

METROPOLITAN HOSPITAL 201 North Eighth Street, Philadelphia, Pa. 19106, (215) 238-2200
Department of Radiology

Robert R. Rosenbaum, D.O.
Philip Shtasel, D.O.
Lewis Halin, D.O.
Frank Stratton, D.O.
Paul Wallner, D.O.
Christopher Meoli, D.O.

May 27, 1977

Paul P. Psomas
Radioisotope Licensing Branch
Division of Fuel Cycle and
Material Safety
Nuclear Regulatory Commission
Washington, D.C. 20555

RE: License No: 37-04871-01

Dear Mr. Psomas:

Please accept this letter and the enclosed exhibits as a request for an ammendment to License No. 37-04871-01 for the possession and use of 133 Xe to equal 200 mCi per week.

Reference is made to previous communications re this request. The enclosed submissions are in response to the questions posed in your letter of 1/25/77.

Question 1: Amount of anticipated use.

Answer 1: 200 mCi per week (see enclosure of D.A. Lightfoot suggesting safe limit of 259 mCi per week).

Question 2a: Describe actions taken to create negative air flow.

Answer 2a: This problem was addressed to Paul H. Yeomans - Consulting Engineers. Their consultation is enclosed. The recommendations submitted were executed. The suggested structural corrections were performed.

Question 2b: Submit diagrams of measured air flow rate.

Answer 2b: Submitted is the report of Eugene G. Freda, Company - Testing and Balancing Specialists - with their certified measurements of air flow rates at all of the

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37-04871-01 PDR

A Non-Profit Osteopathic Institution

"OFFICIAL RECORD COPY"

Item 21
2/26/79

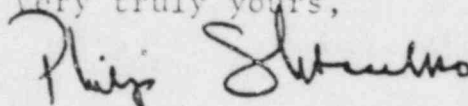
questioned vents.

Question 3: Calculations of concentrations of ^{133}Xe in exhausted air.

Answer 3: Submitted are calculations and conclusions of D. A. Lightfoot, our consultant physicist, suggesting that the existing conditions satisfy present requirements for the possession and use of ^{133}Xe .

We hope and believe that these data are satisfactory responses to your questions. We are most hopeful that our request will be approved.

Very truly yours,



Philip Shtasel, D.O., Chairman
Division of Nuclear Medicine

PS:am
Encs.

Item 21
2/26/79

PAUL H. YEOMANS, INC.
CONSULTING ENGINEERS

1621 RANSTEAD STREET . . . PHILADELPHIA, PA. 19103
215-561-5770

PAUL H. YEOMANS, P. E.
ROBERT B. YEOMANS, P. E.

March 28, 1977

Metropolitan Hospital
201 North Eighth Street
Philadelphia, Pa. 19106

Attention: Mr. Sidney Kahn
Administrator - Hospital Operations

Gentlemen:

In response to your letter of February 17, 1977, we have discussed your concern regarding the ventilation system serving the Nuclear Medicine Facility with Dr. Philip Shtasel and Mr. David A. Lightfoot. Our conclusion from these discussions is that two spaces, Hot Room and Scanning Room, should be exhausted so as to provide a negative pressure in each space. Also, it is felt that readings of actual air flows should be taken to determine the rate of exhaust of these particular spaces and also to determine total air flow in this exhaust system as a means of calculating the dilution rate for the entire system.

At present the Hot Room is supplied with 150 cfm and exhausted at a rate of 200 cfm which results in a negative pressure. The Scanning Room is supplied with 250 cfm and this air is returned to the air handling system. It is recommended the return from this room be blanked off and a new exhaust outlet be cut into the existing duct system as indicated on the enclosed sketch. The writer met with your Mr. Lee M. Covenko at the hospital on March 14, 1977 and it was his opinion this work could be accomplished by hospital personnel.

As far as the air readings are concerned, although we could accomplish this work with our personnel, we are primarily design oriented and feel you should utilize the services of a certified air balancing contractor for this work. Two firms we would recommend for your consideration are Eastern Air Balance Company, 2800 B West Westmoreland Street, Philadelphia, Pa. and Eugene Freda Company, 107 Palmer Lane, Trenton, New Jersey.

As modifications to the present air flows are contemplated, some minor balancing adjustments may be required to provide the desired exhaust air flow from the two spaces in question. We will be pleased to meet with the balancing contractor you select, at the hospital, to review just what his work will entail.

