

CONSULTING RADIOLOGIC PHYSICIAN
803 OXFORD STREET
WORTHINGTON, OHIO 43085

(614) 885-6187

DEPARTMENT PLANNING
EQUIPMENT SPECIFICATION
SYSTEMS ANALYSIS
HAZARD AND QUALITY CONTROL

NOV 30 1988

RADIATION SURVEY REPORT

1. LICENSEE: Doctors North Hospital
1087 Dennison Avenue, Columbus, OH. 43201

License No.: 34-05488-02
2. SURVEY CONDUCTED BY: George W. Callendine Jr., Ph.D.
Consulting Radiological Physicist
803 Oxford Street, Worthington, OH 43085

(Certified by the American Board of Radiology)
3. REASON FOR SURVEY: Installation of new Cobalt-60 teletherapy source
4. COMPLETION OF INSTALLATION: October 14, 1988
5. SURVEY CONDUCTED ON: October 14, 1988
6. RADIATION DETECTION INSTRUMENTATION:
 - .1 Calibration Meter: Victoreen Model 550, Electrometer

Date of Last Calibration: May 11, 1987
Standard Used: 60-Co
 - .2 Survey Meter: Victoreen Model 470A;

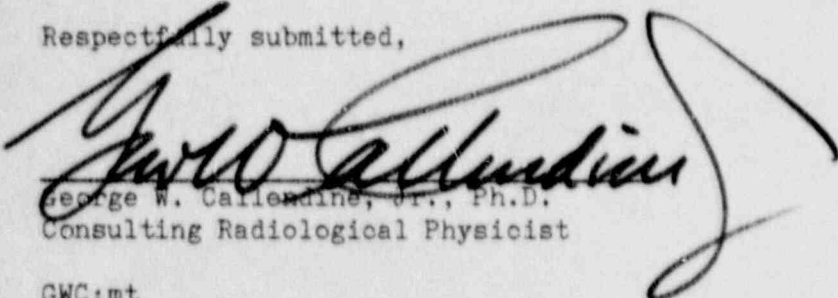
Date of Last Calibration: June 1, 1988 (with a source of radium which had been calibrated traceable to the National Bureau of Standards.
 - .3 Bicron Model: SURVEYOR-2000

Date of Last Calibration: July 12, 1988
Standard Used: 137-Cs
7. TELETHERAPY UNIT: AECL THERATRON-780; Serial No. 326
8. TELETHERAPY SOURCE: AECL Model C-151; Serial No. S-3585
9. SOURCE ACTIVITY: 3594 Curies, as of September 15, 1988
10. FULL CALIBRATION PERFORMED: October 14, 1988
The unit was calibrated to have an exposure of 107.54 per minute at a source chamber distance of 80 cm for a 10x10 cm field. A full calibration was performed on the unit at the time of installation of the source.
11. SOURCE HEAD SURVEY: The maximum and average radiation levels measured at 1 meter from the source in the "OFF" position are 0.50 mR per hour and 0.23 mR per hour respectively.

12. **BEAM ORIENTATION LIMITS:** The beam will operate in any orientation when positioned toward the beamstopper. When the head is rotated away from the beamstopper it can be rotated 95 degrees in the clockwise position (facing toward the West) and 2 degrees in the counter-clockwise position (beam facing toward the East). These are electrical stops. The unit has no movement in the swivel (IN-OUT) position.
13. **RADIATION SURVEY METHOD:** Radiation levels in adjacent areas were measured during radiation of a phantom.
- a. Phantom: 30 cm x 30 cm x 30 cm polystyrene block
 - b. Source-to-Phantom Distance: Source axis distance = 65 cm
 - c. Collimator Size: 35 cm x 35 cm
14. **PLAN/ELEVATION DRAWINGS:** Attached are plan views of the teletherapy room and adjacent areas. Each has the beam direction indicated, along with the exposure levels measured at the maximum position along each wall, overhead or below.
- The beam directions are chosen to indicate the exposure levels with the beam in the most common orientation (0 degrees or down) and also in those orientations which produce the maximum exposure levels at the various locations.
15. **PERSONNEL EXPOSURE ESTIMATES:** A computation sheet is attached which shows the calculations for exposure estimates to individuals who might be located in critical areas. The calculations assume beam "ON" times at least double those actually experienced in our statistical evaluation of the clinical practice. Calculations indicate that no individual will be exposed to more than 10 mR per week.
- Eight (8) years experience monitoring the personnel exposure levels supports these computations.
16. **SAFETY SYSTEMS:** A report is attached indicating the proper operation of all safety systems. The method of test is described under Procedures in License No. 34-16779-01.

