

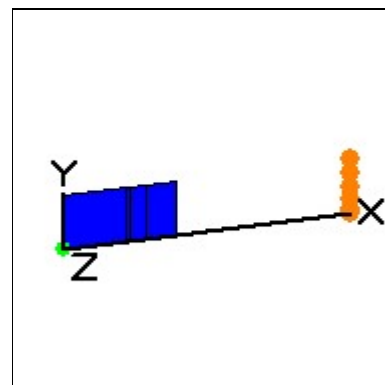
**MicroShield 7.02**  
**Dominion (07-MSD-7.02-1318)**

Date	By	Checked

Filename	Run Date	Run Time	Duration
synthAir.ms7	November 11, 2022	7:02:36 PM	00:00:00

Project Info	
Case Title	synthetic benchmark
Description	Case 1
Geometry	1 - Point

Dose Points			
A	X	Y	Z
#1	426.72 cm (14 ft 0.0 in)	0.0 cm (0.0 in)	0.0 cm (0.0 in)
#2	426.72 cm (14 ft 0.0 in)	6.0 cm (2.4 in)	0.0 cm (0.0 in)
#3	426.72 cm (14 ft 0.0 in)	20.0 cm (7.9 in)	0.0 cm (0.0 in)
#4	426.72 cm (14 ft 0.0 in)	40.0 cm (1 ft 3.7 in)	0.0 cm (0.0 in)
#5	426.72 cm (14 ft 0.0 in)	60.0 cm (1 ft 11.6 in)	0.0 cm (0.0 in)
#6	426.72 cm (14 ft 0.0 in)	80.7 cm (2 ft 7.8 in)	0.0 cm (0.0 in)



Shields			
Shield N	Dimension	Material	Density
Shield 1	91.44 cm	Air	0.00122
Shield 2	7.62 cm	Iron	7.874
Shield 3	22.86 cm	Air	0.00122
Shield 4	45.72 cm	Concrete	2.34
Air Gap		Air	0.00122

**Source Input: Grouping Method - Standard Indices**

Number of Groups: 25

Lower Energy Cutoff: 0.015

Photons < 0.015: Excluded

Library: Grove

Nuclide	Ci	Bq
Ba-137m	1.4190e-004	5.2503e+006
Co-58	2.2500e-005	8.3250e+005
Co-60	3.2400e-005	1.1988e+006
Cs-137	1.5000e-004	5.5500e+006
Mn-54	1.2500e-005	4.6250e+005
Sb-125	1.1300e-005	4.1810e+005

**Buildup: The material reference is Shield 4**  
**Integration Parameters**

**Results - Dose Point # 1 - (426.72,0,0) cm**

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec	Fluence Rate MeV/cm <sup>2</sup> /sec	Exposure Rate mR/hr	Exposure Rate mR/hr
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		No Buildup	With Buildup	No Buildup	With Buildup
0.03	4.971e+05	1.128e-262	1.102e-28	1.118e-264	1.092e-30
0.04	9.039e+04	1.317e-120	5.314e-29	5.826e-123	2.350e-31
0.1	1.091e+03	6.545e-22	1.329e-19	1.001e-24	2.033e-22
0.15	1.049e+03	3.582e-16	9.313e-14	5.899e-19	1.534e-16
0.2	3.173e+04	1.028e-12	2.477e-10	1.814e-15	4.372e-13
0.3	1.744e+03	3.844e-12	5.977e-10	7.291e-15	1.134e-12
0.4	1.309e+05	3.133e-09	3.151e-07	6.104e-12	6.139e-10
0.5	2.919e+05	3.751e-08	2.610e-06	7.362e-11	5.124e-09
0.6	4.875e+06	2.280e-06	1.165e-04	4.450e-09	2.273e-07
0.8	1.296e+06	4.161e-06	1.309e-04	7.914e-09	2.490e-07
1.0	1.199e+06	1.569e-05	3.441e-04	2.893e-08	6.343e-07
1.5	1.203e+06	1.621e-04	1.948e-03	2.727e-07	3.277e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.843e-04</b>	<b>2.542e-03</b>	<b>3.141e-07</b>	<b>4.393e-06</b>

### Results - Dose Point # 2 - (426.72,6,0) cm

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.03	4.971e+05	1.063e-262	1.102e-28	1.053e-264	1.092e-30
0.04	9.039e+04	1.283e-120	5.313e-29	5.672e-123	2.350e-31
0.1	1.091e+03	6.519e-22	1.324e-19	9.973e-25	2.025e-22
0.15	1.049e+03	3.573e-16	9.289e-14	5.883e-19	1.530e-16
0.2	3.173e+04	1.025e-12	2.472e-10	1.809e-15	4.362e-13
0.3	1.744e+03	3.836e-12	5.967e-10	7.277e-15	1.132e-12
0.4	1.309e+05	3.127e-09	3.146e-07	6.094e-12	6.130e-10
0.5	2.919e+05	3.744e-08	2.607e-06	7.350e-11	5.116e-09
0.6	4.875e+06	2.276e-06	1.163e-04	4.443e-09	2.270e-07
0.8	1.296e+06	4.155e-06	1.308e-04	7.903e-09	2.488e-07
1.0	1.199e+06	1.567e-05	3.437e-04	2.889e-08	6.336e-07
1.5	1.203e+06	1.619e-04	1.946e-03	2.724e-07	3.274e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.841e-04</b>	<b>2.540e-03</b>	<b>3.138e-07</b>	<b>4.389e-06</b>

