/180	U/BL
4/1/90	177.9	169	187	4/9 180/180	4/16 180/180	4/23 181/180	4/30 181/179	K/LL
5/1/90	177.5	169	186	5/9 180/180	5/16 180/180	5/23 180/180	5/30 179/179	BT/LL
6/1/90	177.2	168	186	6/9 179/179	6/16 179/179	6/23 179/179	6/30 175/179	K/BL/LL
7/1/90	176.8	168	186	7/9 179/179	7/16 179/179	7/23 178/180	7/30 179/178	BT/LL/K
8/1/90	176.5	168	185	8/9 179/179	8/16 178/178	8/23 178/178	8/30 179/178	K/S
9/1/90	176.2	167	185	9/9 178/177	9/16 177/180	9/23 178/178	9/30 179/179	BT/LL
10/1/90	175.8	167	185	10/9 178/178	10/16 177/177	10/23 179/179	10/30 178/177	U/BL
11/1/90	175.5	167	184	11/9 183/181	11/16 181/180	11/23 179/177	11/30 177/177	
12/1/90	175.1	166	184					
1/1/91	174.8	166	184					

* = start of CRC-4
 ✓ = CRC-5 return 11/6

corrected copy

Source s/n 3560382A-44 Label: 214 uCi, 3/29/82 If readings outside limits, call Neil Gaeta @ (617)488-7081 NOW!

DOSE CALIBRATOR Model No. CRC-5 Serial No. 51469 D.O.C. 10/31/90

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG FOR Cs-137 SOURCE WEEKLY MEASUREMENTS

DATE	Source uCi	Lo Limit	Hi Limit	Reading Wk 1	Reading Wk 2	Reading Wk 3	Reading Wk 4	Done by:
7/1/88	185.2	176	194					
8/1/88	184.8	176	194					
9/1/88	184.5	175	194	9/6 187	9/13 187	(9/19) 187	9/26 186	BT
10/1/88	184.1	175	193	10/3 186.9	10/7 187	10/14 186	10/21 186	BT
11/1/88	183.8	175	193	11/3 186/187	11/10 186/187	11/17 186	11/24 186	BT
12/1/88	183.4	174	193	12/3 185/185	12/10 186/186	12/17 187/186	12/24 186/186	BT
1/1/89	183.1	174	192	1/3 186/185	1/10 186/186	1/17 186/186	1/24 186/186	BT
2/1/89	182.7	174	192	2/3 187/186	2/10 185/186	2/17 185/186	2/24 186/186	U/BL
3/1/89	182.4	173	191	3/3 185/185	3/10 185/184	3/17 184/184	3/24 185/185	U/BL/KC
4/1/89	182.0	173	191	4/3 184/185	4/10 185/185	4/17 184/184	4/24 184/184	BT/KC
5/1/89	181.7	173	191	5/3 184/184	5/10 184/184	5/17 184/184	5/24 183/185	BT/KC
6/1/89	181.3	172	190	6/3 184/183	6/10 183/183	6/17 183/182	6/24 184/183	BT/KC
7/1/89	181.0	172	190	7/3 183/183	7/10 184/183	7/17 183/184	7/24 184/182	BT
8/1/89	180.6	172	190	8/3 182/182	8/10 181/182	8/17 182/183	8/24 183/183	U/BL
9/1/89	180.3	171	189	9/3 186/182	9/10 182/182	9/17 182/182	9/24 183/183	U/BL
10/1/89	179.9	171	189	10/3 183/183	10/10 183/183	10/17 182/182	10/24 182/182	U/BL
11/1/89	179.6	171	189	11/3 182/182	11/10 182/183	11/17 183/183	11/24 182/181	KC
12/1/89	179.2	170	188	12/3 181/181	12/10 181/181	12/17 181/181	12/24 181/182	U/BL
1/1/90	178.9	170	188	1/3 181/181	1/10 181/181	1/17 181/181	1/24 181/181	BT
2/1/90	178.5	170	187	2/3 180/180	2/10 180/180	2/17 181/181	2/24 181	KC
3/1/90	178.2	169	187	3/3 180/180	3/10 179/179	3/17 179/179	3/24 179/180	U/BL
4/1/90	177.9	169	187	4/3 180/180	4/10 180/180	4/17 181/180	4/24 181/179	KC/LL
5/1/90	177.5	169	186	5/3 180/180	5/10 181/180	5/17 180/180	5/24 179/179	BT/LL
6/1/90	177.2	168	186	6/3 179/179	6/10 179/179	6/17 179/179	6/24 179/179	KC/BL/KC
7/1/90	176.8	168	186	7/3 179/179	7/10 179/179	7/17 178/180	7/24 179/178	BT/LL/KC
8/1/90	176.5	168	185	8/3 179/179	8/10 178/178	8/17 178/179	8/24 179/178	KC
9/1/90	176.2	167	185	9/3 178/177	9/10 178/180	9/17 178/178	9/24 179/179	BT/LL
10/1/90	175.8	167	185	10/3 178/178	10/10 179/177	10/17 179/179	10/24 178/181	U/BL
11/1/90	175.5	167	184	11/3 183/179	11/10 181/180	11/17 179/177		
12/1/90	175.1	166	184					
1/1/91	174.8	166	184					

