

## Additional Appendices

These are appendices to augment Finklea 2014<sup>1</sup>. These appendices account for ingrowth of specific radionuclides over a 1000 year period. The nuclides along with their progenies are should in Table 1. Finklea 2014 highlights the methodology behind the calculation of the room air kerma as well as the derivation of the room ratios. Room factors were calculated for 5 room sizes; a) 10 x 10 x 10, b) 50 x 50 x 10, c) 100 x100 x10, d) 200 x 200 x 20 and 400 x 400 x 40 ft for photons of energies ranging between 10 keV and 10 MeV. Monoenergetic photons were used in the original room factor calculations. From the monoenergetic room factor, radionuclide specific factors were derived using interpolation methods. The relative radionuclide specific room factor was computed as:

$$R = \frac{\sum_{i=1}^n Y(E_i)R(E_i)D_p(h, E_i)}{\sum_{i=1}^n Y(E_i)D_p(h, E_i)}$$

where  $Y(E_i)$  is the yield of photons of energy  $E_i$  in the decay of the radionuclide (ICRP 107),  $R(E_i)$  is the room factor for the room and location of interest at energy  $E_i$  and  $D_p$  is the dose rate for an infinite planar source emitting photons of energy  $E_i$  with the same source thickness as that in the room. Radionuclides and their respective photon emissions are provided in ICRP 107. It is recommended that an applicable dose rate coefficient for a room with surface or volume contamination be approximated by multiplying the external dose coefficients of FGR 12 by the room factor provided in the following tables. This will yield a conservative estimate of the dose rate as well as relative risk.

Material compositions are provided in section 3.3 of Finklea 2014. The materials are adobe mud brick, concrete, drywall, glass, wood and two composites. Composite one is made of a mixture of drywall, concrete, wood and glass. Composite two is made of a mixture of wood, drywall, and concrete. The specific contributions of each material to the composite is explained in the materials section.

In these appendixes, Room Factors are presented for:

**Adobe.....A**

**Glass.....D**

**Concrete.....B**

**Wood.....E**

**Drywall.....C**

**Composite 1.....F**

**Composite 2.....G**

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<sup>1</sup> Finklea, L. *Room Radiation Dose Coefficients for External Exposure*. Master's Thesis, Georgia Institute of Technology, 2014.

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## Decay Chain for Plus E Radionuclides over 1000 year Ingrowth