Cont'd ...

Copy to: Dr. Shtasel
Mr. L. Covenko

"OFFICIAL RECORD COPY"

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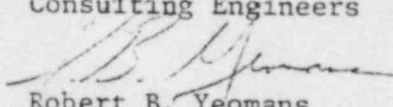
PAUL H. YEOMANS, INC.
CONSULTING ENGINEERS

Page Two
Mr. Sidney Kahn
March 28, 1977

If there is any further information we can provide you at this time, please let us know.

Very truly yours,

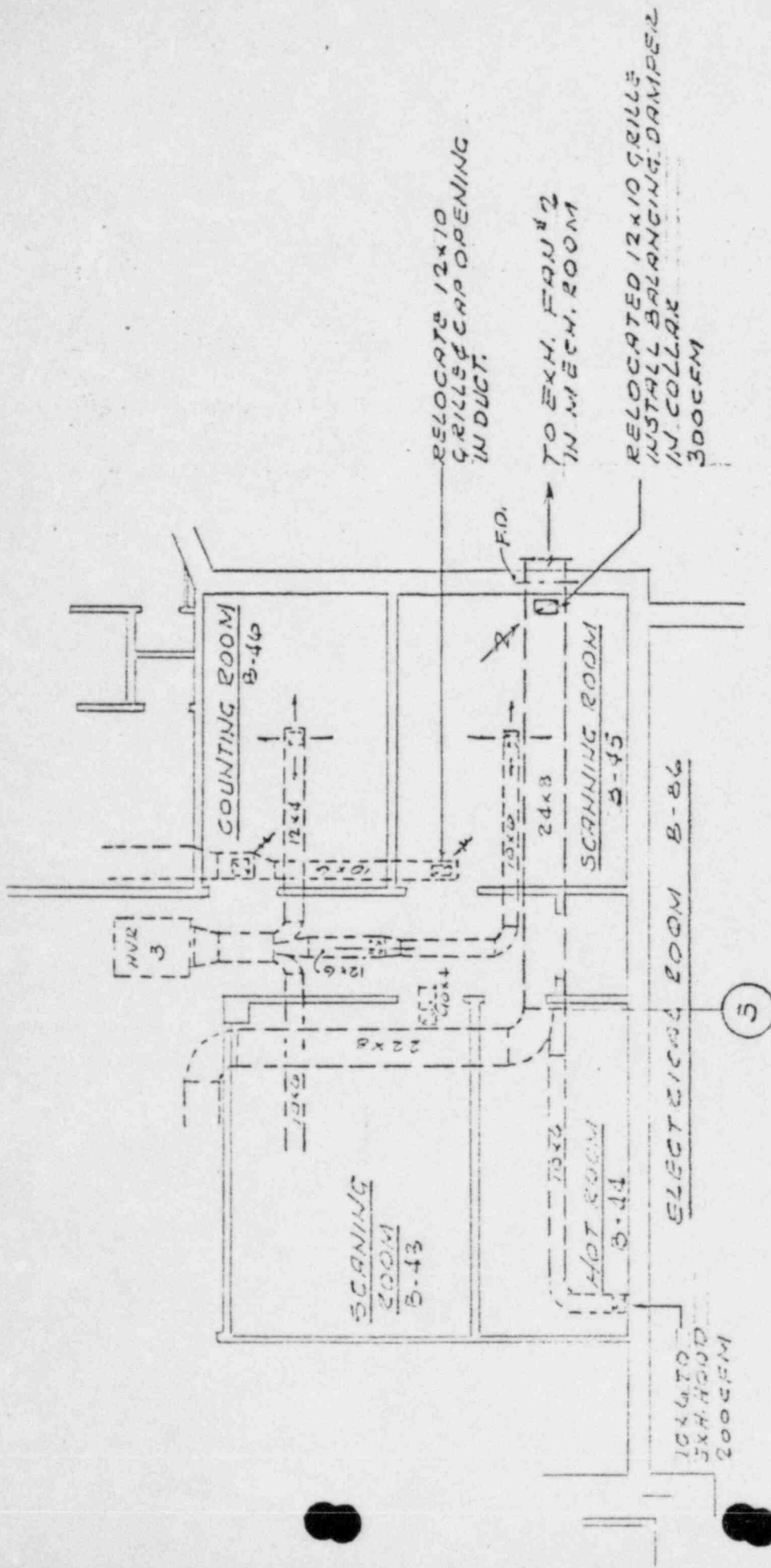
PAUL H. YEOMANS, INC.
Consulting Engineers