* = Start of CRC-4
 ✓ = CRC-5 return 11/6

original

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG FOR Ba-133 SOURCE WEEKLY MEASUREMENTS

DATE	Source uCi	Lo Limit	Hi Limit	Reading Wk 1	Reading Wk 2	Reading Wk 3	Reading Wk 4	Done by:
7/1/88	165.4	157	174					
8/1/88	164.5	156	173					
9/1/88	163.6	155	172	9/2 172.4	172.5	9/13 172	9/26 172	BT
10/1/88	162.8	155	171	10/2 170.4	169.4	10/19 170	169	BT
11/1/88	161.9	154	170	169/169/168	168/168/168	168/168/168	168/168/168	BT
12/1/88	161.0	153	169	168/168/167	169/168/168	167/169/169	167/167/167	BT
1/1/89	160.2	152	168	168/167/167	167/167/167	167/167/167	167/167/167	U/ BT
2/1/89	159.3	151	167	169/168/167	167/167/165	165/165/165	165/166/165	U/ BT
3/1/89	158.4	151	166	166/166/165	165/165/165	164/164/164	165/165/165	BT
4/1/89	157.6	150	165	165/165/165	166/166/165	164/164/164	164/164/164	U/ BT
5/1/89	156.7	149	165	164/164/163	163/163/163	164/164/164	164/162/162	BT/KC
6/1/89	155.9	148	164	163/163/163	163/162/162	163/162/162	162/162/162	BT
7/1/89	155.1	147	163	162/162/162	161/161/161	162/162/161	161/161/160	BT/UC
8/1/89	154.2	147	162	161/161/161	161/161/161	161/161/161	161/161/161	U/ BT
9/1/89	153.4	146	161	160/161/161	161/160/159	159/160/160	160/159/160	U/ BT KC
10/1/89	152.6	145	160	159/159/159	159/159/159	159/158/159	159/158/158	U/ BT
11/1/89	151.8	144	159	158/158/158	157/158/157	157/157/157	157/157/157	U/ BT
12/1/89	151.0	143	159	158/158/157	157/157/157	157/157/155	155/156/156	BT/UC
1/1/90	150.1	143	158	156/156/156	156/156/156	156/156/155	155/155/156	BT/UC
2/1/90	149.3	142	157	156/155/155	156/155/155	155/154/154	154	BT/KC
3/1/90	148.5	141	156	154/154/154	154/155/155	153/153/154	154/154/154	U/ BT
4/1/90	147.7	140	155	154/154/154	154/154/154	153/153/153	154/154/151	KC
5/1/90	147.0	140	154	153/153/153	153/153/153	153/153/153	153/153/153	BT/KC
6/1/90	146.2	139	153	153/153/153	153/153/154	152/153/152	151/151/151	BT/UC/KC
7/1/90	145.4	138	153	152/151/152	152/152/152	151/151/151	151/151/151	BT/UC/KC
8/1/90	144.6	137	152	150/151/152	152/150/151	151/151/149	149/149/149	BT KC
9/1/90	143.8	137	151	149/149/149	149/151/147	147/148/148	148/148/148	BT UC
10/1/90	143.1	136	150	148/150/149	148/148/148	148/148/148	148/148/148	BT
11/1/90	142.3	135	149	153/151/154	153/153/153	150/148/148		
12/1/90	141.5	134	149					
1/1/91	140.8	134	148					

* - start of CRC-4
 ✓ = 11/6 LCR - 5 Rater

Source s/n 3580282A-44 Label: 250 uCi, 2/6/82 If readings outside limits, call Neil Gaeta © (617)488-7081 NOW!

