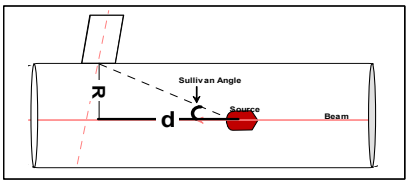
	A	B	C	D	E	F	G	H	I
1	**Title:**	Mucool Ventilation Supply Penetration of 14-inch diameter; note small angle to beam direction							
2	**Description:**	Dose on berm due to losses in experiment hall at 3.54E17 protons per hour.							
3	**Originated:**	W. Higgins 3 Mar 2010							
4	**Checked:**								
5	**Reviewed:**								
6	**Approved:**								
7									
8	**Ep=**	**0.4**	GeV (Kinetic Energy)						
9	**Np=**	**1.60E+13**	Protons per pulse						
10	**fp=**	**2.21E+04**	beam pulses per hour						
11	**R=**	**8**	ft						
12	**d=**	**11.50**	ft	The Off-axis distance					
13	**Θ_{source} =**	**11.38**	degrees (0 - 180 degrees)						
14	**Empirical Source=**	**0.00**	mrem/pulse						
15	**Source Term=**	**3.03E+02**	mrem/pulse		Sullivan Corr.= 4.75			Centerline of pen	750.5
16	**Number of Legs**	**4**			3.54E+17 protons per hour			Beam elevation	742.5
17						Theta		Collinearity	
18	**Leg 1 Area=**	1.115319934	ft^2		**Leg 1 Angle=**	**0**	degrees	1	
19	**Leg 2 Area=**	1.115319934	ft^2		**Leg 2 Angle=**	**90**	degrees	2	
20	**Leg 3 Area=**	1.115319934	ft^2		**Leg 3 Angle=**	**45**	degrees	3	
21	**Leg 4 Area=**	1.115319934	ft^2		**Leg 4 Angle=**	**90**	degrees	4	
22									
23									
24									
25									
26	**Leg 1 Length=**	7.6	ft						
27	**Leg 2 Length=**	9	ft						
28	**Leg 3 Length=**	11.5	ft						
29	**Leg 4 Length=**	6.7	ft						
30									
31									
32									
33									
34	**Leg 1 ("Units")=**	7.2							
35	**Leg 2 ("Units")=**	8.5							
36	**Leg 3 ("Units")=**	10.9							
37	**Leg 4 ("Units")=**	6.3							
38									
39									
40									
41									
42		**Attenuation**							
43	**Leg 1**	2.65E-02							
44	**Leg 2**	3.58E-04							
45	**Leg 3**	1.68E-04							
46	**Leg 4**	1.13E-03							
47									
48									
49									
50									
51		**Attenuation Factors**							
52	**Leg 1**	2.65E-02							
53	**Leg 2**	3.58E-04							
54	**Leg 3**	2.87E-04							
55	**Leg 4**	1.13E-03							
56									
57									
58									
59	**Net Attenuation=**	3.08E-12							
60									
61									
62		**D.E. After Leg**		**D.E. After Leg**					
63		**(mrem/pulse)**		**(mrem/hr)**					
64	**Leg 1**	**8.03E+00**		1.78E+05					
65	**Leg 2**	**2.88E-03**		6.37E+01					
66	**Leg 3**	**8.26E-07**		1.83E-02					
67	**Leg 4**	**9.32E-10**		2.06E-05					
68									
69									
70									
71									



Notes: Worst-case Sullivan angle presumes loss is 71 feet upstream at beam entrance to MTA hall.