Robert B. Yeomans

RBV/b

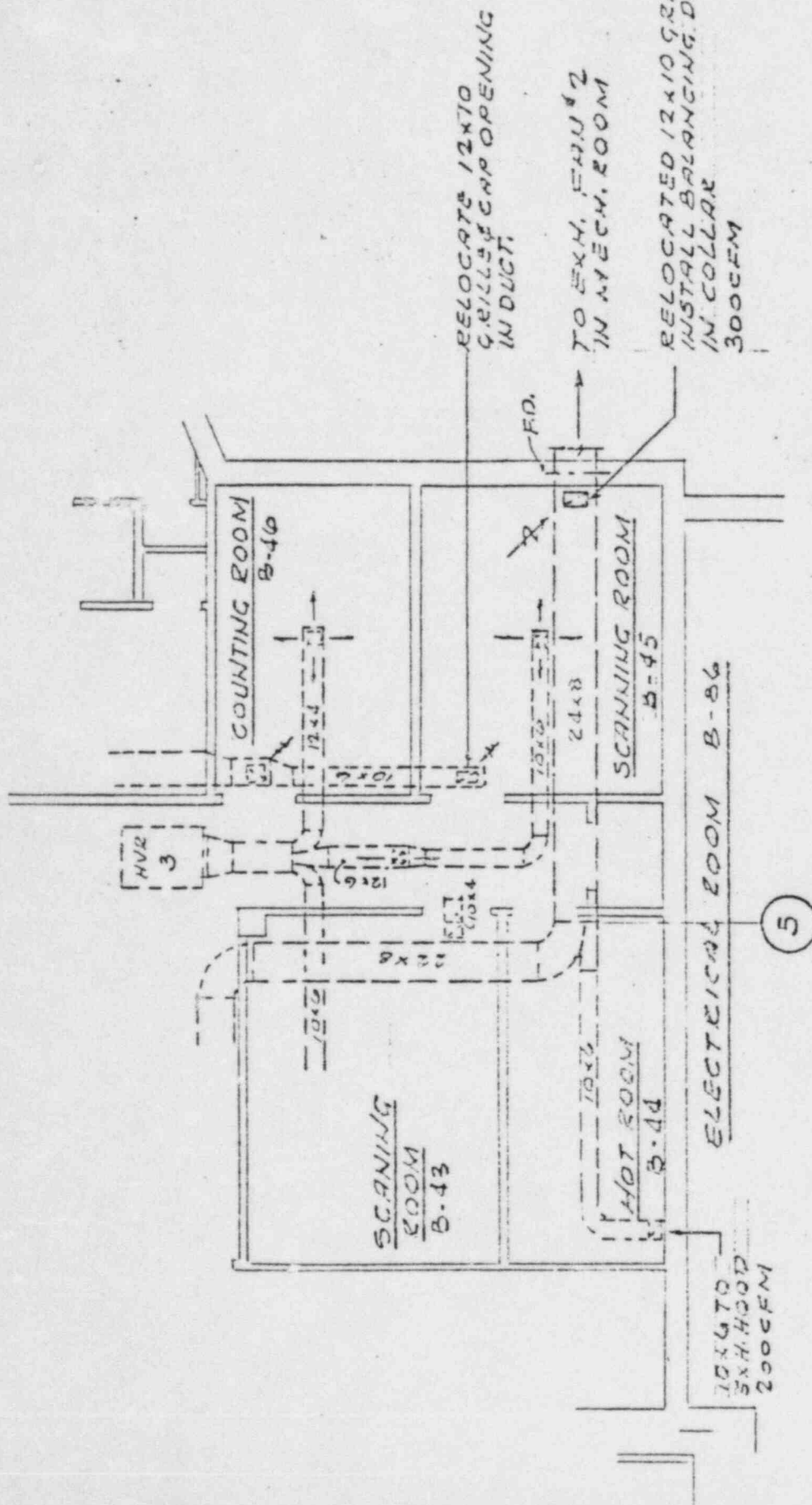
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Item 21
8/22/79



PARTIAL BASEMENT PLAN
SCALE: 1/8" = 1'-0"