DOSE CALIBRATOR Model No. CRC-5 Serial No. 51469 D.O.C. 10/31/90

Corrected copy

HILLCREST HOSPITAL DOSE CALIBRATOR TEST LOG FOR ¹³³Ba SOURCE WEEKLY MEASUREMENTS

DATE	Source uCi	Lo Limit	Hi Limit	Reading Wk 1	Reading Wk 2	Reading Wk 3	Reading Wk 4	Done by:
7/1/88	165.4	157	174					
8/1/88	164.5	156	173					
9/1/88	163.6	155	172	9/6 172.4	9/13 172.5	9/19 172	9/26 172	BT
10/1/88	162.8	155	171	10/3 170.4	169.4/169/170	170/169/169	169/169/169	BT
11/1/88	161.9	154	170	169/169/168	168/168/168	168/168/168	168/168/168	BT
12/1/88	161.0	153	169	168/168/167	169/168/168	167/169/169	167/167/167	BT
1/1/89	160.2	152	168	168/167/167	167/167/167	167/167/167	167/167/167	U/BT
2/1/89	159.3	151	167	167/167/167	167/167/165	165/165/165	165/165/165	U/BT
3/1/89	158.4	151	166	166/166/165	165/165/165	164/164/164	165/165/165	BT
4/1/89	157.6	150	165	165/165/165	166/166/165	164/164/164	164/164/164	U/BT
5/1/89	156.7	149	165	164/164/163	163/163/163	164/164/164	164/162/162	BT/KC
6/1/89	155.9	148	164	162/163/163	163/162/162	162/162/162	162/162/162	BT
7/1/89	155.1	147	163	162/162/162	161/161/161	162/162/162	161/161/160	BT/LL
8/1/89	154.2	147	162	161/161/161	161/161/161	161/161/161	161/161/161	U/BT
9/1/89	153.4	146	161	160/161/161	161/160/159	159/160/160	160/159/160	U/BT KC
10/1/89	152.6	145	160	159/159/159	159/159/159	159/158/159	158/158/158	U/BT
11/1/89	151.8	144	159	158/158/158	157/158/157	157/157/157	157/157/157	U/BT
12/1/89	151.0	143	159	158/158/157	157/157/157	157/157/155	155/156/156	BT/LL
1/1/90	150.1	143	158	154/155/156	156/156/154	156/156/155	155/155/156	BT/LL
2/1/90	149.3	142	157	154/155/155	156/155/155	155/154/154	154 end	BT/KC
3/1/90	148.5	141	156	154/154/154	154/155/155	153/154/154	154/154/154	U/BT
4/1/90	147.7	140	155	154/154/154	154/154/154	153/153/153	154/154/154	KC
5/1/90	147.0	140	154	153/153/153	153/153/153	153/153/153	153/153/153	BT/KC
6/1/90	146.2	139	153	153/153/153	153/153/154	152/153/153	153/151/151	BT/LL KC
7/1/90	145.4	138	153	152/151/152	152/152/152	151/151/151	151/151/151	BT/LL KC
8/1/90	144.6	137	152	150/151/152	152/150/151	151/151/149	149/149/149	BT KC
9/1/90	143.8	137	151	149/149/149	149/151/147	147/148/148	148/148/148	BT LL
10/1/90	143.1	136	150	148/150/149	148/148/148	149/149/148	148/148/148	BT
11/1/90	142.3	135	149	153/154/154	153/153/153	150/148/148		
12/1/90	141.5	134	149					
1/1/91	140.8	134	148					

* - start of CRC-4
 v = 11/6 KC - 5R + 100

original

#2

Return
Linearity
BT
11/6
11/7

DATA SHEET #2 (to be completed each quarter)

Dose Calibrator Activity Linearity Check

50.0
mCi

Correction

Dose Calibrator CRC-5 Date 11/6/90
 Model CRC-5 Technologist BT
 Serial No. 51468
 Source Configuration Syr. 2 (must be same as on Data Sheet #1)

All readings must be taken at lowest range setting available and converted to mCi units.

A	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	PRODUCT OF B X C
Black Only:	63.9 mCi	X 1.00	= 63.9
Black & Red:	37.2 mCi	X 1.63	= 63.89
Black & Orange:	21.6 mCi	X 2.96	= 63.93
Black & Yellow:	6.8 mCi	X 9.36	= 63.64
Black & Green:	2.50 mCi	X 25.80	= 64.5
Black & Blue:	0.80 mCi	X 81.40	= 65.12
Black & Purple:	0.27 mCi	X 244.20	= 65.9

SUM = 450.88

MEAN = $\frac{SUM}{7}$ = 64.41

MEAN X 1.05 = 67.63 = UPPER LIMIT*

MEAN X 0.95 = 61.19 = LOWER LIMIT*

Compare Column D data to upper and lower limits to confirm linearity.