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| Ac-223+E       | 2.10m                         |                   |           |
| 2              | Fr-219                        | 2.0E-2s           | 9.90E-01  |
| 3              | At-215                        | 1.00E-4s          | 9.90E-01  |
| Ac-225+E       | 10.0d                         |                   |           |
| 2              | Fr-221                        | 4.9m              | 1.00E+00  |
| 3              | At-217                        | 3.23E-2s          | 1.00E+00  |
| 4              | Bi-213                        | 45.59m            | 1.00E+00  |
| 5              | Po-213                        | 4.2E-6s           | 9.79E-01  |
| 6              | Tl-209                        | 2.161m            | 2.09E-02  |
| Ac-227+E       | 21.772y                       |                   |           |
| 2              | Th-227                        | 18.68d            | 9.86E-01  |
| 3              | Fr-223                        | 22.00m            | 1.38E-02  |
| 4              | Ra-223                        | 11.43d            | 1.00E+00  |
| 5              | Rn-219                        | 3.96s             | 1.00E+00  |
| 6              | At-219                        | 56s               | 8.28E-07  |
| 7              | Bi-215                        | 7.6m              | 8.03E-07  |
| 8              | Po-215                        | 1.781E-3s         | 1.00E+00  |
| 9              | Pb-211                        | 36.1m             | 1.00E+00  |
| 10             | Bi-211                        | 2.14m             | 1.00E+00  |
| 11             | Tl-207                        | 4.77m             | 9.97E-01  |
| 12             | Po-211                        | 0.516s            | 2.76E-03  |
| Ag-108m+E      | 418y                          |                   |           |
| 2              | Ag-108                        | 2.37m             | 8.70E-02  |
| Ag-110m+E      | 249.76d                       |                   |           |
| 2              | Ag-110                        | 24.6s             | 1.36E-02  |
| Am-242m+E      | 141y                          |                   |           |
| 2              | Am-242                        | 16.02h            | 9.96E-01  |
| 3              | Np-238                        | 2.117d            | 4.50E-03  |
| 4              | Cm-242                        | 162.8d            | 8.23E-01  |
| Am-243+E       | 7.37E+3y                      |                   |           |
| 2              | Np-239                        | 2.3565d           | 1.00E+00  |
| Ar-42+E        | 32.9y                         |                   |           |
| 2              | K-42                          | 12.360h           | 1.00E+00  |
| At-211+E       | 7.214h                        |                   |           |
| 2              | Po-211                        | 0.516s            | 5.82E-01  |
| Ba-128+E       | 2.43d                         |                   |           |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 2              | Cs-128                        | 3.640m            | 1.00E+00  |
| Bi-210m+E      | 3.04E+6y                      |                   |           |
| 2              | Tl-206                        | 4.200m            | 1.00E+00  |
| Bi-212+E       | 60.55m                        |                   |           |
| 2              | Po-212                        | 2.99E-7s          | 6.41E-01  |
| Bi-213+E       | 45.59m                        |                   |           |
| 2              | Po-213                        | 4.2E-6s           | 9.79E-01  |
| Bi-214+E       | 19.9m                         |                   |           |
| 2              | Po-214                        | 1.643E-4s         | 1.00E+00  |
| Bi-215+E       | 7.6m                          |                   |           |
| 2              | Po-215                        | 1.781E-3s         | 1.00E+00  |
| Bi-216+E       | 2.17m                         |                   |           |
| 2              | Po-216                        | 0.145s            | 1.00E+00  |
| Cd-118+E       | 50.3m                         |                   |           |
| 2              | In-118                        | 5.0s              | 1.00E+00  |
| Ce-134+E       | 3.16d                         |                   |           |
| 2              | La-134                        | 6.45m             | 1.00E+00  |
| Ce-144+E       | 284.91d                       |                   |           |
| 2              | Pr-144m                       | 7.2m              | 9.77E-03  |
| 3              | Pr-144                        | 17.28m            | 1.00E+00  |
| Cl-34m+E       | 32.00m                        |                   |           |
| 2              | Cl-34                         | 1.5264s           | 4.46E-01  |
| Cm-245+E       | 8.5E+3y                       |                   |           |
| 2              | Pu-241                        | 14.35y            | 1.00E+00  |
| Cm-247+E       | 1.56E+7y                      |                   |           |
| 2              | Pu-243                        | 4.956h            | 1.00E+00  |
| Cm-250+E       | 8300y                         |                   |           |
| 2              | Pu-246                        | 10.84d            | 1.80E-01  |
| 3              | Bk-250                        | 3.212h            | 8.00E-02  |
| 4              | Am-246m                       | 25.0m             | 1.80E-01  |
| 5              | Cf-250                        | 13.08y            | 8.00E-02  |
| Cs-137+E       | 30.1671y                      |                   |           |
| 2              | Ba-137m                       | 2.552m            | 9.44E-01  |
| Es-254+E       | 275.7d                        |                   |           |
| 2              | Bk-250                        | 3.212h            | 1.00E+00  |
| 3              | Fm-254                        | 3.240h            | 1.74E-06  |
| Fe-60+E        | 1.5E+6y                       |                   |           |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 2              | Co-60m                        | 10.467m           | 1.00E+00  |
| 3              | Co-60                         | 5.2713y           | 9.98E-01  |
| Fr-220+E       | 27.4s                         |                   |           |
| 2              | At-216                        | 3.00E-4s          | 9.97E-01  |
| 3              | Ra-220                        | 1.79E-2s          | 3.50E-03  |
| Fr-221+E       | 4.9m                          |                   |           |
| 2              | At-217                        | 3.23E-2s          | 1.00E+00  |
| Ge-68+E        | 270.95d                       |                   |           |
| 2              | Ga-68                         | 67.71m            | 1.00E+00  |
| Hf-172+E       | 1.87y                         |                   |           |
| 2              | Lu-172m                       | 3.7m              | 9.93E-01  |
| Hf-182+E       | 9E+6y                         |                   |           |
| 2              | Ta-182                        | 114.43d           | 1.00E+00  |
| Hg-193+E       | 3.80h                         |                   |           |
| 2              | Au-193m                       | 3.9s              | 3.54E-02  |
| Hg-194+E       | 440y                          |                   |           |
| 2              | Au-194                        | 38.02h            | 1.00E+00  |
| In-114m+E      | 49.51d                        |                   |           |
| 2              | In-114                        | 71.9s             | 9.68E-01  |
| Ir-192m+E      | 241y                          |                   |           |
| 2              | Ir-192                        | 73.827d           | 1.00E+00  |
| Kr-76+E        | 14.8h                         |                   |           |
| 2              | Br-76m                        | 1.31s             | 8.11E-03  |
| Mg-28+E        | 20.915h                       |                   |           |
| 2              | Al-28                         | 2.2414m           | 1.00E+00  |
| Nd-140+E       | 3.37d                         |                   |           |
| 2              | Pr-140                        | 3.39m             | 1.00E+00  |
| Ni-66+E        | 54.6h                         |                   |           |
| 2              | Cu-66                         | 5.120m            | 1.00E+00  |
| Np-235+E       | 396.1d                        |                   |           |
| 2              | U-235m                        | 26m               | 3.99E-03  |
| Np-237+E       | 2.144E+6y                     |                   |           |
| 2              | Pa-233                        | 26.967d           | 1.00E+00  |
| Os-194+E       | 6.0y                          |                   |           |
| 2              | Ir-194                        | 19.28h            | 1.00E+00  |
| Pa-231+E       | 3.276E+4y                     |                   |           |
| 2              | Ac-227                        | 21.772y           | 1.00E+00  |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 3              | Th-227                        | 18.68d            | 9.86E-01  |
