

7-13-77

ST. MARY'S HOSPITAL

July 6, 1977

Patricia C. Vacca
Radioisotopes Licensing Branch,
Division of Fuel Cycle and Material Safety
USNRC
Washington D. C. 20555



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Dear Ms. Vacca,

In answer to your letter of June 17th we are now answering your questions with regard to the new room for our Cobalt therapy unit. Our answers bear the same numbers as your questions.

1. Patient viewing is by closed circuit television with the camera located as shown on figure 3 (large plan), where its view can never be obscured by the machine. The camera has remote pan and tilt adjustment. In case of TV System failure, treatment will be suspended until it is repaired. "In house" repairman and back-up system are available.
2. The presence of a door interlock switch is shown on the architect's drawings. (Not attached) The correct operation of this interlock will be checked by the NRC approved engineers who will be responsible for moving the unit and also by the Radiation Safety Officer in the pretreatment radiation survey.
3. We have attached improved copies of figures 2, 3, and 4 as requested which have been modified as requested.
 - (a) All concrete used in shielding construction has a density of 147 lb./ft.³. The room is submerged below ground level with nothing beneath it.
 - (b) The adjacent rooms to the E, W and S are shown on figure 3. The north wall is below ground level with a walkway passing at ceiling level--see figure 3 and soil level on figure 2. Above the roof is a garden area with shrubs to discourage people from frequenting the area.
 - (c) The atrium (areaway) area is best seen in the plan figure 3 and the South elevation (figure 2). Access to the atrium is through the treatment room via the glass partition. A steel grating covers the atrium area.
4. (a) The radiation levels outside the door due to penetration through the primary barrier (location J on figure 3) was calculated in our original letter to be 0.00044 mr/hr.

5801 BREMO ROAD

RICHMOND, VIRGINIA 23226

(804) 285-2011

34-522
8503190268 850301
REG2 LIC30
45-11367-0

PDR

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INSPECTION AND ENFORCEMENT

The exposure rate due to door ($\frac{1}{4}$ lead) penetration is due only to double scatter. The exposure, due to patient scatter, striking the wall inside the door beyond the maze wall is estimated to be 450 mr/hr. If this strikes an area of 4' x 8' of wall located 3 meters from the door, and we get 0.1% scatter at 1 meter for each 400 in.², then the exposure rate at the door would be

$$450 \times \frac{.001 \times 8 \times 4 \times 144}{400} \times \frac{1}{3^2} = 0.58 \text{ mr/hr.}$$

This is already at an acceptable level but $\frac{1}{4}$ of lead is also included in the door.

- (b) Exposure at location R on figure 3. This room will contain a linear accelerator. The wall is 2 ft. thick (concrete), has an attenuation of 0.0001, and is a secondary barrier receiving exposure scattered at 90 degrees from the patient (scatter factor = 0.9×10^{-3} at 1 meter). The distance to point R is 7 meters so the exposure rate is

$$16,700 \text{ R/hr. (at 60 cm.)} \times 0.9 \times 10^{-3} \times 0.0001 \times 10^3 \times \frac{1}{7^2} = 0.03 \text{ mr/hr.}$$

- (c) As there is no access to the atrium except through the Cobalt room the exposure rate inside it is not important.
- (d) Calculations, similar to 4(a) above, indicate that the maximum exposure rate, by double scatter up through the ceiling opening (skylight), could be 0.5 mr/hr.
- (e) There is nothing beneath the facility.

5. A notice will be placed in the garden area which will read as follows:

NOTICE

The soil in this area provides shielding from radiation machines beneath. Do not remove any soil before contacting the Radiation Therapy Department Ext. 350.

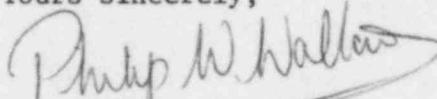
It should be noted that the beam stopper will almost certainly be in place whenever the machine is beaming vertically up. If any major gardening is being performed, the beam stopper will be used.

6. (a) The six-monthly leak test will be performed by the Radiation Safety Officer.
- (b) Alcohol wetted swabs will be wiped over the inner faces of the beam port with the aid of long handled forceps.
- (c) The swabs will be counted in a well Scintillation Counter (Picker Spectroscaler IIIA with Model 2804F well or similar instrument) located in the Nuclear Medicine Department.
- (d) The swabs will be counted and compared with a standard Co^{60} rod source (New England Nuclear-0.139 μCi on 11/22/76) which has been recently purchased for this purpose.

7. A copy of the emergency procedures is attached.

We hope we have answered all your questions adequately. If there are any problems, I may be reached at 804-770-1433 (Radiation Physics Division, Medical College of Virginia).