* Instead of a variation in the Column D data of $\pm 5\%$, your radioactive material license may allow a difference of $\pm 10\%$ in the test results. If so, multipliers of 1.10 and 0.90 can be used to determine the upper and lower limits.

OK — Joseph A. Moriarty

Corrected
Copy
RSO

BT
11/7

DATA SHEET #2 (to be completed each quarter)

UCII

Dose Calibrator Activity Linearity Check

Dose Calibrator CR-5 Date 11/7
Model CR-5 Technologist BT
Serial No. 51469
Source Configuration _____ (must be same as on Data Sheet #1)

All readings must be taken at lowest range setting available and converted to mCi units.

A	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	PRODUCT OF B X C
Black Only:	<u>1310 mCi</u>	X <u>1.00</u>	= <u>1310</u>
Black & Red:	<u>857 mCi</u>	X <u>1.63</u>	= <u>1396.91</u>
Black & Orange:	<u>470 mCi</u>	X <u>2.96</u>	= <u>1391.2</u>
Black & Yellow:	<u>141 mCi</u>	X <u>9.36</u>	= <u>1319.76</u>
Black & Green:	<u>50.10 mCi</u>	X <u>25.80</u>	= <u>1292.58</u>
Black & Blue:	<u>17.10 mCi</u>	X <u>81.40</u>	= <u>1391.94</u>
Black & Purple:	<u>5.1 mCi</u>	X <u>244.20</u>	= <u>1245.42</u>

SUM = 93478.1

MEAN = $\frac{\text{SUM}}{7} = \frac{1335.40}{7}$

MEAN X 1.05 = 1402.17 = UPPER LIMIT*

MEAN X 0.95 = 1268.63 = LOWER LIMIT*

Compare Column D data to upper and lower limits to confirm linearity.

* Instead of a variation in the Column D data of $\pm 5\%$, your radioactive material license may allow a difference of $\pm 10\%$ in the test results. If so, multipliers of 1.10 and 0.90 can be used to determine the upper and lower limits.

Joseph A. Morant RSO

Corrected

Return
 Linearity BT
 11/6
 11/7

DATA SHEET #2 (to be completed each quarter)

Dose Calibrator Activity Linearity Check

50.0
 mCi

Dose Calibrator CRC-5 Date 11/6/90
 Model CRC-5 Technologist BT
 Source Configuration SyR-3 (must be same as on Data Sheet #1)

All readings must be taken at lowest range setting available and converted to mCi units.

A	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	PRODUCT OF B X C
Black Only:	<u>63.9 mCi</u>	X <u>1.00</u>	= <u>63.9</u>
Black & Red:	<u>39.2 mCi</u>	X <u>1.63</u>	= <u>63.89</u>
Black & Orange:	<u>21.6 mCi</u>	X <u>2.96</u>	= <u>63.93</u>
Black & Yellow:	<u>6.8 mCi</u>	X <u>9.36</u>	= <u>63.64</u>
Black & Green:	<u>2.50 mCi</u>	X <u>25.80</u>	= <u>64.5</u>
Black & Blue:	<u>.80 mCi</u>	X <u>81.40</u>	= <u>65.12</u>
Black & Purple:	<u>.27 mCi</u>	X <u>244.20</u>	= <u>65.9</u>
		SUM	= <u>450.88</u>
	MEAN = $\frac{\text{SUM}}{7}$		= <u>64.41</u>
	MEAN X 1.05	= <u>67.63</u>	= UPPER LIMIT*
	MEAN X 0.95	= <u>61.19</u>	= LOWER LIMIT*

Compare Column D data to upper and lower limits to confirm linearity.

* Instead of a variation in the Column D data of $\pm 5\%$, your radioactive material license may allow a difference of $\pm 10\%$ in the test results. If so, multipliers of 1.10 and 0.90 can be used to determine the upper and lower limits.

original

BT
11/7

DATA SHEET #2 (to be completed each quarter)

UCII

Dose Calibrator Activity Linearity Check

Dose Calibrator _____ Date 11/7
Model _____ Technologist BT
Source Configuration _____ (must be same as on Data Sheet #1)

All readings must be taken at lowest range setting available and converted to mCi units.