| 4              | Fr-223                        | 22.00m            | 1.38E-02  |
| 5              | Ra-223                        | 11.43d            | 1.00E+00  |
| 6              | Rn-219                        | 3.96s             | 1.00E+00  |
| 7              | At-219                        | 56s               | 8.28E-07  |
| 8              | Bi-215                        | 7.6m              | 8.03E-07  |
| 9              | Po-215                        | 1.781E-3s         | 1.00E+00  |
| 10             | Pb-211                        | 36.1m             | 1.00E+00  |
| 11             | Bi-211                        | 2.14m             | 1.00E+00  |
| 12             | Tl-207                        | 4.77m             | 9.97E-01  |
| 13             | Po-211                        | 0.516s            | 2.76E-03  |
| Pb-202+E       | 5.25E+4y                      |                   |           |
| 2              | Tl-202                        | 12.23d            | 9.90E-01  |
| Pb-210+E       | 22.20y                        |                   |           |
| 2              | Bi-210                        | 5.013d            | 1.00E+00  |
| 3              | Hg-206                        | 8.15m             | 1.90E-08  |
| Pd-103+E       | 16.991d                       |                   |           |
| 2              | Rh-103m                       | 56.114m           | 9.99E-01  |
| Pt-202+E       | 44h                           |                   |           |
| 2              | Au-202                        | 28.8s             | 1.00E+00  |
| Pu-239+E       | 2.411E+4y                     |                   |           |
| 2              | U-235m                        | 26m               | 9.99E-01  |
| Pu-244+E       | 8.00E+7y                      |                   |           |
| 2              | U-240                         | 14.1h             | 9.99E-01  |
| 3              | Np-240m                       | 7.22m             | 9.99E-01  |
| 4              | Np-240                        | 61.9m             | 1.10E-03  |
| Pu-246+E       | 10.84d                        |                   |           |
| 2              | Am-246m                       | 25.0m             | 1.00E+00  |
| Ra-219+E       | 10ms                          |                   |           |
| 2              | Rn-215                        | 2.30us            | 1.00E+00  |
| Ra-221+E       | 28s                           |                   |           |
| 2              | Rn-217                        | 5.40E-4s          | 1.00E+00  |
| 3              | Po-213                        | 4.2E-6s           | 1.00E+00  |
| Ra-222+E       | 38.0s                         |                   |           |
| 2              | Rn-218                        | 3.5E-2s           | 1.00E+00  |
| 3              | Po-214                        | 1.643E-4s         | 1.00E+00  |
| Ra-223+E       | 11.43d                        |                   |           |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 2              | Rn-219                        | 3.96s             | 1.00E+00  |
| 3              | Po-215                        | 1.781E-3s         | 1.00E+00  |
| 4              | Pb-211                        | 36.1m             | 1.00E+00  |
| 5              | Bi-211                        | 2.14m             | 1.00E+00  |
| 6              | Tl-207                        | 4.77m             | 9.97E-01  |
| 7              | Po-211                        | 0.516s            | 2.76E-03  |
| Ra-224+E       | 3.66d                         |                   |           |
| 2              | Rn-220                        | 55.6s             | 1.00E+00  |
| 3              | Po-216                        | 0.145s            | 1.00E+00  |
| Ra-226+E       | 1600y                         |                   |           |
| 2              | Rn-222                        | 3.8235d           | 1.00E+00  |
| 3              | Po-218                        | 3.10m             | 1.00E+00  |
| 4              | Pb-214                        | 26.8m             | 1.00E+00  |
| 5              | At-218                        | 1.5s              | 2.00E-04  |
| 6              | Bi-214                        | 19.9m             | 1.00E+00  |
| 7              | Rn-218                        | 3.5E-2s           | 2.00E-07  |
| 8              | Po-214                        | 1.643E-4s         | 1.00E+00  |
| 9              | Tl-210                        | 1.30m             | 2.10E-04  |
| Ra-228+E       | 5.75y                         |                   |           |
| 2              | Ac-228                        | 6.15h             | 1.00E+00  |
| Rb-81+E        | 4.576h                        |                   |           |
| 2              | Kr-81m                        | 13.10s            | 9.57E-01  |
| Rb-83+E        | 86.2d                         |                   |           |
| 2              | Kr-83m                        | 1.83h             | 7.43E-01  |
| Re-186m+E      | 2.00E+5y                      |                   |           |
| 2              | Re-186                        | 3.7183d           | 1.00E+00  |
| Rn-219+E       | 3.96s                         |                   |           |
| 2              | Po-215                        | 1.781E-3s         | 1.00E+00  |
| Rn-220+E       | 55.6s                         |                   |           |
| 2              | Po-216                        | 0.145s            | 1.00E+00  |
| Rn-222+E       | 3.8235d                       |                   |           |
| 2              | Po-218                        | 3.10m             | 1.00E+00  |
| Ru-103+E       | 39.26d                        |                   |           |
| 2              | Rh-103m                       | 56.114m           | 9.88E-01  |
| Ru-106+E       | 373.59d                       |                   |           |
| 2              | Rh-106                        | 29.80s            | 1.00E+00  |
| Si-32+E        | 132y                          |                   |           |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 2              | P-32                          | 14.263d           | 1.00E+00  |
| Sn-113+E       | 115.09d                       |                   |           |
| 2              | In-113m                       | 1.6579h           | 1.00E+00  |
| Sn-121m+E      | 43.9y                         |                   |           |
| 2              | Sn-121                        | 27.03h            | 7.76E-01  |
| Sn-126+E       | 2.30E+5y                      |                   |           |
| 2              | Sb-126m                       | 19.15m            | 1.00E+00  |
| 3              | Sb-126                        | 12.35d            | 1.40E-01  |
| Sr-82+E        | 25.36d                        |                   |           |
| 2              | Rb-82                         | 1.273m            | 1.00E+00  |
| Sr-90+E        | 28.79y                        |                   |           |
| 2              | Y-90                          | 64.10h            | 1.00E+00  |
| Te-118+E       | 6.00d                         |                   |           |
| 2              | Sb-118                        | 3.6m              | 1.00E+00  |
| Te-129m+E      | 33.6d                         |                   |           |
| 2              | Te-129                        | 69.6m             | 6.30E-01  |
| Th-229+E       | 7.34E+3y                      |                   |           |
| 2              | Ra-225                        | 14.9d             | 1.00E+00  |
| 3              | Ac-225                        | 10.0d             | 1.00E+00  |
| 4              | Fr-221                        | 4.9m              | 1.00E+00  |
| 5              | At-217                        | 3.23E-2s          | 1.00E+00  |
| 6              | Bi-213                        | 45.59m            | 1.00E+00  |
| 7              | Po-213                        | 4.2E-6s           | 9.79E-01  |
| 8              | Tl-209                        | 2.161m            | 2.09E-02  |
| 9              | Pb-209                        | 3.253h            | 1.00E+00  |
| Th-232+E       | 1.405E10y                     |                   |           |
| 2              | Ra-228                        | 5.75y             | 1.00E+00  |
| 3              | Ac-228                        | 6.15h             | 1.00E+00  |
| 4              | Th-228                        | 1.9116y           | 1.00E+00  |
| 5              | Ra-224                        | 3.66d             | 1.00E+00  |
| 6              | Rn-220                        | 55.6s             | 1.00E+00  |
| 7              | Po-216                        | 0.145s            | 1.00E+00  |
| 8              | Pb-212                        | 10.64h            | 1.00E+00  |
| 9              | Bi-212                        | 60.55m            | 1.00E+00  |
| 10             | Po-212                        | 2.99E-7s          | 6.41E-01  |
| 11             | Tl-208                        | 3.053m            | 3.59E-01  |
| Th-234+E       | 24.10d                        |                   |           |