Yours sincerely,



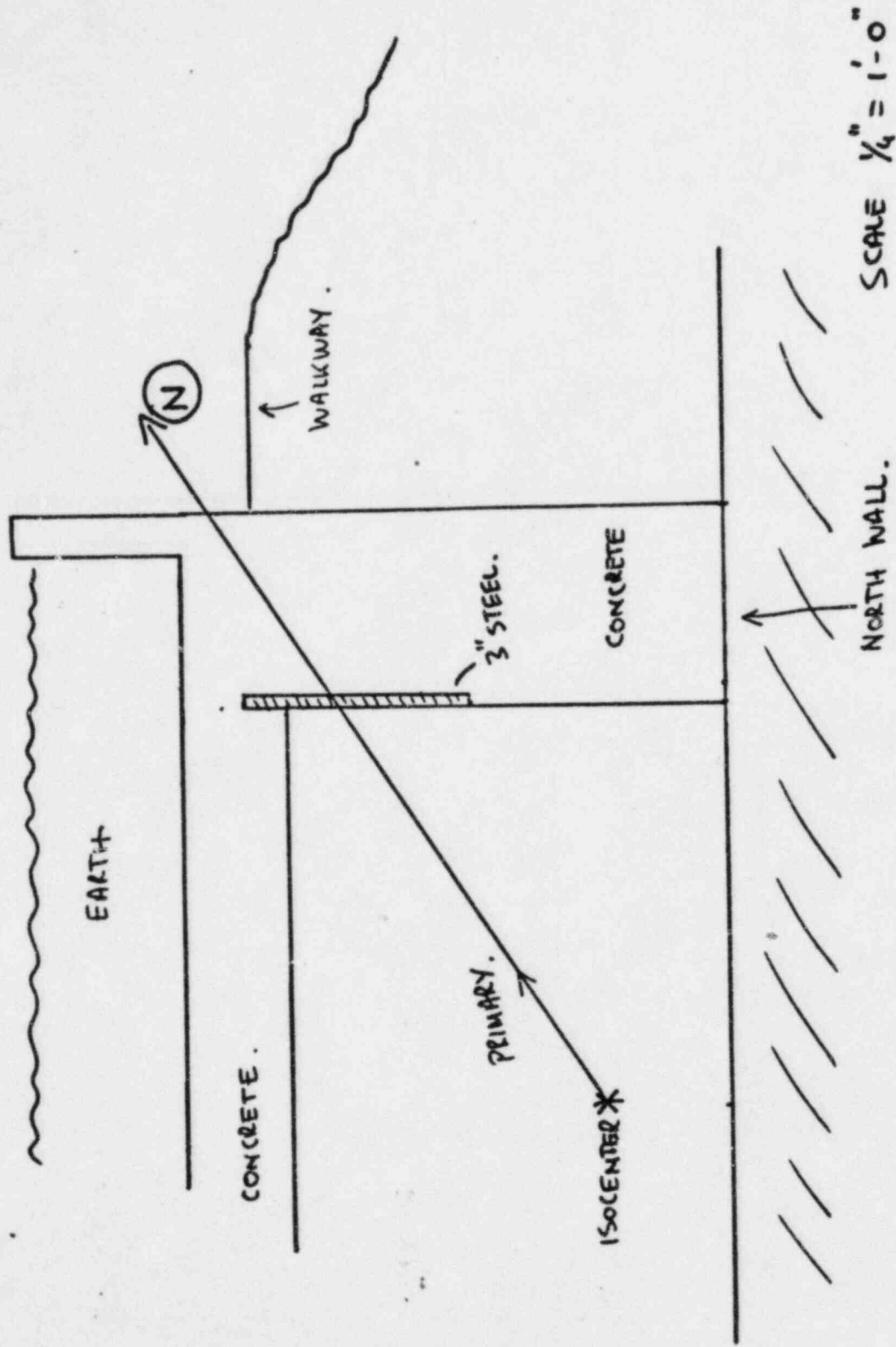
Philip W. Walton, Ph.D.
Radiation Safety Officer

PWW:mat

*Keep in envelope
back of file*

2257

ST. MARY'S HOSPITAL, RICHMOND, VA.
COBALT THERAPY ROOM.