A	B	C	D
TUBE COLOR	DISPLAYED ACTIVITY	CALIBRATION FACTOR	PRODUCT OF B X C
Black Only:	<u>1310 mCi</u>	X <u>1.00</u>	= <u>1310</u>
Black & Red:	<u>857 mCi</u>	X <u>1.63</u>	= <u>1396.91</u>
Black & Orange:	<u>470 mCi</u>	X <u>2.96</u>	= <u>1391.2</u>
Black & Yellow:	<u>141 mCi</u>	X <u>9.36</u>	= <u>1319.76</u>
Black & Green:	<u>50.10 mCi</u>	X <u>25.80</u>	= <u>1292.58</u>
Black & Blue:	<u>17.10 mCi</u>	X <u>81.40</u>	= <u>1391.94</u>
Black & Purple:	<u>5.1 mCi</u>	X <u>244.20</u>	= <u>1245.42</u>

SUM = 93478.1

MEAN = $\frac{\text{SUM}}{7}$ = 1335.40

MEAN X 1.05 = 1402.17 = UPPER LIMIT*

MEAN X 0.95 = 1268.63 = LOWER LIMIT*

Compare Column D data to upper and lower limits to confirm linearity.

* Instead of a variation in the Column D data of ± 5%, your radioactive material license may allow a difference of ± 10% in the test results. If so, multipliers of 1.10 and 0.90 can be used to determine the upper and lower limits.

original

DAILY ROOM SURVEYS

<u>DATE</u>	<u>TIME</u>	<u>AREA</u>	<u>TECH</u>	<u>INST</u>
11/15/90	2 ³⁰	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	BT	Victa
11/16/90	2 ¹⁵	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	BT	Victa
11/19/90	4 ²⁰ pm	1. ✓ 2. ✓ 3. ✓ 4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	CC	Vict A
11/20/90	2 ⁰⁰ pm	1. 0.03 mCi/hr 2. 0.03 mCi/hr 3. 0.02 mCi/hr 4. 0.02 mCi/hr 5. 0.03 mCi/hr 6. 0.02 mCi/hr 7. 0.03 mCi/hr 8. 0.03 mCi/hr	CC	Vict A
<u>DATE</u>	<u>TIME</u>	<u>AREA</u>	<u>TECH</u>	<u>INST</u>
		1. 2. 3. 4. 5. 6. 7. 8.		

Conduct

AREAS

1. desk
2. phone
3. camera
4. tech. work area
5. rubbish areas
6. infection table
7. outside door
8. stretcher

*****Policy on tech. hand monitoring*****

Following:

1. mixing kits
2. injection of patients
3. before break and lunch
4. end of day

PROCEDURE

Any area reading .05 or above will be documented
 This .05 would be considered an ACTION necessary level.
 Decontamination will be performed, and a repeat reading documented.
 If below .05 mCi/hr no documentation is necessary

DAILY ROOM SURVEYS

Date of Calibration: 11/7/90

<u>DATE</u>	<u>TIME</u>	<u>AREA</u>	<u>TECH</u>	<u>INST</u>
11/15/90	2 ³⁰	1. ✓ 2. ✓ 3. ✓	4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	BT Victoria
11/16/90	2 ¹⁵	1. ✓ 2. ✓ 3. ✓	4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓	BT Victoria
11/19/90	4 ²⁰ pm	1. ✓ 2. ✓ 3. ✓	4. ✓ 5. ✓ 6. ✓ 7. ✓ 8. ✓ original	CC Vict A
<u>DATE</u>	<u>TIME</u>	<u>AREA</u>	<u>TECH</u>	<u>INST</u>
		1. 2. 3.	4. 5. 6. 7. 8.	
<u>DATE</u>	<u>TIME</u>	<u>AREA</u>	<u>TECH</u>	<u>INST</u>
		1. 2. 3.	4. 5. 6. 7. 8.	

AREAS

1. desk
2. phone
3. camera
4. tech. work area
5. rubbish areas
6. injection table
7. outside door
8. stretcher

*****Policy on tech. hand monitoring*****

Following:

1. mixing kits
2. injection of patients
3. before break and lunch
4. end of day

PROCEDURE

Any area reading .05 or above will be documented

This .05 would be considered an ACTION necessary level.

Decontamination will be performed, and a repeat reading documented.