METROPOLITAN HOSPITAL PHILADELPHIA - PENNA.	
DUCT MODIFICATION NUCLEAR MEDICINE	
P.H. YEOMANS - MECH/ELECT. ENGINEERS	
SCALE AS NOTED	CHECKED BY: P.A.M.
DRAWN BY: G.F.	DATE: 3-28-77
COMM. NO. C-252 DWG. NO. SKM-3-28-7	



PARTIAL BASEMENT PLAN
SCALE 1/8" = 1'-0"

METROPOLITAN HOSPITAL PHILADELPHIA -- PENNA.		DATE: COMM. NO. C-252	
DUCT MODIFICATION NUCLEAR MEDICINE		DRAWN BY: G. F.	
P. H. YEOMANS - MECHANICAL ENGINEERS		CHECKED BY: R. A. M.	3-28-77 DWG NO. SKM-3-28
SCALE:		AS NOTED	

EUGENE G. FREDA, III.

107 PALMER LANE
TRENTON, NEW JERSEY
609-883-2087

NUCLEAR MEDICINE

April 18, 1977

SUMMARY

The purpose of the adjustments to the supply and exhaust systems serving the nuclear medicine area, was to produce pressures which would cause the nonducted air flow to be from the corridor into the rooms R-31, R-32, R-33.

Room R-33 had its original return air grille removed and a new exhaust grille installed. The exhaust grille was attached to the exhaust system fan No. 2. This exhaust system has two branch ducts, one serving a large portion of the basement, and the other serving another part of the basement which includes the nuclear medicine area. These two ducts are then joined together, both of which are served by exhaust fan # 2, as shown on page D.

Exhaust fan # 2 was designed to deliver 3,550 CFM. This fan total is made up of the CFM total of exhaust grilles in the branch duct coming from the nuclear medicine area and 14 exhaust grilles in the other duct serving the remainder of the basement. This information was taken from the sheet metal drawings. The lab hood in room R-32 is not included in this total. The lab hood could have an air quantity of anywhere from 150 CFM, which would match the supply air quantity into this room, or a maximum of 325 cu.ft. per minute, based on the lab hood gate being open 1/4 of its full opening and a capture velocity of 100 FPM. Excluding the lab hood air quantity, the fan is presently operating 15% below design. There are five amperes left in the motor rating, however the drive package is at its present maximum limit. To achieve the 3,550 CFM would require a new motor and drive package and a review of the fan curve.

Page B shows the design air quantity, less the lab hood to be 1,200 CFM. The actual air quantity is 953 CFM, which is approximately 20% low. Page C shows the design CFM and actual CFM for the other branch which is operating approximately 12% low.

Page E is a diagram showing the actual air quantity measured at each supply inlet and exhaust outlet.

98829

AIR CONDITIONING SYSTEMS / TESTING & BALANCING SPECIALIST

Item 21
2/26/79

SUMMARY

Room 32 has a supply air inlet that does not have a face plate installed.. The air is dropping straight down on the work bench. The lab hood was measured at the lab hood gate full open and 1/4 open. On page H, the lab hood was tested with smoke to insure that proper capture was being effected. The heavy dark lines indicate the smoke tracer, which was used to demonstrate capture. The top line indicates very good capture right at the gate opening. The middle line had very good capture 4" out from the gate, and the bottom line had good to fair capture 12" out from the gate. Very little backwash occurred under this gate condition. When the gate was full open, the face velocity dropped down to approximately 15 FPM and the capture became very sluggish.

The new exhaust grille in Room R-33 was scheduled for 200 CFM. The adjustment of this outlet was left higher than design because at the time of adjustment the ceiling in this room was still open to the return air plenum. The added CFM will be required to produce good conducted flow into this room. The supply to this room is below design with the adjusting damper full open.

Room R-31 is in very poor condition. The supply air is far below design, as is the exhaust air quantity. The exhaust (this could very well be a return air grille) would barely remove tracer smoke when the smoke was injected immediately in front of the grille.

Page F shows the results of the tracer smoke when the smoke was injected in the corridor upstream of the 3 rooms. The smoke indicated a good velocity going down the corridor and into Room R-33. The entrance into room R-32 was somewhat slower and completely by-passed room R-31.

Page G shows the results of the tracer smoke test at each door into each of the rooms tested. The tracer smoke was emitted at the door line or slightly outside of the door starting at the top going to the bottom. The heavy dark lines show the results of the smoke test and the numbers indicate the approximate air velocities into the rooms. Room R-31 had almost no motion, either in or out of the

Metropolitan Hospital

SUMMARY

room which was also demonstrated on the previous page.