| Parent Nuclide | Half Life/<br>Progeny Nuclide | Progeny Half Life | Intensity |
|----------------|-------------------------------|-------------------|-----------|
| 2              | Pa-234m                       | 1.17m             | 9.97E-01  |
| Ti-44+E        | 60.0y                         |                   |           |
| 2              | Sc-44                         | 3.97h             | 1.00E+00  |
| U-228+E        | 9.1m                          |                   |           |
| 2              | Th-224                        | 1.05s             | 9.75E-01  |
| 3              | Ra-220                        | 1.79E-2s          | 9.75E-01  |
| 4              | Rn-216                        | 4.5E-5s           | 9.75E-01  |
| 5              | Po-212                        | 2.99E-7s          | 9.75E-01  |
| U-230+E        | 20.8d                         |                   |           |
| 2              | Th-226                        | 30.57m            | 1.00E+00  |
| 3              | Ra-222                        | 38.0s             | 1.00E+00  |
| 4              | Rn-218                        | 3.5E-2s           | 1.00E+00  |
| 5              | Po-214                        | 1.643E-4s         | 1.00E+00  |
| U-235+E        | 7.04E+8y                      |                   |           |
| 2              | Th-231                        | 25.52h            | 1.00E+00  |
| U-238+E        | 4.468E+9y                     |                   |           |
| 2              | Th-234                        | 24.10d            | 1.00E+00  |
| 3              | Pa-234m                       | 1.17m             | 9.97E-01  |
| 4              | Pa-234                        | 6.70h             | 4.16E-03  |
| W-178+E        | 21.6d                         |                   |           |
| 2              | Ta-178                        | 9.31m             | 1.00E+00  |
| Xe-122+E       | 20.1h                         |                   |           |
| 2              | I-122                         | 3.63m             | 1.00E+00  |
| Zr-93+E        | 1.53E+6y                      |                   |           |
| 2              | Nb-93m                        | 16.13y            | 9.75E-01  |