If below .05 m³/hr no documentation is necessary

#4

Certificate of Instrument Accuracy for Dose Calibrator

INSTRUMENT DATA

Customer Hillcrest Manufacturer Capintec
Model No. CRC-5A Serial No. 51469

CALIBRATION SOURCE

Source	Activity	Serial Number	Effective Date
1. Co-57	29.83 mCi	EGAG 90/1135; Lot 701	06/30/89
2. Co-57	26.80 mCi	S90210RRFA	08/01/86
3. Co-57	<u>5.10</u> mCi	<u>3206028-67</u>	<u>08/05/88</u>
4. Ba-133	260.0 uCi	3580185A	01/18/85
5. Cs-137	196.0 uCi	229-292-21	06/04/76
6. Co-60	47.0 uCi	3551184A-11	11/28/84

CALCULATED ACTIVITY AT TIME OF CALIBRATION

Date: 10-31-90

TEST 154.4V
ZERO 0

1. Co-57	<u>8.60</u> mCi	4. Ba-133	<u>178.8</u> uCi	BKG	<u>0</u>
2. Co-57	<u>0.510</u> "	5. Cs-137	<u>140.5</u> "		
3. Co-57	<u>0.632</u> "	6. Co-60	<u>21.6</u> "		

RESPONSES UNDER TEST AGAINST STANDARDS LISTED

1. Co-57 (112)	<u>8.91</u> mCi (-3.6%)	4. Ba-133 (591)	<u>178.8</u> uCi (0%)
99mTc	<u>10.63</u> " R=1.19	99mTc	<u>722</u> " R=4.04
2. Co-57	<u>0.510</u> " (0%)	5. Cs-137 (220)	<u>136.8</u> " (2.6%)
99mTc	<u>0.609</u> " R=1.19	99mTc	<u>251</u> " R=1.83
3. Co-57 (112)	<u>0.611</u> " (3.3%)	6. Co-60 (990)	<u>21.9</u> " (-1.4%)
99mTc	<u>0.727</u> mCi R=1.19	99mTc	<u>142.2</u> uCi R=6.49

REMARKS

The unit was operating satisfactorily with new battery replacement. All values were within the ±5% limits.

CERTIFICATION DATA

The above calibration was performed to manufacturer's specifications:

Date of Calibration 10/31/90 Next Calibration Due 1/91

N. Gaeta/T. Martin
35 Grove Street
Medford, MA 02155
(617) 488-7081, 872-0502

Calibrated By N. Gaeta
NRC License 20-15240-01
Expires June 30, 1995

with ¹³⁷Cs Vial E

Bulbs	99mTc	¹³¹ I	¹²³ I	¹³³ Xe	⁶⁷ Ga	²⁰¹ Tl	¹¹¹ In	Mo Assay	TEST	BKG	ZERO
Rdg	250	176	116	152	222	145	109	358	154.4	0	0
R=	1.83	1.29	0.85	1.11	1.62	1.06	0.80	2.62	-	-	-

Correction

ASO
M. Gaeta

Certificate of Instrument Accuracy for Dose Calibrator

INSTRUMENT DATA

Customer Hillcrest Manufacturer Capintec
 Model No. CRC-5A Serial No. 51469

CALIBRATION SOURCE

Source	Activity	Serial Number	Effective Date
1. Co-57	29.83 mCi	EGAG 90/1135; Lot 701	06/30/89
2. Co-57	26.80 mCi	S90210885A	08/01/86
3. Co-57	5.10 mCi	3206023-67	08/05/88
4. Ba-133	260.0 uCi	3580185A	01/18/85
5. Cs-137	196.0 uCi	229-292-21	06/04/76
6. Co-60	47.0 uCi	3551184A-11	11/28/84

CALCULATED ACTIVITY AT TIME OF CALIBRATION

Date: 10-31-90

TEST 154.4V
 ZERO 0

1. Co-57	<u>8.60 mCi</u>	4. Ba-133	<u>178.8 uCi</u>	BKG	<u>~0</u>
2. Co-57	<u>0.510 "</u>	5. Cs-137	<u>140.5 "</u>		
3. Co-57	<u>0.632 "</u>	6. Co-60	<u>21.6 "</u>		

RESPONSES UNDER TEST AGAINST STANDARDS LISTED

1. Co-57 (112)	<u>8.91 mCi (-3.6%)</u>	4. Ba-133 (591)	<u>178.8 uCi (0%)</u>
99mTc <u>10.63 "</u>	<u>R=1.19</u>	99mTc <u>722 "</u>	<u>R=4.04</u>
2. Co-57	<u>0.510 " (0%)</u>	5. Cs-137 (22)	<u>136.8 " (2.6%)</u>
99mTc <u>0.609 "</u>	<u>R=1.19</u>	99mTc <u>251 "</u>	<u>R=1.83</u>
3. Co-57 (112)	<u>0.611 " (3.3%)</u>	6. Co-60 (990)	<u>21.9 " (-1.4%)</u>
99mTc <u>0.727 mCi</u>	<u>R=1.19</u>	99mTc <u>142.2 uCi</u>	<u>R=6.49</u>

REMARKS

The unit was operating satisfactorily with new battery replacement. All values were within the ±5% limit.