In conclusion , exhaust system No. 2 is operating below design as well as that portion of the supply air sytem that serves the nuclear medicine area.

Engel & Freda

AIR MOVING EQUIPMENT TEST SHEET

Date 4/13/79

Sheet No. 8

PROJECT: METROPOLITAN HOSPITAL SYSTEM EXHAUST

Fan No.	FAN # 2			
Location	BASE MER.			
Area Served	BASEMENT			
Manufacturer	PVC			
Model No.	-			

	Design	Actual	Design	Actual	Design	Actual	Design	Actual
Total C.F.M.	3550	3034						
Return Air C.F.M.	-	-						
Outdoor Air C.F.M.	-	-						
Total/Ext. Static Pres.* W.G.	-	1.10						
Approx. Suct. Press.* W.G.	-	-0.52						
Approx. Disch. Press.* W.G.	-	40.58						
R.P.M. Fan	-	969*						

Motor	Rated	Actual	Rated	Actual	Rated	Actual	Rated	Actual
H.P.	-	1 $\frac{1}{2}$						
Voltage	460	490						
Phase	3	3						
Amperage	2.8	2.3						
	T1	2.3a						
	T2	2.3a						
	T3	2.3a						

*NOTE: Fan speed calculated using motor speed of 1776 RPM & Pulley Ratio

Sheet No. 3

SYSTEM EXHAUST

Traverse Location T-1 in basement M.E.R.

DAMPER POSITION OPEN	O.A.	%	R.A.	%	E.A.	%
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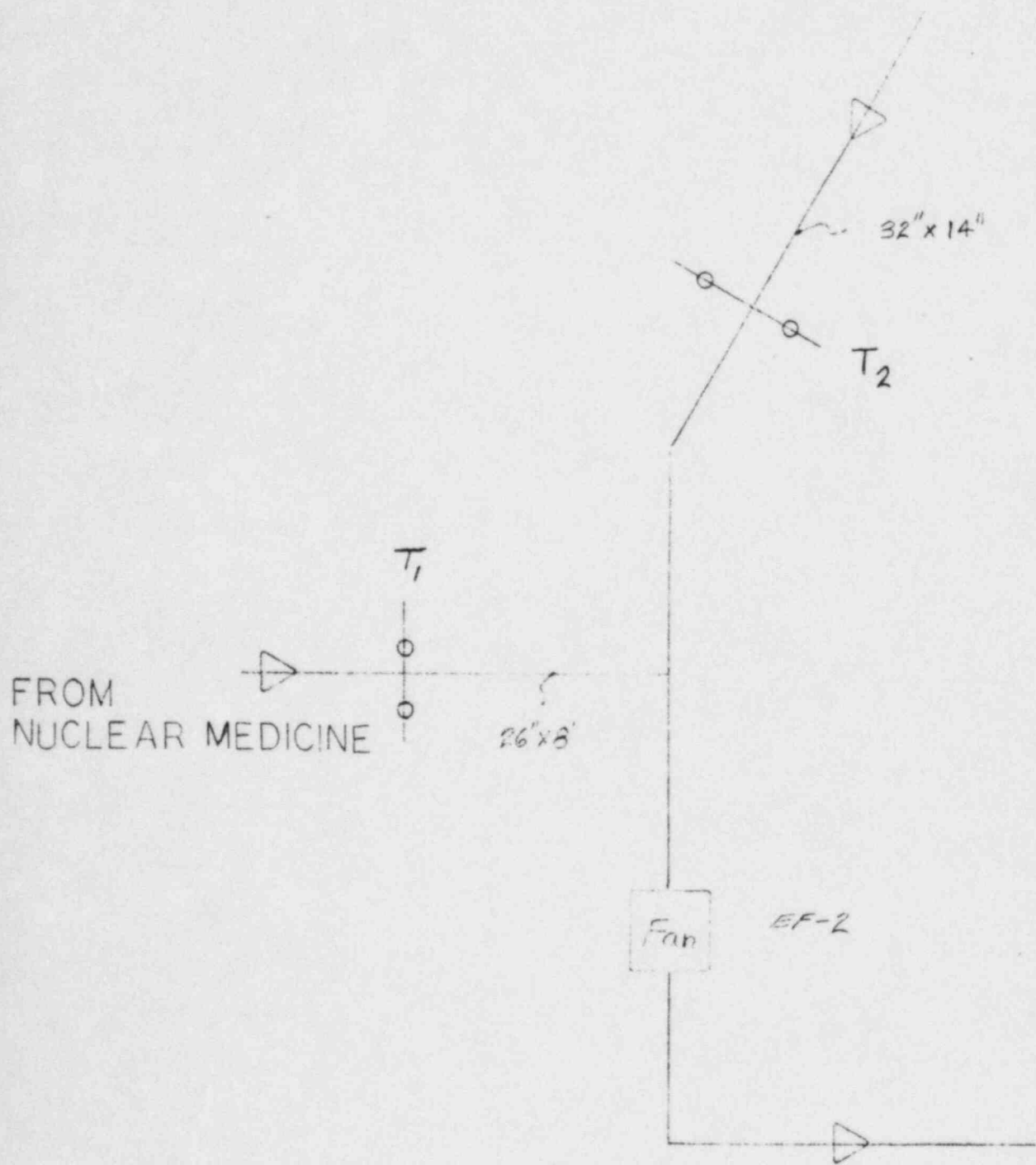
Date 4/13/77
Sheet No. C