## Appendix A

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 1: Adobe Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5911  | 0.3394  | 0.5112  | 0.5992  | 0.4850  | 0.3382  | 0.5562  | 0.6302  |
| Ac-225+E  | 1.5096  | 0.9691  | 1.3430  | 1.5280  | 1.4333  | 1.1444  | 1.5854  | 1.7013  |
| Ac-227+E  | 5.3561  | 3.3971  | 4.7469  | 5.4235  | 4.9733  | 3.9087  | 5.5249  | 5.9808  |
| Ag-108m+E | 3.6153  | 2.5833  | 3.3189  | 3.6431  | 4.1518  | 3.7419  | 4.4145  | 4.4218  |
| Ag-110m+E | 2.9653  | 2.1387  | 2.7379  | 2.9875  | 3.5666  | 3.2659  | 3.7759  | 3.7204  |
| Am-242m+E | 2.0173  | 1.2053  | 1.7610  | 2.0371  | 1.7419  | 1.2897  | 1.9620  | 2.1646  |
| Am-243+E  | 4.6948  | 3.1140  | 4.2050  | 4.7499  | 4.5817  | 3.7722  | 5.0242  | 5.3360  |
| Ar-42+E   | 0.1679  | 0.1192  | 0.1545  | 0.1689  | 0.2039  | 0.1865  | 0.2154  | 0.2111  |
| At-211+E  | 1.1286  | 0.7119  | 0.9974  | 1.1438  | 1.0271  | 0.7965  | 1.1452  | 1.2497  |
| Ba-128+E  | 1.9320  | 1.3120  | 1.7450  | 1.9429  | 2.0805  | 1.8226  | 2.2234  | 2.2697  |
| Bi-210m+E | 1.2417  | 0.8852  | 1.1368  | 1.2588  | 1.3565  | 1.1942  | 1.4606  | 1.5001  |
| Bi-212+E  | 0.4039  | 0.2312  | 0.3497  | 0.4093  | 0.3440  | 0.2453  | 0.3921  | 0.4384  |
| Bi-213+E  | 0.3698  | 0.2627  | 0.3386  | 0.3741  | 0.4108  | 0.3637  | 0.4407  | 0.4493  |
| Bi-214+E  | 1.2612  | 0.9023  | 1.1610  | 1.2703  | 1.5066  | 1.3739  | 1.5959  | 1.5759  |
| Bi-215+E  | 0.9958  | 0.6932  | 0.9054  | 1.0083  | 1.0584  | 0.9154  | 1.1443  | 1.1838  |
| Bi-216+E  | 1.4820  | 1.0757  | 1.3675  | 1.4973  | 1.7268  | 1.5655  | 1.8367  | 1.8382  |
| Cd-118+E  | 0.0620  | 0.0443  | 0.0570  | 0.0624  | 0.0750  | 0.0691  | 0.0792  | 0.0779  |
| Ce-134+E  | 1.6117  | 1.0600  | 1.4417  | 1.6200  | 1.6757  | 1.4375  | 1.8012  | 1.8553  |
| Ce-144+E  | 0.3129  | 0.2239  | 0.2864  | 0.3159  | 0.3447  | 0.3076  | 0.3700  | 0.3751  |
| Cl-34m+E  | 1.1222  | 0.8250  | 1.0384  | 1.1321  | 1.3369  | 1.2263  | 1.4192  | 1.4014  |
| Cm-245+E  | 2.7031  | 1.7687  | 2.4128  | 2.7329  | 2.5779  | 2.0886  | 2.8401  | 3.0373  |
| Cm-247+E  | 1.5432  | 1.0851  | 1.4069  | 1.5609  | 1.6644  | 1.4561  | 1.7922  | 1.8446  |
| Cm-250+E  | 14.9203 | 10.8405 | 13.7708 | 15.0534 | 17.6017 | 16.0596 | 18.6675 | 18.5500 |
| Cs-137+E  | 1.9997  | 1.4454  | 1.8472  | 2.0158  | 2.3799  | 2.1765  | 2.5337  | 2.4757  |
| Es-254+E  | 4.2338  | 2.5480  | 3.7101  | 4.2754  | 3.8342  | 2.9337  | 4.2844  | 4.6532  |
| Fe-60+E   | 2.7136  | 1.7280  | 2.4177  | 2.7408  | 2.8211  | 2.3630  | 3.0753  | 3.1992  |
| Fr-220+E  | 0.4953  | 0.2974  | 0.4327  | 0.5017  | 0.4245  | 0.3107  | 0.4803  | 0.5348  |
| Fr-221+E  | 0.2472  | 0.1731  | 0.2249  | 0.2507  | 0.2588  | 0.2229  | 0.2804  | 0.2913  |
| Ge-68+E   | 1.7512  | 0.8311  | 1.4531  | 1.7845  | 1.1725  | 0.6011  | 1.4376  | 1.7727  |
| Hf-172+E  | 4.5169  | 2.6531  | 3.9258  | 4.5900  | 3.9252  | 2.8833  | 4.4393  | 4.9692  |
| Hf-182+E  | 4.6589  | 3.1664  | 4.2095  | 4.7216  | 4.8917  | 4.1888  | 5.3081  | 5.5266  |
| Hg-193+E  | 3.9338  | 2.4844  | 3.4846  | 3.9889  | 3.7299  | 2.9590  | 4.1395  | 4.4636  |
| Hg-194+E  | 4.0717  | 2.5490  | 3.5996  | 4.1281  | 3.8449  | 3.0314  | 4.2749  | 4.6219  |
| In-114m+E | 0.8211  | 0.5642  | 0.7442  | 0.8260  | 0.8802  | 0.7696  | 0.9404  | 0.9656  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Ir-192m+E | 3.5236 | 2.3247 | 3.1604 | 3.5714 | 3.5631 | 2.9566 | 3.9062 | 4.1278 |
| Kr-76+E   | 3.5004 | 2.2087 | 3.1006 | 3.5429 | 3.2476 | 2.5352 | 3.6086 | 3.9119 |
| Mg-28+E   | 2.9374 | 2.0973 | 2.6992 | 2.9513 | 3.5024 | 3.2089 | 3.6933 | 3.6388 |
| Nd-140+E  | 1.6617 | 1.0912 | 1.4846 | 1.6720 | 1.7135 | 1.4628 | 1.8458 | 1.9097 |
| Ni-66+E   | 0.0907 | 0.0649 | 0.0837 | 0.0913 | 0.1097 | 0.1008 | 0.1159 | 0.1139 |
| Np-235+E  | 1.1921 | 0.6742 | 1.0274 | 1.2048 | 0.9518 | 0.6477 | 1.0943 | 1.2428 |
| Np-237+E  | 4.8905 | 3.0762 | 4.3241 | 4.9406 | 4.4786 | 3.4943 | 4.9761 | 5.3916 |
| Os-194+E  | 1.0177 | 0.5622 | 0.8728 | 1.0339 | 0.8230 | 0.5565 | 0.9523 | 1.0919 |
| Pa-231+E  | 7.5439 | 4.6546 | 6.6400 | 7.6350 | 6.7668 | 5.1625 | 7.5734 | 8.2903 |
| Pb-202+E  | 3.6773 | 2.2654 | 3.2364 | 3.7313 | 3.3691 | 2.5959 | 3.7709 | 4.1233 |
| Pb-210+E  | 0.9362 | 0.5009 | 0.7966 | 0.9492 | 0.6987 | 0.4325 | 0.8205 | 0.9632 |
| Pd-103+E  | 1.2997 | 0.8550 | 1.1617 | 1.3065 | 1.3106 | 1.1041 | 1.4183 | 1.4731 |
| Pt-202+E  | 0.2299 | 0.1659 | 0.2119 | 0.2320 | 0.2710 | 0.2469 | 0.2877 | 0.2867 |
| Pu-239+E  | 0.1993 | 0.1091 | 0.1705 | 0.2018 | 0.1543 | 0.1008 | 0.1793 | 0.2067 |
| Pu-244+E  | 2.5158 | 1.5387 | 2.2117 | 2.5399 | 2.2690 | 1.7365 | 2.5335 | 2.7517 |
| Pu-246+E  | 4.3694 | 2.9147 | 3.9282 | 4.4123 | 4.4448 | 3.7422 | 4.8352 | 5.0466 |
| Ra-219+E  | 0.9964 | 0.6928 | 0.9049 | 1.0086 | 1.0468 | 0.9004 | 1.1335 | 1.1789 |
| Ra-221+E  | 1.1389 | 0.6969 | 1.0002 | 1.1534 | 0.9981 | 0.7467 | 1.1243 | 1.2406 |
| Ra-222+E  | 0.0354 | 0.0259 | 0.0326 | 0.0357 | 0.0402 | 0.0362 | 0.0429 | 0.0435 |
| Ra-223+E  | 2.5578 | 1.7040 | 2.2957 | 2.5915 | 2.5321 | 2.0925 | 2.7764 | 2.9445 |
| Ra-224+E  | 1.1971 | 0.8755 | 1.1098 | 1.2054 | 1.4201 | 1.3082 | 1.5067 | 1.4755 |
| Ra-226+E  | 3.7315 | 2.6229 | 3.4165 | 3.7637 | 4.2045 | 3.7327 | 4.5063 | 4.5338 |
| Ra-228+E  | 3.3585 | 2.2676 | 3.0403 | 3.3818 | 3.5740 | 3.0702 | 3.8559 | 3.9443 |
| Rb-81+E   | 2.7620 | 1.8060 | 2.4696 | 2.7919 | 2.6317 | 2.1084 | 2.8999 | 3.0990 |
| Rb-83+E   | 2.9488 | 1.8052 | 2.5942 | 2.9786 | 2.6234 | 1.9713 | 2.9375 | 3.2139 |
| Re-186m+E | 3.0058 | 1.5693 | 2.5438 | 3.0589 | 2.2479 | 1.3830 | 2.6603 | 3.1442 |
| Rn-219+E  | 0.2404 | 0.1733 | 0.2209 | 0.2436 | 0.2670 | 0.2373 | 0.2864 | 0.2924 |
| Rn-220+E  | 1.1342 | 0.8303 | 1.0521 | 1.1416 | 1.3516 | 1.2479 | 1.4330 | 1.3999 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.1138 | 0.7944 | 1.0225 | 1.1250 | 1.2730 | 1.1426 | 1.3577 | 1.3648 |
| Ru-106+E  | 0.3175 | 0.2321 | 0.2939 | 0.3204 | 0.3793 | 0.3478 | 0.4017 | 0.3976 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.0815 | 1.4438 | 1.8919 | 2.0913 | 2.2783 | 2.0154 | 2.4230 | 2.4735 |
| Sn-121m+E | 0.3222 | 0.2004 | 0.2844 | 0.3241 | 0.3104 | 0.2513 | 0.3388 | 0.3616 |
| Sn-126+E  | 4.3517 | 3.1224 | 3.9984 | 4.3918 | 4.9961 | 4.5027 | 5.3176 | 5.3465 |
| Sr-82+E   | 1.6464 | 1.0098 | 1.4475 | 1.6573 | 1.4077 | 1.0318 | 1.5792 | 1.7377 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |
| Te-118+E  | 1.3695 | 0.9159 | 1.2320 | 1.3717 | 1.4496 | 1.2600 | 1.5426 | 1.5874 |
| Te-129m+E | 0.7708 | 0.4982 | 0.6874 | 0.7752 | 0.7816 | 0.6562 | 0.8449 | 0.8840 |
| Th-229+E  | 6.0833 | 3.7583 | 5.3541 | 6.1530 | 5.4491 | 4.1621 | 6.0935 | 6.6625 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-232+E       | 8.4514       | 5.7785       | 7.6724       | 8.5251       | 9.1117       | 7.8996       | 9.8250       | 10.0100      |
| Th-234+E       | 0.5026       | 0.3137       | 0.4435       | 0.5081       | 0.4543       | 0.3506       | 0.5064       | 0.5515       |
| Ti-44+E        | 3.3739       | 2.4458       | 3.0988       | 3.4138       | 3.8076       | 3.4325       | 4.0601       | 4.1087       |
| U-228+E        | 0.5921       | 0.3752       | 0.5246       | 0.5986       | 0.5445       | 0.4262       | 0.6054       | 0.6545       |
| U-230+E        | 0.7331       | 0.4399       | 0.6407       | 0.7406       | 0.6280       | 0.4613       | 0.7093       | 0.7851       |
| U-235+E        | 3.9726       | 2.5773       | 3.5425       | 4.0185       | 3.7727       | 3.0507       | 4.1559       | 4.4212       |
| U-238+E        | 1.4962       | 1.0484       | 1.3740       | 1.5168       | 1.6263       | 1.4347       | 1.7373       | 1.7869       |
| W-178+E        | 3.0722       | 1.8137       | 2.6730       | 3.1237       | 2.6825       | 1.9784       | 3.0312       | 3.3907       |
| Xe-122+E       | 1.7487       | 1.1911       | 1.5811       | 1.7559       | 1.8912       | 1.6617       | 2.0149       | 2.0552       |
| Zr-93+E        | 0.2419       | 0.1507       | 0.2135       | 0.2433       | 0.2190       | 0.1715       | 0.2429       | 0.2600       |