CERTIFICATION DATA

The above calibration was performed to manufacturer's specifications:

Date of Calibration 10/31/90 Next Calibration Due 1/91

N. Gaeta/T. Martin
 35 Grove Street
 Medford, MA 02155
 (617) 488-7081, 872-0502

Calibrated By N. Gaeta
 NRC License 20-15240-01
 Expires June 30, 1995

with ¹³⁷Cs Vial E

Bulb	99mTc	¹³⁷ I	¹²³ I	¹³³ Xe	⁶⁷ Ga	²⁰¹ Tl	¹¹¹ In	Mo Assay	TEST	BKG	ZERO
Rdg	250	176	116	152	222	145	109	358	154.4	0	0
R=	1.83	1.29	0.85	1.11	1.62	1.06	0.80	2.62	-	-	-

original

FROM THE DESK OF

Butch Gabriel

Chris,

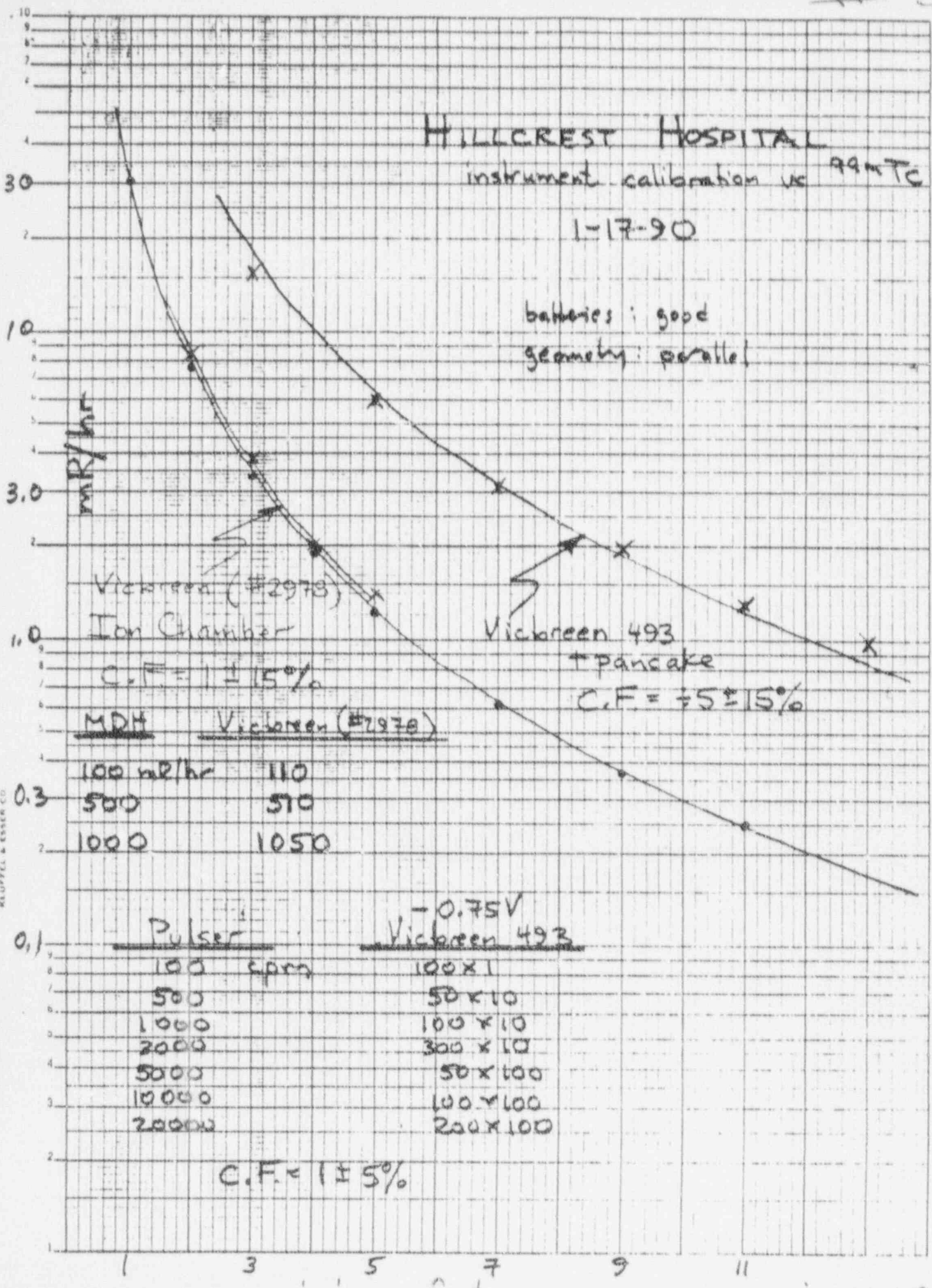
I spoke with our
physicist and he
says that the attached,
which we had, is the
approved method of
doing the surveys
by the NRC per his
license # 20-20743-01
which expires 6-30-95