It is my professional opinion that the unit is operating safely and correctly.

Respectfully submitted,


George W. Callendine, Jr., Ph.D.
Consulting Radiological Physicist

GWC:mt

CONTROL NO 8648 1

TELETHERAPY ROOM SURVEY

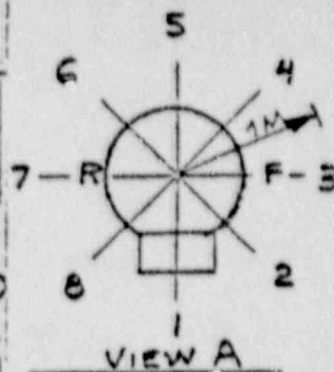
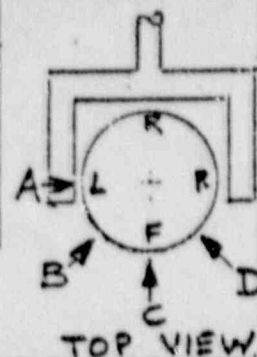
MEASUREMENTS

AREA OF INTEREST	Adjacent Space Use	Beam Stopper	BEAM DIRECTION		EXPOSURE TO POINT		Occupancy Factor	NET EXPOSURE
Direction			Head Angle	Hr/Wk	mR/Hr	mR/Wk		mR/Week
S-E	Control	IN	0	9	0.7	6.3		
			180	9	0.7	6.3		
			90	1	1.5	1.5		
			270	1	0.5	0.5		
			303	1	0.5	0.5		
		OUT	90	0.25	2.5	2.5		
						17.6	1	< 17.6
SOUTH	Corridor	IN	0	9	0.3	2.7		
			180	9	0.3	2.7		
			90	1	2.0	2.0		
			270	1	0.1	0.1		
			303	1	0.1	0.1		
		OUT	90	0.25	3	0.75		
						8.35	0.25	< 2.1
WEST	X-Ray Control	IN	0	9	0.1	0.9		
			180	9	0.1	0.9		
			90	1	0.1	0.1		
			270	1	0.1	0.1		
			303	1	0.1	0.1		
		OUT	90	0.25	20	5		
						7.1	1	< 7.1
NORTH	Corridor	IN	0	9	0.1	0.9		
			180	9	0.1	0.9		
			90	1	0.1	0.1		
			270	1	0.1	0.1		
			303	1	0.1	0.1		
		OUT	90	0.25	0.1	0.025		
						2.325	0.25	< 0.6
EAST	Ortho Voltage Therapy	IN	0	9	1.3	11.7		
			180	9	1.3	11.7		
			90	1	0.3	0.3		
			270	1	5	5		
			303	1	5	5		
		OUT	90	0.25	0.3	0.075		
						33.775	0.25	< 9

UP	Roof				0.7		
BASEMENT	Locker Room	IN	0	9	0.3	2.7	
			180	9	0.1	0.9	
			90	1	0.2	0.2	
			270	1	0.2	0.2	
			303	1	0.3	0.3	
		OUT	90	0.25	0.2	4.3	0.25 < 1.1

	Mfg.	Model	Serial
UNIT	AECL	T-780	326
HEAD			
COLLIMATOR			
SOURCE	AECL	C-151	S-3585