SYSTEM EXHAUST

DAMPER POSITION OPEN	O.A.	%	R.A.	%	E.A.	%
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[illegible]

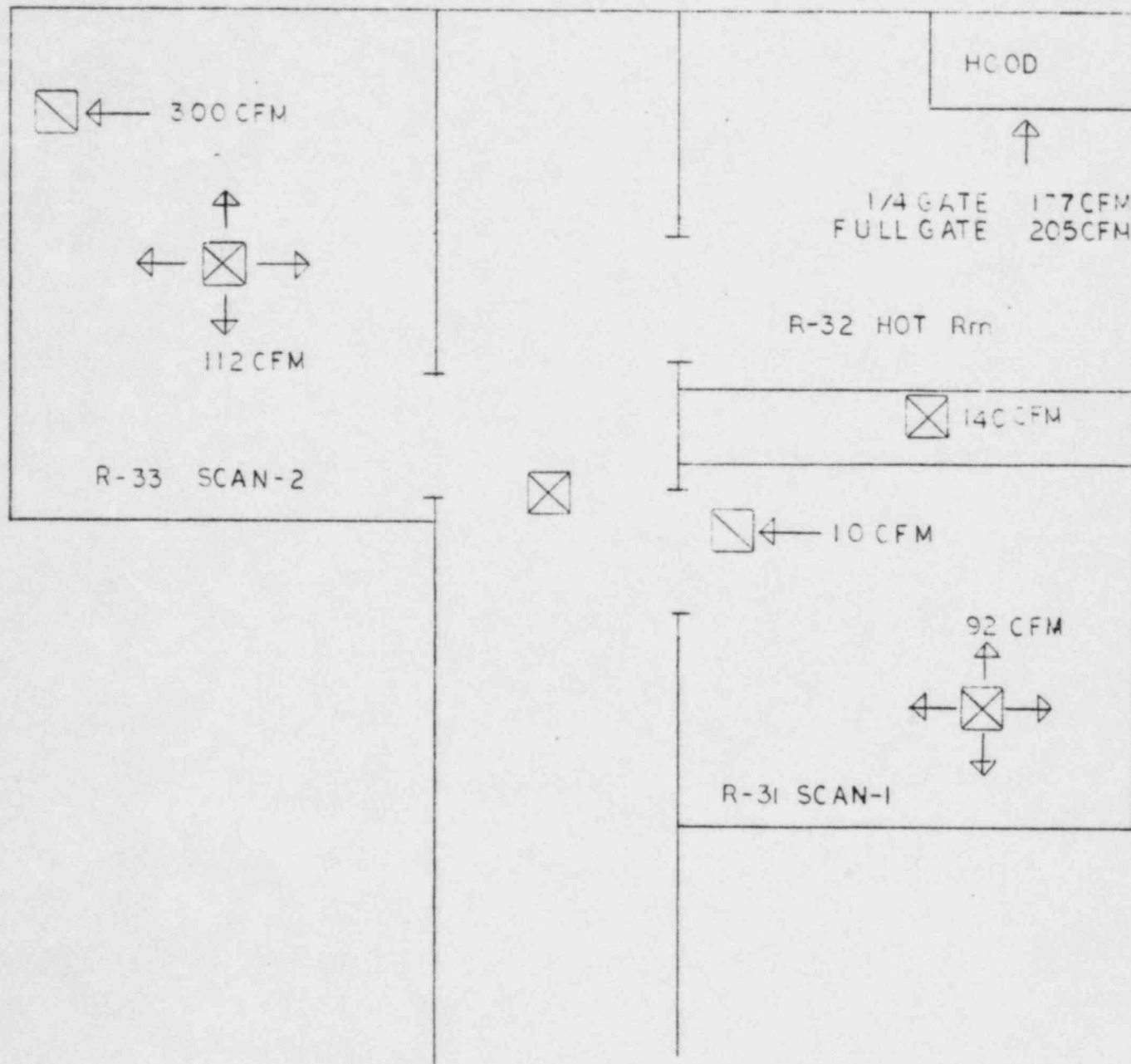
EXHAUST SYSTEM



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NUCLEAR MEDICINE

F-E