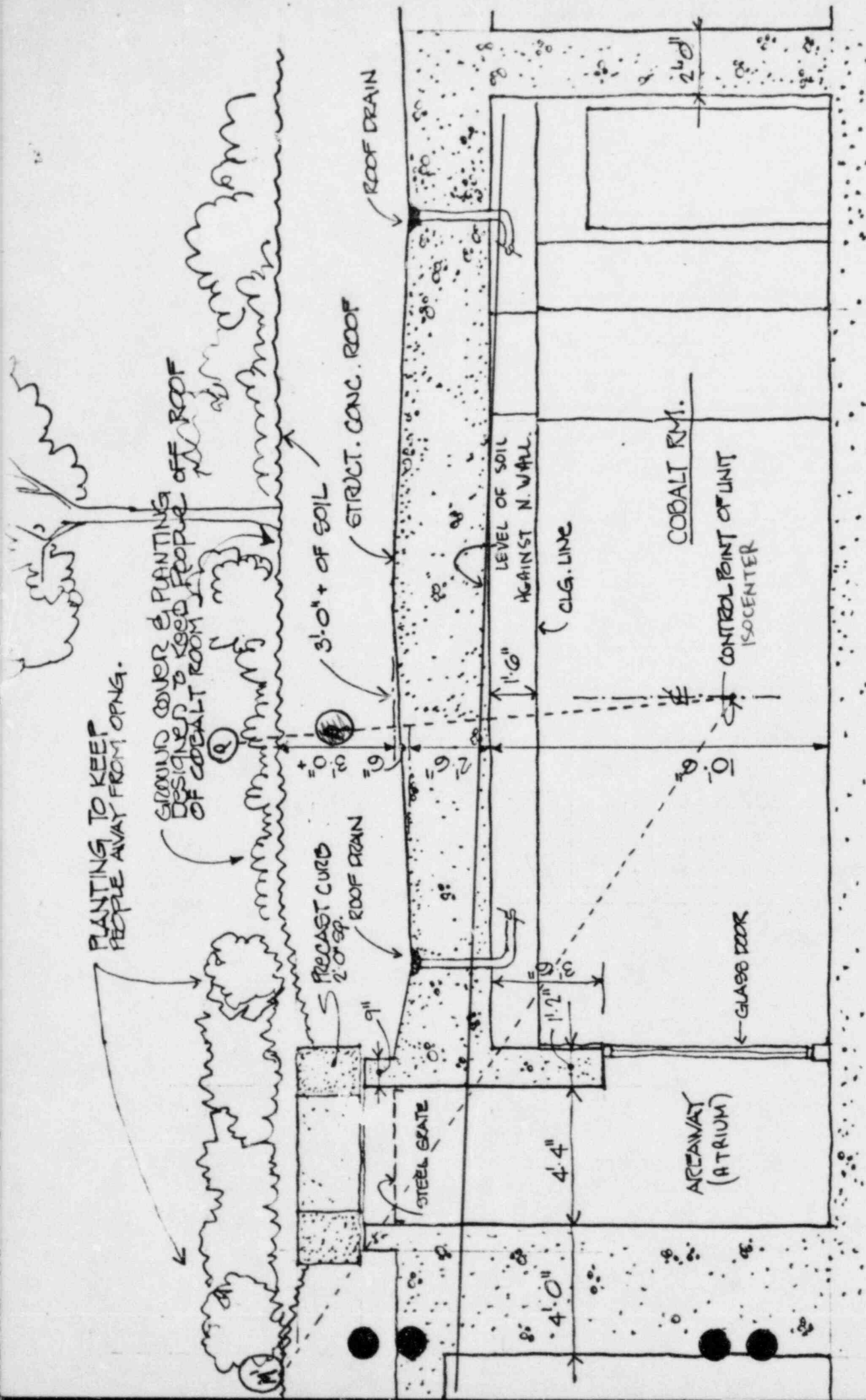


SCALE $\frac{1}{4}'' = 1'-0''$

VERTICAL ELEVATION THROUGH LINE NN' OF FIG 3.

PWW
6/30/77.

FIG 4.



SOUTH ELEVATION OF COBALT RM.

1/4" = 1'-0"

6/24/77 BY JVN.

ST. MARY'S HOSPITAL
RICHMOND VA.

EMERGENCY INSTRUCTIONS

Cobalt Unit (AECL Theratron 80)

If the shutter fails to close after a treatment proceed as follows:

(a) If the patient is ambulatory

Instruct him to get off the table and leave the room.

(b) If the patient is not ambulatory

Enter the room and slide the couch top so that the primary beam no longer strikes the patient. Transfer the patient to a stretcher and remove him from the room (always be careful to avoid the primary beam).

If there is difficulty in promptly removing the patient then enter the room with the special "T" bar provided and push the source to its safe position as indicated by the red mark on the bar no longer being visible. If the source will not return then close the collimators and direct the beam away from the patient before proceeding to remove him from the room.

(c) Lock the door.

(d) Call either:	Office	Home
Dr. Calvalcanti	285-2011 X350	320-2097
Dr. Calkins	285-2011 X235	272-0708
Dr. Walton	770-1433	320-2953
Mr. Dunn	285-2011 X235	1-932-3209