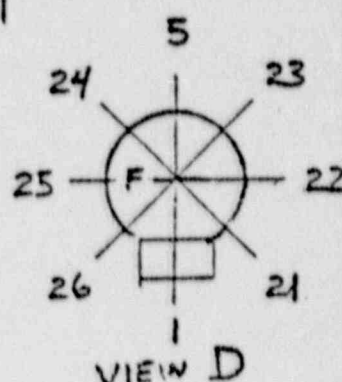
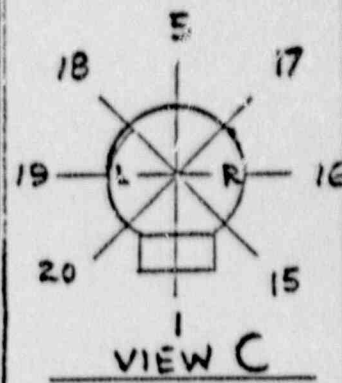
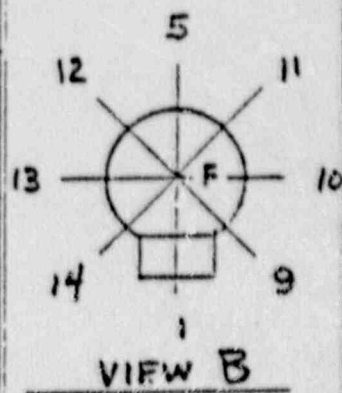
Diameter = 2.0-cm : Wipe Test ≤ 0.005 - μCi
 Spec's: Date 09-15-88: -Rhm: 3594-Ci



Pos. NO.	mR/hr	
	Surface	1-Meter
1	3.5	0.4
2	3.0	0.2
3	0.3	0.2
4	0.5	0.2
5	2.5	0.5
6	1.3	0.2
7	1.2	0.2
8	1.0	0.3
9	0.2	0.2
10	0.2	0.1
11	0.3	0.2
12	1.0	0.2
13	0.5	0.2
14	2.5	0.4

Pos. NO.	mR/hr	
	Surface	1-Meter
15	3.0	0.2
16	2.0	0.2
17	0.7	0.2
18	0.8	0.2
19	2.0	0.2
20	3.5	0.25
21	3.5	0.25
22	2.5	0.25
23	1.0	0.2
24	0.4	0.2
25	0.5	0.2
26	0.2	0.2

37.1 6.05 Totals
 1.43 0.23 Average
 3.5 0.50 Maximum



COMMENTS:
 BG < 0.1

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RADIATIONS SURVEY
 RADIATION THERAPY - RADIOLOGY
 DOCTORS NORTH HOSPITAL
 COLUMBUS, OHIO

AECL TH780
 Co-60 UNIT
 10-14-88

AECL MEDICAL

A Division of Atomic Energy of Canada Limited

INSPECTION CERTIFICATE

TELETHERAPY UNIT MODEL T 780 SERIAL NO. 326
TELETHERAPY SOURCE SERIAL NO. 3585 CURIES 3594 DATE SEPT 15-1988
CUSTOMER DOCTORS HOSPITAL
LOCATION COLUMBUS OHIO

A.E.C.L. MEDICAL certifies that the source exposure mechanism
in the above unit was fully inspected and serviced in accordance with U.S.
Nuclear Regulatory Commission License No. 54-00300-04 issued to Atomic
Energy of Canada Ltd.

OCTOBER 14-1988
Date of Inspection

W. T. Schluenger, M.D.
Authorized Source Handler

AECL MEDICAL
a division of
Atomic Energy of Canada Limited

SOURCE DISPOSAL CERTIFICATE

TO WHOM IT MAY CONCERN:

This is to certify that the following source has been removed from the unit described herein, and returned to AECL MEDICAL, Kanata, Ontario, Canada for disposal:

COBALT 60 OR CAESIUM 137 SEALED SOURCE	<i>G⁶⁰</i>	SERIAL NO. <i>2110</i>	DEPLETED URANIUM	UNIT <i>T780 #326</i>	UNIT SERIAL NO. <i>326</i>
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LOCATION OF UNIT

DOCTORS HOSPITAL

COLUMBUS OHIO

Date: *OCT. 14-1988*

Signed: *W. T. Schlenger AECL*
AECL Service Representative

GEORGE W. CALLENDINE, JR., PH. D.
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CERTIFICATION OF TELETHERAPY PERFORMANCE