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NUCLEAR MEDICINE

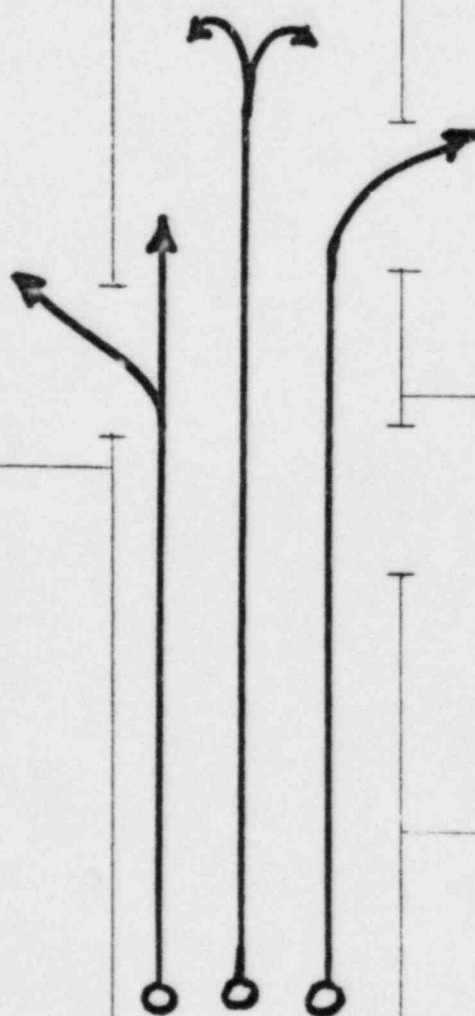
HOOD

R-33

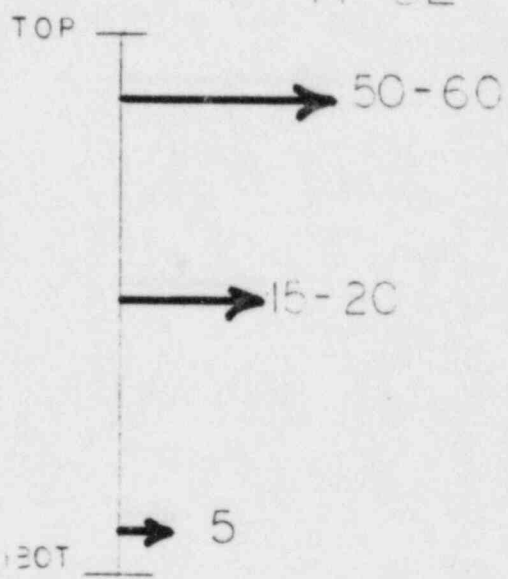
R-32

R-31

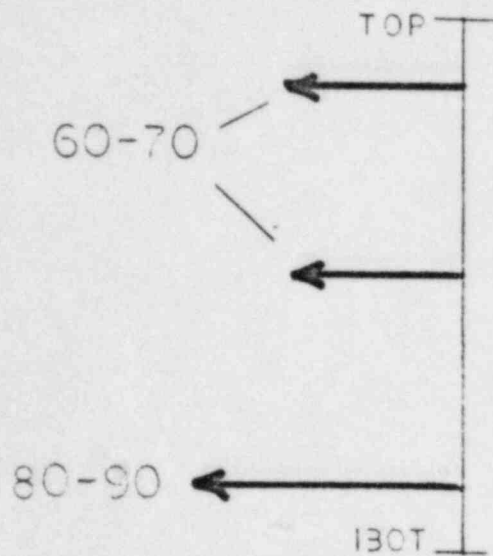
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R-32