Table 2: Adobe Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.4848        | 0.3736        | 0.5877        | 0.6566        | 0.3451        | 0.3222        | 0.5689        | 0.6583        |
| Ac-225+E       | 1.5198        | 1.3302        | 1.7182        | 1.7851        | 1.2539        | 1.2564        | 1.7312        | 1.8472        |
| Ac-227+E       | 5.2194        | 4.4969        | 5.9556        | 6.2664        | 4.2221        | 4.1928        | 5.9395        | 6.4546        |
| Ag-108m+E      | 4.7112        | 4.5782        | 4.9311        | 4.7029        | 4.3715        | 4.6068        | 5.1785        | 4.9743        |
| Ag-110m+E      | 4.1635        | 4.1187        | 4.3167        | 4.0428        | 4.0559        | 4.3599        | 4.6624        | 4.3636        |
| Am-242m+E      | 1.7484        | 1.4047        | 2.0422        | 2.2405        | 1.2299        | 1.1534        | 1.9617        | 2.2224        |
| Am-243+E       | 4.8725        | 4.3576        | 5.4137        | 5.5821        | 4.0799        | 4.1045        | 5.4386        | 5.8360        |
| Ar-42+E        | 0.2400        | 0.2381        | 0.2471        | 0.2299        | 0.2351        | 0.2530        | 0.2700        | 0.2506        |
| At-211+E       | 1.0692        | 0.9082        | 1.2287        | 1.3026        | 0.8597        | 0.8447        | 1.2179        | 1.3660        |
| Ba-128+E       | 2.3077        | 2.1758        | 2.4660        | 2.4188        | 2.0573        | 2.1561        | 2.5217        | 2.5194        |
| Bi-210m+E      | 1.5187        | 1.4557        | 1.6410        | 1.5979        | 1.4131        | 1.4765        | 1.7005        | 1.7006        |
| Bi-212+E       | 0.3544        | 0.2833        | 0.4218        | 0.4612        | 0.2699        | 0.2618        | 0.4184        | 0.4667        |
| Bi-213+E       | 0.4637        | 0.4453        | 0.4952        | 0.4781        | 0.4335        | 0.4548        | 0.5219        | 0.5099        |
| Bi-214+E       | 1.7570        | 1.7335        | 1.8242        | 1.7100        | 1.7072        | 1.8304        | 1.9727        | 1.8477        |
| Bi-215+E       | 1.1737        | 1.1044        | 1.2738        | 1.2567        | 1.0692        | 1.1107        | 1.3169        | 1.3388        |
| Bi-216+E       | 1.9846        | 1.9450        | 2.0848        | 1.9738        | 1.9041        | 2.0201        | 2.2272        | 2.1096        |
| Cd-118+E       | 0.0880        | 0.0872        | 0.0911        | 0.0850        | 0.0860        | 0.0923        | 0.0989        | 0.0919        |
| Ce-134+E       | 1.8390        | 1.7001        | 1.9824        | 1.9793        | 1.6065        | 1.6813        | 2.0119        | 2.0602        |
| Ce-144+E       | 0.3851        | 0.3699        | 0.4092        | 0.3977        | 0.3580        | 0.3771        | 0.4264        | 0.4279        |
| Cl-34m+E       | 1.5481        | 1.5354        | 1.6097        | 1.5132        | 1.5089        | 1.6154        | 1.7397        | 1.6405        |
| Cm-245+E       | 2.7090        | 2.3779        | 3.0349        | 3.1695        | 2.1994        | 2.1899        | 3.0312        | 3.2803        |
| Cm-247+E       | 1.8477        | 1.7491        | 1.9883        | 1.9480        | 1.6792        | 1.7446        | 2.0626        | 2.0677        |
| Cm-250+E       | 20.3191       | 20.0254       | 21.2066       | 19.9973       | 19.5937       | 20.9225       | 22.7283       | 21.5611       |
| Cs-137+E       | 2.7606        | 2.7611        | 2.8765        | 2.7110        | 2.6730        | 2.8571        | 3.1016        | 2.9341        |
| Es-254+E       | 3.9828        | 3.3398        | 4.5676        | 4.8812        | 3.0476        | 2.9857        | 4.5078        | 4.9020        |
| Fe-60+E        | 3.1707        | 2.9249        | 3.4676        | 3.4545        | 2.8798        | 3.0077        | 3.6509        | 3.6347        |
| Fr-220+E       | 0.4305        | 0.3464        | 0.5087        | 0.5559        | 0.3212        | 0.3068        | 0.4972        | 0.5674        |
| Fr-221+E       | 0.2840        | 0.2664        | 0.3111        | 0.3078        | 0.2557        | 0.2646        | 0.3196        | 0.3296        |
| Ge-68+E        | 1.0867        | 0.6324        | 1.5049        | 1.8554        | 0.6120        | 0.4806        | 1.3987        | 1.7932        |
| Hf-172+E       | 4.0668        | 3.3587        | 4.7742        | 5.2187        | 3.2184        | 3.1713        | 4.7431        | 5.2492        |
| Hf-182+E       | 5.4338        | 5.1087        | 5.9170        | 5.8893        | 4.9715        | 5.1769        | 6.1501        | 6.2184        |
| Hg-193+E       | 3.9935        | 3.5193        | 4.5208        | 4.7060        | 3.3934        | 3.4280        | 4.5906        | 4.9024        |
| Hg-194+E       | 4.1192        | 3.6163        | 4.6722        | 4.8784        | 3.4933        | 3.5289        | 4.7505        | 5.0502        |
| In-114m+E      | 0.9646        | 0.9080        | 1.0289        | 1.0088        | 0.8369        | 0.8658        | 1.0408        | 1.0455        |
| Ir-192m+E      | 3.9123        | 3.5785        | 4.3366        | 4.3860        | 3.4814        | 3.5896        | 4.4748        | 4.5697        |
| Kr-76+E        | 3.4199        | 2.9427        | 3.9032        | 4.0919        | 2.7704        | 2.7654        | 3.9190        | 4.1990        |
| Mg-28+E        | 4.0602        | 4.0045        | 4.1999        | 3.9355        | 3.8921        | 4.1723        | 4.5001        | 4.2305        |
| Nd-140+E       | 1.8770        | 1.7299        | 2.0233        | 2.0267        | 1.6421        | 1.7230        | 2.0576        | 2.1321        |
| Ni-66+E        | 0.1285        | 0.1273        | 0.1332        | 0.1242        | 0.1255        | 0.1356        | 0.1445        | 0.1346        |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.9247  | 0.6835 | 1.1278  | 1.2837  | 0.5900 | 0.5249 | 1.0655  | 1.2551  |
| Np-237+E  | 4.6364  | 3.9333 | 5.2874  | 5.6193  | 3.5900 | 3.5172 | 5.2145  | 5.7169  |
| Os-194+E  | 0.8315  | 0.6353 | 1.0209  | 1.1469  | 0.6109 | 0.5788 | 0.9982  | 1.1477  |
| Pa-231+E  | 6.9927  | 5.8513 | 8.0925  | 8.6609  | 5.4233 | 5.2976 | 7.9832  | 8.8187  |
| Pb-202+E  | 3.5621  | 3.0558 | 4.1009  | 4.3341  | 2.9447 | 2.9318 | 4.1303  | 4.4759  |
| Pb-210+E  | 0.6676  | 0.4571 | 0.8514  | 0.9957  | 0.4114 | 0.3554 | 0.8043  | 0.9761  |
| Pd-103+E  | 1.3784  | 1.2467 | 1.4806  | 1.5052  | 1.0627 | 1.0439 | 1.4387  | 1.5095  |
| Pt-202+E  | 0.3137  | 0.3087 | 0.3283  | 0.3092  | 0.3031 | 0.3232 | 0.3527  | 0.3322  |
| Pu-239+E  | 0.1488  | 0.1063 | 0.1853  | 0.2141  | 0.0931 | 0.0814 | 0.1744  | 0.2087  |
| Pu-244+E  | 2.3389  | 1.9534 | 2.6829  | 2.8716  | 1.7637 | 1.7129 | 2.6376  | 2.8816  |
| Pu-246+E  | 4.8243  | 4.4100 | 5.2713  | 5.3256  | 4.1475 | 4.2560 | 5.3799  | 5.5533  |
| Ra-219+E  | 1.1528  | 1.0771 | 1.2527  | 1.2468  | 1.0389 | 1.0762 | 1.2924  | 1.3231  |
| Ra-221+E  | 1.0201  | 0.8379 | 1.1937  | 1.2927  | 0.7758 | 0.7497 | 1.1737  | 1.3146  |
| Ra-222+E  | 0.0455  | 0.0443 | 0.0483  | 0.0464  | 0.0432 | 0.0457 | 0.0508  | 0.0494  |
| Ra-223+E  | 2.7306  | 2.4651 | 3.0396  | 3.1002  | 2.3636 | 2.4035 | 3.0882  | 3.2671  |
| Ra-224+E  | 1.6445  | 1.6806 | 1.7215  | 1.5969  | 1.5920 | 1.6996 | 1.8530  | 1.8076  |
| Ra-226+E  | 4.8116  | 4.6460 | 5.1000  | 4.8477  | 4.5449 | 4.8032 | 5.4112  | 5.2374  |
| Ra-228+E  | 3.9784  | 3.7959 | 4.3010  | 4.2105  | 3.5734 | 3.7215 | 4.5009  | 4.4529  |
| Rb-81+E   | 2.7778  | 2.4371 | 3.1294  | 3.2284  | 2.2637 | 2.2720 | 3.1601  | 3.3453  |
| Rb-83+E   | 2.7068  | 2.2383 | 3.1324  | 3.3415  | 2.0581 | 2.0008 | 3.1166  | 3.3912  |
| Re-186m+E | 2.1924  | 1.5369 | 2.8127  | 3.2906  | 1.4764 | 1.3239 | 2.6947  | 3.2455  |
| Rn-219+E  | 0.3004  | 0.2896 | 0.3227  | 0.3112  | 0.2810 | 0.2945 | 0.3361  | 0.3321  |
| Rn-220+E  | 1.5683  | 1.6076 | 1.6387  | 1.5165  | 1.5217 | 1.6264 | 1.7678  | 1.7217  |
| Rn-222+E  | 0.0010  | 0.0010 | 0.0011  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4507  | 1.4096 | 1.5293  | 1.4623  | 1.3644 | 1.4370 | 1.6222  | 1.5474  |
| Ru-106+E  | 0.4403  | 0.4356 | 0.4583  | 0.4299  | 0.4276 | 0.4564 | 0.4933  | 0.4606  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.5165  | 2.3885 | 2.6612  | 2.5808  | 2.2046 | 2.2872 | 2.7042  | 2.6688  |
| Sn-121m+E | 0.3296  | 0.2897 | 0.3662  | 0.3776  | 0.2655 | 0.2677 | 0.3607  | 0.3821  |
| Sn-126+E  | 5.7006  | 5.5500 | 5.9931  | 5.7180  | 5.4009 | 5.7226 | 6.3370  | 6.1214  |
| Sr-82+E   | 1.3978  | 1.1051 | 1.6311  | 1.7765  | 0.9475 | 0.8824 | 1.5778  | 1.7792  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0002  | 0.0002  | 0.0001 | 0.0001 | 0.0001  | 0.0002  |
| Te-118+E  | 1.5791  | 1.4684 | 1.6802  | 1.6547  | 1.3341 | 1.3761 | 1.6750  | 1.6900  |
| Te-129m+E | 0.8474  | 0.7703 | 0.9242  | 0.9306  | 0.7159 | 0.7349 | 0.9270  | 0.9521  |
| Th-229+E  | 5.6179  | 4.6922 | 6.4854  | 6.9465  | 4.3336 | 4.2333 | 6.3990  | 7.1047  |
| Th-232+E  | 10.2084 | 9.7965 | 10.9674 | 10.6826 | 9.3215 | 9.7444 | 11.5731 | 11.5230 |
| Th-234+E  | 0.4683  | 0.3951 | 0.5359  | 0.5737  | 0.3608 | 0.3519 | 0.5287  | 0.5841  |
| Ti-44+E   | 4.3086  | 4.2022 | 4.5403  | 4.3719  | 4.1053 | 4.3221 | 4.7750  | 4.7814  |
| U-228+E   | 0.5645  | 0.4817 | 0.6448  | 0.6839  | 0.4412 | 0.4342 | 0.6383  | 0.6955  |
| U-230+E   | 0.6303  | 0.5036 | 0.7419  | 0.8149  | 0.4485 | 0.4228 | 0.7175  | 0.8133  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.9674        | 3.4747        | 4.4553        | 4.6675        | 3.2203        | 3.1837        | 4.4182        | 4.7423        |
| U-238+E        | 1.8202        | 1.7335        | 1.9392        | 1.8614        | 1.6720        | 1.7591        | 2.0509        | 1.9843        |
| W-178+E        | 2.7906        | 2.3243        | 3.2659        | 3.5669        | 2.2400        | 2.2185        | 3.2642        | 3.5967        |
| Xe-122+E       | 2.0922        | 1.9739        | 2.2238        | 2.1757        | 1.8461        | 1.9294        | 2.2639        | 2.2549        |
| Zr-93+E        | 0.2200        | 0.1824        | 0.2492        | 0.2707        | 0.1522        | 0.1437        | 0.2371        | 0.2629        |