### Results - Dose Point # 3 - (426.72,20,0) cm

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.03	4.971e+05	5.837e-263	1.100e-28	5.785e-265	1.090e-30
0.04	9.039e+04	9.778e-121	5.303e-29	4.324e-123	2.345e-31
0.1	1.091e+03	6.258e-22	1.273e-19	9.574e-25	1.948e-22
0.15	1.049e+03	3.474e-16	9.052e-14	5.721e-19	1.491e-16
0.2	3.173e+04	1.001e-12	2.419e-10	1.767e-15	4.270e-13
0.3	1.744e+03	3.760e-12	5.862e-10	7.133e-15	1.112e-12
0.4	1.309e+05	3.072e-09	3.097e-07	5.986e-12	6.033e-10
0.5	2.919e+05	3.684e-08	2.569e-06	7.231e-11	5.043e-09
0.6	4.875e+06	2.242e-06	1.148e-04	4.376e-09	2.240e-07
0.8	1.296e+06	4.099e-06	1.292e-04	7.796e-09	2.458e-07

1.0	1.199e+06	1.548e-05	3.400e-04	2.853e-08	6.267e-07
1.5	1.203e+06	1.602e-04	1.928e-03	2.696e-07	3.244e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.821e-04</b>	<b>2.515e-03</b>	<b>3.104e-07</b>	<b>4.346e-06</b>

**Results - Dose Point # 4 - (426.72,40,0) cm**

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.03	4.971e+05	8.123e-264	1.092e-28	8.051e-266	1.083e-30
0.04	9.039e+04	4.006e-121	5.268e-29	1.772e-123	2.330e-31
0.1	1.091e+03	5.473e-22	1.120e-19	8.373e-25	1.713e-22
0.15	1.049e+03	3.169e-16	8.314e-14	5.218e-19	1.369e-16
0.2	3.173e+04	9.261e-13	2.254e-10	1.635e-15	3.978e-13
0.3	1.744e+03	3.522e-12	5.530e-10	6.682e-15	1.049e-12
0.4	1.309e+05	2.898e-09	2.940e-07	5.646e-12	5.728e-10
0.5	2.919e+05	3.491e-08	2.450e-06	6.853e-11	4.808e-09
0.6	4.875e+06	2.132e-06	1.098e-04	4.162e-09	2.143e-07
0.8	1.296e+06	3.920e-06	1.242e-04	7.456e-09	2.362e-07
1.0	1.199e+06	1.486e-05	3.279e-04	2.739e-08	6.044e-07
1.5	1.203e+06	1.548e-04	1.870e-03	2.605e-07	3.146e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.758e-04</b>	<b>2.434e-03</b>	<b>2.996e-07</b>	<b>4.206e-06</b>

**Results - Dose Point # 5 - (426.72,60,0) cm**

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.03	4.971e+05	3.080e-265	1.081e-28	3.052e-267	1.071e-30
0.04	9.039e+04	9.110e-122	5.211e-29	4.029e-124	2.305e-31
0.1	1.091e+03	4.381e-22	9.049e-20	6.702e-25	1.384e-22
0.15	1.049e+03	2.721e-16	7.219e-14	4.480e-19	1.189e-16
0.2	3.173e+04	8.139e-13	2.005e-10	1.436e-15	3.538e-13
0.3	1.744e+03	3.160e-12	5.020e-10	5.995e-15	9.523e-13
0.4	1.309e+05	2.630e-09	2.697e-07	5.124e-12	5.255e-10
0.5	2.919e+05	3.194e-08	2.263e-06	6.269e-11	4.443e-09
0.6	4.875e+06	1.963e-06	1.020e-04	3.831e-09	1.991e-07
0.8	1.296e+06	3.640e-06	1.163e-04	6.923e-09	2.212e-07
1.0	1.199e+06	1.389e-05	3.088e-04	2.560e-08	5.693e-07
1.5	1.203e+06	1.462e-04	1.777e-03	2.460e-07	2.990e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.657e-04</b>	<b>2.307e-03</b>	<b>2.824e-07</b>	<b>3.985e-06</b>

**Results - Dose Point # 6 - (426.72,80.7,0) cm**

Energy (MeV)	Activity (Photons/sec)	Fluence Rate MeV/cm <sup>2</sup> /sec No Buildup	Fluence Rate MeV/cm <sup>2</sup> /sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.03	4.971e+05	2.708e-267	1.064e-28	2.683e-269	1.055e-30
0.04	9.039e+04	1.069e-122	5.131e-29	4.730e-125	2.269e-31
0.1	1.091e+03	3.175e-22	6.649e-20	4.858e-25	1.017e-22

0.15	1.049e+03	2.182e-16	5.886e-14	3.594e-19	9.692e-17
0.2	3.173e+04	6.751e-13	1.692e-10	1.192e-15	2.987e-13
0.3	1.744e+03	2.702e-12	4.365e-10	5.125e-15	8.279e-13
0.4	1.309e+05	2.286e-09	2.381e-07	4.454e-12	4.638e-10
0.5	2.919e+05	2.808e-08	2.019e-06	5.512e-11	3.963e-09
0.6	4.875e+06	1.741e-06	9.169e-05	3.398e-09	1.790e-07
0.8	1.296e+06	3.270e-06	1.058e-04	6.220e-09	2.012e-07
1.0	1.199e+06	1.260e-05	2.832e-04	2.322e-08	5.220e-07
1.5	1.203e+06	1.346e-04	1.652e-03	2.265e-07	2.779e-06
<b>Totals</b>	<b>9.619e+06</b>	<b>1.523e-04</b>	<b>2.135e-03</b>	<b>2.594e-07</b>	<b>3.685e-06</b>