Location: DOCTOR'S NORTH HOSPITAL Room C 60 Date 10-14-88
COLUMBUS OHIO Unit:
Mfg. AECI Model TH 780

Signs Posted: AEC Form 3 YES Emergency Procedures YES
Door: Caution, High Radiation Area YES Radioactive Materials YES
Head: Radioactive Materials YES
Other: NA

Patient Monitoring: View Window OK Mirror N/A Aural OK
CCTV N/A Other N/A

Door Interlock(s): Door to Room OK Other N/A

Machine interlocks: Power On/Off OK Timer On/Off OK Key OK
Emergency Bar OK Other N/A

Warning Lights:	Control	Door	Room	Head	Other
Green	☒	☒		☒	
Red	☒	☒		☒	
White					

Beam Limiting Stops: Adequate YES
Electrical CW-9H°; CCW-2° Mechanical NO SWIVEL

Treatment Timing Device: Terminate Exp. @ Zero YES Accuracy -1.58 x 10⁻² min.

Source Head Survey: @ Surface ≤ 3.5 -mR/Hr ; @ One Meter ≤ 0.5 -mRhm

Wipe Test: Source Area ≤ 0.005 -uCi; Collimator ≤ 0.005 -uCi; Housing ≤ 0.005 -uCi

Area Survey: SEE DATA

Output Calibration: 107.54 R/Min @ SCD = 80 -cm & WxH = 10 -cm x 10 -cm

Comments:

This unit conforms with presently accepted performance standards of radiation hazard control: Yes ☒ No ☐

Room monitor operates with & without AC
Light/Radiation convergence within 2mm.

Respectfully submitted,

George W. Calledine, Jr.

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STATEMENT OF LEAK TEST RESULTS

Location: Doctors North Hospital
Columbus, OH.

Date: October 14, 1988
Physician: T. Anderson, D.O.

Device: CO-60 Teletherapy

	Radionuclide	Manufacturer	Model No.	Serial No.
Unit		A E C L	TH-780	321
Source	CO-60	A E C L	C-151	3585

Source Specifications:

Authorization Number 34-05488-02
Specification Date 10-14-88
Specified Strength -Rhm OR 3594 -Curie

Test Procedure:

Wipe Test X Immersion Test Gaseous Leak Test

DATA:

	SAMPLE							
	Background	Standard	1 ₀₆₂	2 ₀₆₃	3 ₀₆₄	4	5	6
gcpm	248	55667	650	257	238			
-uCi	-0-	0.02	BG	BG	BG			

RECOMMENDATIONS:

CONTROL NO. 86481



CORRIDOR
 $\leq 0.1 \text{ mR/hr}$

ORTHO VOLTAGE
 THERAPY

$\leq 5 \text{ mR/hr}$

Dx X-RAY
 CONTROL

$\leq 0.1 \text{ mR/hr}$

$\leq 0.5 \text{ mR/hr}$

CONTROL

$\leq 0.2 \text{ mR/hr}$

$\leq 0.1 \text{ mR/hr}$

CORRIDOR

GEORGE W. CALLENDINE, JR., PH. D.

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RADIATIONS SURVEY

RADIATION THERAPY - RADIOLOGY

DOCTORS NORTH HOSPITAL

COLUMBUS, OHIO

WITH
BEAMSTOPPER

GANTRY 303°

CONTRL NO. 86481

11-14-88

$\leq 1 \text{ mR/hr}$

$\leq 20 \text{ mR/hr}$

$\leq 5 \text{ mR/hr}$

$\leq 2.5 \text{ mR/hr}$

$\leq 18 \text{ mR/hr}$

$\leq 3 \text{ mR/hr}$

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RADIATION THERAPY - RADIOLOGY