Table 3: Adobe Surface Contamination 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2473        | 0.3162        | 0.5683        | 0.6845        |
| Ac-225+E       | 1.0409        | 1.2587        | 1.7588        | 1.9769        |
| Ac-227+E       | 3.4403        | 4.1701        | 5.9895        | 6.8618        |
| Ag-108m+E      | 3.9305        | 4.6563        | 5.3127        | 5.5444        |
| Ag-110m+E      | 3.8556        | 4.5820        | 4.8732        | 5.0080        |
| Am-242m+E      | 0.8187        | 1.0670        | 1.9389        | 2.2812        |
| Am-243+E       | 3.3997        | 4.0484        | 5.4582        | 6.1960        |
| Ar-42+E        | 0.2258        | 0.2672        | 0.2862        | 0.2879        |
| At-211+E       | 0.7036        | 0.8433        | 1.2118        | 1.4372        |
| Ba-128+E       | 1.7661        | 2.0666        | 2.5393        | 2.7695        |
| Bi-210m+E      | 1.2975        | 1.5022        | 1.7567        | 1.8884        |
| Bi-212+E       | 0.2115        | 0.2689        | 0.4234        | 0.4966        |
| Bi-213+E       | 0.3997        | 0.4658        | 0.5374        | 0.5672        |
| Bi-214+E       | 1.6243        | 1.9174        | 2.0725        | 2.1142        |
| Bi-215+E       | 0.9675        | 1.1307        | 1.3522        | 1.4722        |
| Bi-216+E       | 1.7866        | 2.0823        | 2.3113        | 2.3776        |
| Cd-118+E       | 0.0822        | 0.0973        | 0.1050        | 0.1051        |
| Ce-134+E       | 1.3549        | 1.6040        | 2.0121        | 2.2332        |
| Ce-144+E       | 0.3252        | 0.3881        | 0.4374        | 0.4777        |
| Cl-34m+E       | 1.4407        | 1.7303        | 1.8447        | 1.9011        |
| Cm-245+E       | 1.7704        | 2.1454        | 3.0420        | 3.4678        |
| Cm-247+E       | 1.5050        | 1.7575        | 2.1023        | 2.2687        |
| Cm-250+E       | 18.4673       | 21.7390       | 23.7904       | 24.4865       |
| Cs-137+E       | 2.5221        | 2.9459        | 3.2613        | 3.3764        |
| Es-254+E       | 2.2961        | 2.8947        | 4.5309        | 5.1895        |
| Fe-60+E        | 2.6358        | 3.1658        | 3.8317        | 4.0584        |
| Fr-220+E       | 0.2427        | 0.3037        | 0.4951        | 0.5923        |
| Fr-221+E       | 0.2284        | 0.2671        | 0.3322        | 0.3588        |
| Ge-68+E        | 0.3359        | 0.4912        | 1.3874        | 1.8413        |
| Hf-172+E       | 2.6106        | 3.1615        | 4.7337        | 5.5472        |
| Hf-182+E       | 4.5397        | 5.3318        | 6.3273        | 6.8634        |
| Hg-193+E       | 2.9358        | 3.5132        | 4.6566        | 5.2913        |
| Hg-194+E       | 3.0198        | 3.6094        | 4.8310        | 5.4597        |
| In-114m+E      | 0.6907        | 0.8270        | 1.0524        | 1.1459        |
| Ir-192m+E      | 3.1084        | 3.6652        | 4.6150        | 5.0207        |
| Kr-76+E        | 2.2673        | 2.7734        | 3.9814        | 4.4880        |
| Mg-28+E        | 3.6226        | 4.2603        | 4.6888        | 4.8179        |
| Nd-140+E       | 1.3957        | 1.6829        | 2.0622        | 2.2891        |
| Ni-66+E        | 0.1199        | 0.1414        | 0.1520        | 0.1560        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3460        | 0.4820        | 1.0497        | 1.2757        |
| Np-237+E       | 2.7466        | 3.3893        | 5.2148        | 5.9949        |
| Os-194+E       | 0.4656        | 0.5876        | 1.0068        | 1.2101        |
| Pa-231+E       | 4.2213        | 5.2073        | 8.0136        | 9.2975        |
| Pb-202+E       | 2.4918        | 2.9843        | 4.1647        | 4.7947        |
| Pb-210+E       | 0.2431        | 0.3435        | 0.7951        | 0.9960        |
| Pd-103+E       | 0.7383        | 0.9312        | 1.4161        | 1.5506        |
| Pt-202+E       | 0.2866        | 0.3361        | 0.3688        | 0.3773        |
| Pu-239+E       | 0.0539        | 0.0756        | 0.1720        | 0.2123        |
| Pu-244+E       | 1.3036        | 1.6524        | 2.6429        | 3.0192        |
| Pu-246+E       | 3.5235        | 4.2560        | 5.4838        | 6.0074        |
| Ra-219+E       | 0.9303        | 1.0866        | 1.3238        | 1.4439        |
| Ra-221+E       | 0.5952        | 0.7532        | 1.1784        | 1.3883        |
| Ra-222+E       | 0.0401        | 0.0464        | 0.0530        | 0.0553        |
| Ra-223+E       | 2.0556        | 2.4334        | 3.1315        | 3.5314        |
| Ra-224+E       | 1.5063        | 1.7386        | 1.9444        | 2.0662        |
| Ra-226+E       | 4.2349        | 4.9768        | 5.7626        | 5.9461        |
| Ra-228+E       | 3.1853        | 3.8153        | 4.7072        | 4.9352        |
| Rb-81+E        | 1.8492        | 2.2858        | 3.2476        | 3.5782        |
| Rb-83+E        | 1.5746        | 1.9945        | 3.1467        | 3.5769        |
| Re-186m+E      | 1.0330        | 1.3492        | 2.6832        | 3.3768        |
| Rn-219+E       | 0.2588        | 0.2997        | 0.3471        | 0.3702        |
| Rn-220+E       | 1.4424        | 1.6646        | 1.8560        | 1.9712        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.2538        | 1.4704        | 1.6822        | 1.7239        |
| Ru-106+E       | 0.4047        | 0.4728        | 0.5146        | 0.5229        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8326        | 2.1707        | 2.7095        | 2.9411        |
| Sn-121m+E      | 0.2034        | 0.2468        | 0.3558        | 0.4120        |
| Sn-126+E       | 4.9956        | 5.8541        | 6.5070        | 6.8756        |
| Sr-82+E        | 0.6087        | 0.8382        | 1.5658        | 1.8235        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.0513        | 1.2537        | 1.6517        | 1.8523        |
| Te-129m+E      | 0.5803        | 0.6920        | 0.9238        | 1.0391        |
| Th-229+E       | 3.3478        | 4.1650        | 6.4129        | 7.4478        |
| Th-232+E       | 8.4552        | 10.0082       | 12.1174       | 12.9100       |
| Th-234+E       | 0.2770        | 0.3423        | 0.5259        | 0.6099        |
| Ti-44+E        | 3.8583        | 4.4493        | 4.8638        | 5.2777        |
| U-228+E        | 0.3425        | 0.4290        | 0.6454        | 0.7354        |
| U-230+E        | 0.3108        | 0.4020        | 0.7143        | 0.8412        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5931        | 3.1162        | 4.4716        | 5.1555        |
| U-238+E        | 1.5180        | 1.7874        | 2.3584        | 2.3633        |
| W-178+E        | 1.8574        | 2.2320        | 3.2580        | 3.7957        |
| Xe-122+E       | 1.5552        | 1.8317        | 2.2688        | 2.4858        |
| Zr-93+E        | 0.0942        | 0.1253        | 0.2329        | 0.2664        |