GRAPHIC ARTS CENTER

PITTSFIELD, MASS. 01201 • TEL: 413/445-6657 • 499-1078

HILLCREST HOSPITAL
 instrument calibration vs ^{99m}Tc
 1-17-90

batteries: good
 geometry: parallel



Vichreen (#2978)
 Ion Chamber
 C.F. = $1 \pm 15\%$
 MDH Vichreen (#2978)

Vichreen 493
 + pancake
 C.F. = $\pm 5 \pm 15\%$

100 mR/hr	110
500	510
1000	1050

Pulser	-0.75V Vichreen 493
100 cpm	100 x 1
500	50 x 10
1000	100 x 10
2000	300 x 10
5000	50 x 100
10000	100 x 100
20000	200 x 100

C.F. = $1 \pm 5\%$

6010
 R.E. SEMILO
 4 CYCLE 8 30 DIVISION
 KLUFFEL & ESSER CO

GEOMETRY TEST

11-20-90

~~6~~

CORRECTION VS Volume

(Correction Factor)

1.03

1.00

0.97

0.5

1.0

1.5

2.0

2.5

(mL)

(Net Reading)

0.28

0.25

0.22

0.5

1.0

1.5

2.0

2.5

(mL)

1.08 mci/ml Solution

Bkg = 0.00

mL

Net Reading

CF

0.5

0.27 mci

1

1.0

0.27 mci

1

1.5

0.27 mci

1

2.0

0.27 mci

1

Joseph A. McCreary RSO

#7

CAUTION
RADIOACTIVE MATERIAL

Syncor Int'l Corporation
Pharmacy Service Center
36 Green Mountain Drive
Cohoes NY 12047
518/783-0555 RT # 01 RUN # 1

Customer HILLCREST HOSPITAL
165 Tor Court
Pittsfield MA 01201
Doctor MORIARTY Date 20 NOV 90

Radionuclide Tc99m
Pharmaceutical Sulfur Colloid Cis
Procedure Liver Imaging

Lot # TC9920-32401 Expires **A**
Assay 13.367 mCi/ml as of 09:30
Qty. Ordered 4.40 mCi 162.80 MBq
Dispensed 4.8 mCi By RAM
Vol. Dispensed .33 ml R# 540033

Patient: Per Phys Order
Mo99 (0.15 uCi/mCi Tc99m @ 24:00 11/20/90
Administer Intravenously
Agitate Gently

Use as directed by physician

McMahon 88

Previous code

CAUTION
RADIOACTIVE MATERIAL

Syncor Int'l Corporation
Pharmacy Service Center
36 Green Mountain Drive
Cohoes NY 12047
518/783-0555 RT # 01 RUN # 1

Customer HILLCREST HOSPITAL
165 Tor Court
Pittsfield MA 01201
Doctor MORIARTY Date 21 NOV 90

Radionuclide Tc99m
Pharmaceutical MDP
Procedure Bone Imaging MPI

Lot # TC9950-32511 A Expires **A**
Assay 35.738 mCi/ml as of 10:30
Qty. Ordered 20.00 mCi 740.00 MBq
Dispensed 21.93 mCi By RAM
Vol. Dispensed .56 ml R# 540220

Patient: Per Phys Order
Mo99 (0.15 uCi/mCi Tc99m @ 11:15 11/21/90
Administer Intravenously
Product Of Fission Mo99
Comment: Medi-Physics

Use as directed by physician

Corrected Specific time