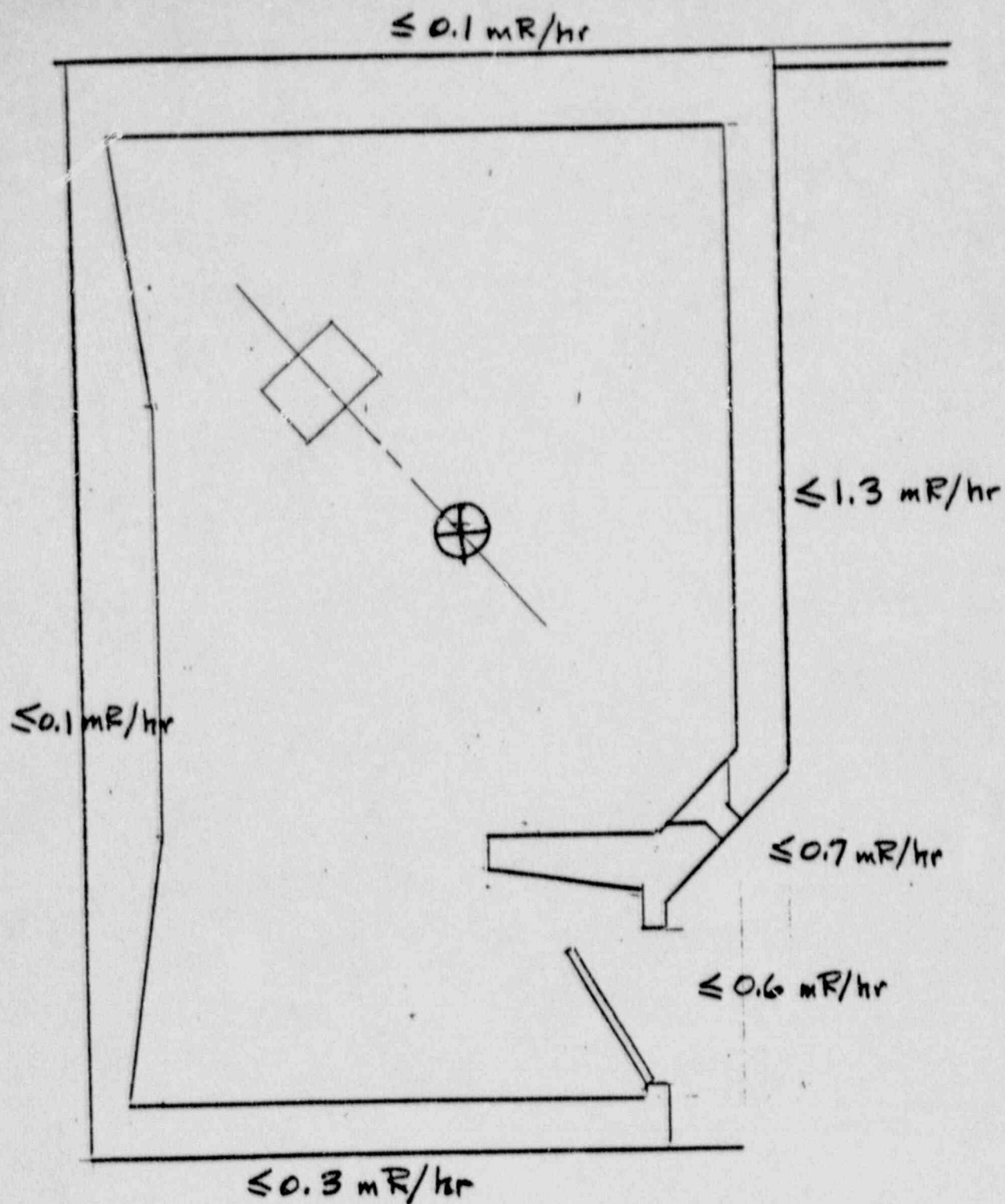
DOCTORS NORTH HOSPITAL

COLUMBUS, OHIO

NO BEAMSTOPPER
BEAM HORIZONTAL

CONTROL NO 8648

11-14-88



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RADIATIONS SURVEY

RADIATION THERAPY - RADIOLOGY

DOCTORS NORTH HOSPITAL