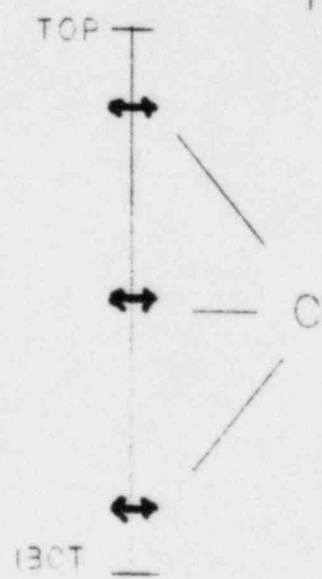


R-33



DOOR VEL. IN FPM
INTO ROOM

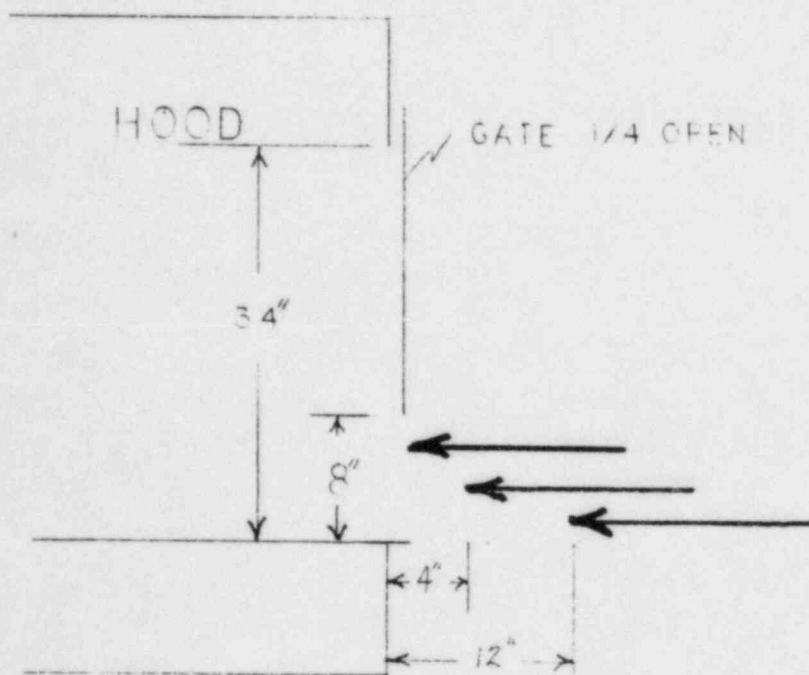
R-31



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RM-32 HOT ROOM



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DEPARTMENTAL CORRESPONDENCE

0192

DATE February 23, 1979

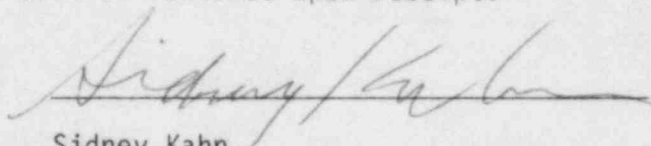
SUBJECT Delivery of Radioactive Materials to Nuclear Medicine Hot Lab
Scott Muunro, Director Maintenance & Engineering
TO John Hamilton, Director DEPT Safety & Security
FROM Sidney Kahn, Administrator DEPT Hospital Operations

Federal regulation requires that all incoming orders of Radioactive materials be delivered immediately to and stored in the Nuclear Medicine Hot Lab. Currently, such deliveries arrive between 2:00 A.M. and 5:00 A.M. and are kept on the Information Desk or the Outpatient Receptionist's Desk.

I am requesting that when such deliveries occur that the Security Guard on duty call "No. 1" and that "No. 1" take the delivery down to the Hot Lab, unlock the room and leave the delivery on the work counter and relock the door.

If the package is wet or appears to be damaged, immediately contact the hospital Radiation Safety Officer. Ask the carrier to remain at the hospital until it can be determined that neither he nor the delivery vehicle is contaminated.

If you see a problem with this procedure, please let me know, otherwise I will expect that it will be followed upon receipt.


Sidney Kahn
Administrator-Hospital Operations

SK/maa

cc: Mr. Nelson Marin
Dr. Philip Shtasel

Radiation Safety Officer: Philip Shtasel, D.O.
Office Phone: 215-238-2200
Home Phone: 215-MO4-8005