

Attachment E

"Interlock gates for MI - 8 service
building", Memo from
C.M. Bhat to Phil Martin and John Anderson, (Nov. 14,
1996)

From : C.M. Bhat
To : Phil Martin
cc : John Anderson

Nov. 14, 1996

Subject : Interlock gates for MI -8 GeV beam line at MI - 8 service building

I have checked whether or not the bottom of the hatch in the MI-8 service building can be classified as MIMIMAL occupancy. Using the Van Ginneken's estimation of the radiation level at the north side entrance to the bottom of the hatch as 3.2×10^{-18} rem/8 GeV proton loss, I have calculated the radiation doses at different locations. A picture indicating those locations is attached herewith.

I assume beam loss scenarios in accordance with the Fermilab Main Injector Preliminary Safety Analysis Report. Thus the beam losses are as follows:

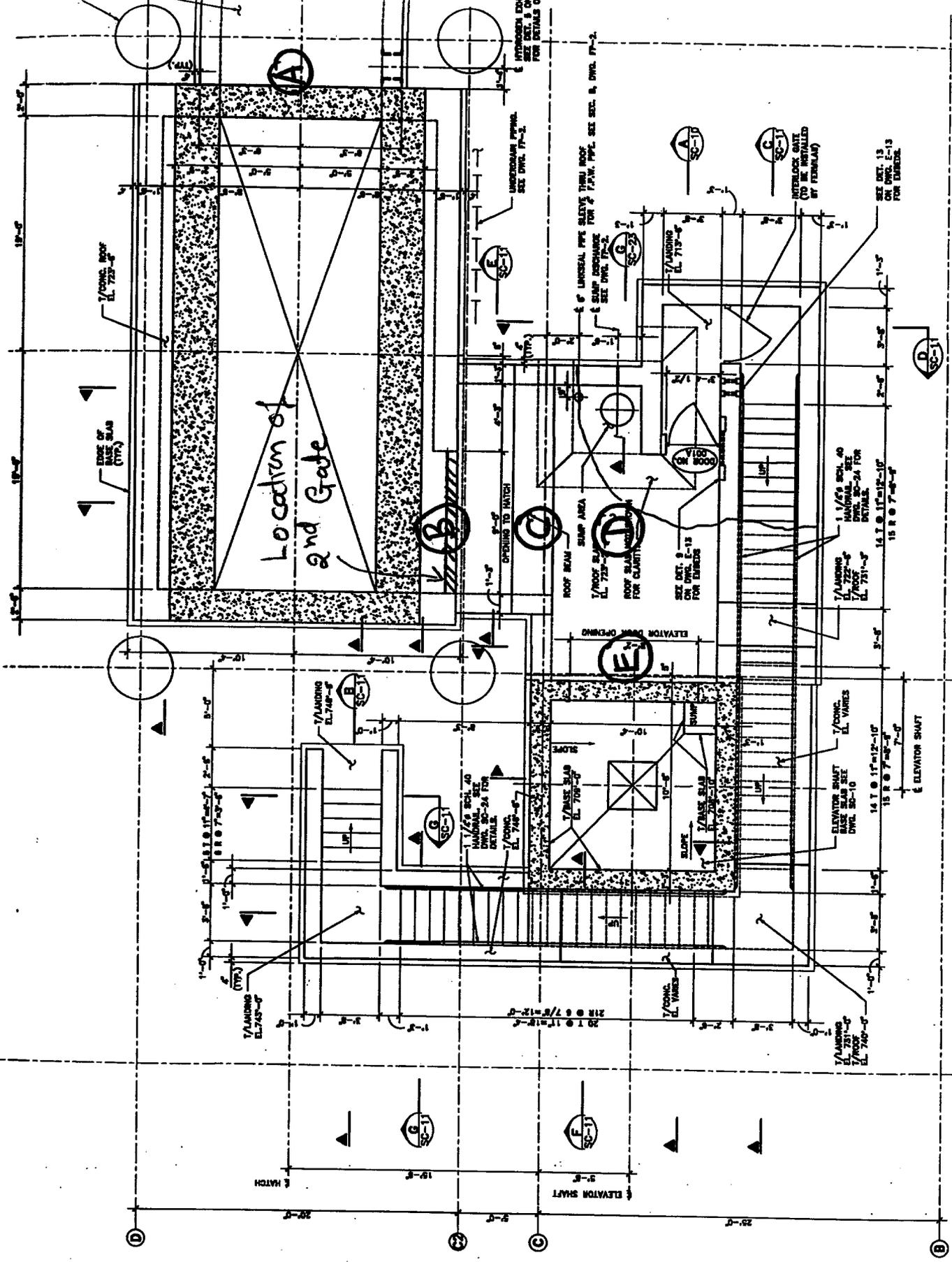
5.7×10^{16} @ 8 GeV per accident
 1.0×10^{19} @ 8 GeV per year - operational loss (= 1.7×10^{15} @ 8 GeV per hour)

The dose rates estimated using EXIT2A code are tabulated below.

Estimated Radiation Dose near MI 8 Service Building

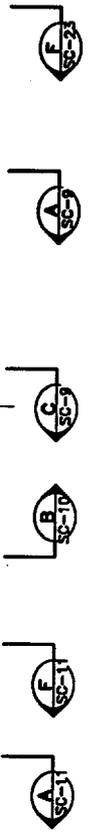
Location	Radiation Dose	
	Normal Beam loss (mrem/ hr)	Accidental Beam loss (mrem/ acci-dent)
Bottom of the hatch North entrance -A	5.4	182
With 1.5 ft Concrete shielding on the Hatch	0.069	2.3
Below the hatch East entrance - B	0.25	8.4
Location - C	0.062	2.1
Location - D	0.042	1.4
Near the elevator - E	<0.025	<0.1
In the Service Building (top of the exit stairs)	<0.025	<0.1

Thus the bottom of the hatch can be treated as a MIMIMAL occupancy region with signs "Radiation Area" with a fencing to define the perimeters. The above table suggests that we can install an interlocked gate at location B with appropriate posting. Signs "Radiation Area" need to be posted on the entrance door of stair case as well as the elevator door, defining the perimeters of minimal occupancy area.



Location of
2nd Gate

MI-8 BLDG. EQUIPMENT ACCESS HATCH & STAIR PLAN
1/4" BASE SLAB EL. 719'-0" (TYP. U.S.A.)



1.
2.
3.