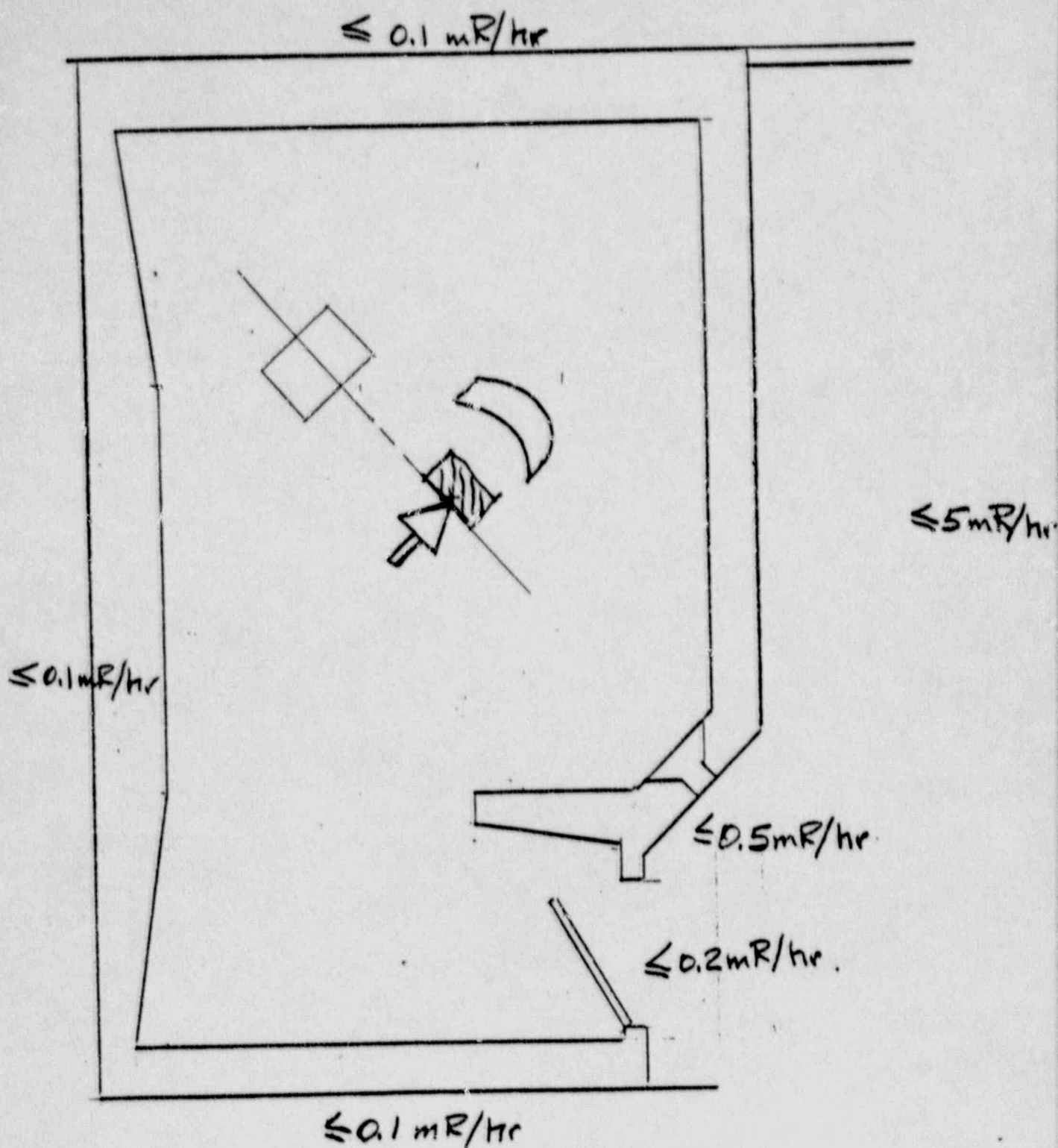
COLUMBUS, OHIO

BEAM
DOWN

0°

CONTROL NO. 86481

11-14-88



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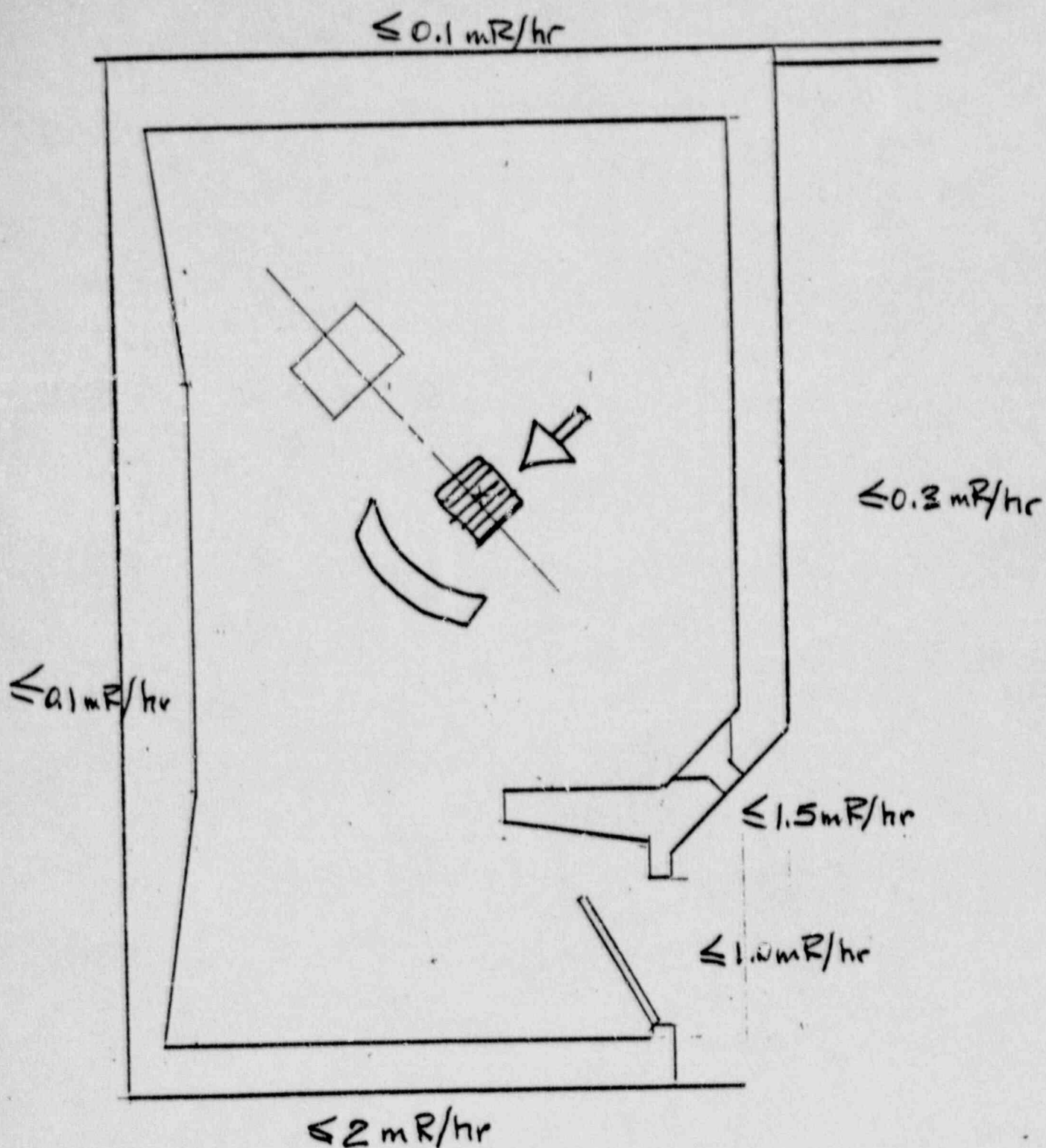
RADIATIONS SURVEY

RADIATION THERAPY - RADIOLOGY

DOCTORS NORTH HOSPITAL

COLUMBUS, OHIO CONTROL NO. 86481

WITH
 BEAM STOPPER
 BEAM
 HORIZONTAL
 GANTRY
 270°
 11-14-88



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RADIATIONS SURVEY

RADIATION THERAPY - RADIOLOGY

DOCTORS NORTH HOSPITAL

COLUMBUS, OHIO

WITH
BEAMSTOPPER
BEAM
HORIZONTAL

START AT 90°

CONTROL NO. 86481

11-14-88