Table 4: Adobe 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5090  | 0.4050  | 0.4884  | 0.5404  | 0.4131  | 0.3415  | 0.4755  | 0.5489  |
| Ac-225+E  | 1.5286  | 1.2563  | 1.4837  | 1.6010  | 1.4491  | 1.3210  | 1.6030  | 1.7087  |
| Ac-227+E  | 5.2996  | 4.3794  | 5.1444  | 5.5554  | 4.8973  | 4.4231  | 5.4278  | 5.8526  |
| Ag-108m+E | 4.4422  | 3.7057  | 4.3426  | 4.5900  | 4.8408  | 4.7019  | 5.1981  | 5.1632  |
| Ag-110m+E | 4.0263  | 3.1706  | 3.9065  | 4.1807  | 4.6467  | 4.5354  | 5.0293  | 4.9096  |
| Am-242m+E | 1.7018  | 1.4483  | 1.6492  | 1.7819  | 1.3701  | 1.1551  | 1.5373  | 1.7627  |
| Am-243+E  | 4.8603  | 4.1461  | 4.7492  | 5.0588  | 4.6208  | 4.2845  | 5.0334  | 5.3274  |
| Ar-42+E   | 0.2166  | 0.1658  | 0.2086  | 0.2247  | 0.2543  | 0.2468  | 0.2756  | 0.2680  |
| At-211+E  | 1.0972  | 0.9107  | 1.0655  | 1.1515  | 0.9944  | 0.8944  | 1.1026  | 1.1998  |
| Ba-128+E  | 2.0464  | 1.8055  | 2.0116  | 2.1065  | 2.0329  | 1.9458  | 2.1538  | 2.2153  |
| Bi-210m+E | 1.5428  | 1.2770  | 1.5081  | 1.6052  | 1.6467  | 1.5884  | 1.7829  | 1.7959  |
| Bi-212+E  | 0.3688  | 0.2826  | 0.3523  | 0.3920  | 0.3214  | 0.2732  | 0.3688  | 0.4128  |
| Bi-213+E  | 0.4531  | 0.3704  | 0.4420  | 0.4712  | 0.4905  | 0.4735  | 0.5316  | 0.5323  |
| Bi-214+E  | 1.6603  | 1.2996  | 1.6072  | 1.7238  | 1.9137  | 1.8611  | 2.0727  | 2.0270  |
| Bi-215+E  | 1.1825  | 0.9758  | 1.1538  | 1.2314  | 1.2381  | 1.1835  | 1.3446  | 1.3666  |
| Bi-216+E  | 1.9349  | 1.5643  | 1.8867  | 2.0100  | 2.1705  | 2.1161  | 2.3471  | 2.3146  |
| Cd-118+E  | 0.0818  | 0.0634  | 0.0791  | 0.0849  | 0.0953  | 0.0928  | 0.1033  | 0.1006  |
| Ce-134+E  | 1.6314  | 1.4567  | 1.6044  | 1.6798  | 1.5474  | 1.4630  | 1.6353  | 1.7149  |
| Ce-144+E  | 0.3733  | 0.3225  | 0.3670  | 0.3857  | 0.3889  | 0.3774  | 0.4141  | 0.4187  |
| Cl-34m+E  | 1.4775  | 1.1849  | 1.4336  | 1.5289  | 1.6639  | 1.6226  | 1.7911  | 1.7556  |
| Cm-245+E  | 2.6981  | 2.3056  | 2.6334  | 2.8097  | 2.5034  | 2.2903  | 2.7393  | 2.9340  |
| Cm-247+E  | 1.8031  | 1.5086  | 1.7631  | 1.8721  | 1.8870  | 1.8099  | 2.0405  | 2.0685  |
| Cm-250+E  | 19.4926 | 15.7183 | 18.9630 | 20.1989 | 21.9253 | 21.3763 | 23.6372 | 23.2317 |
| Cs-137+E  | 2.2166  | 1.8811  | 2.1912  | 2.2942  | 2.4546  | 2.4254  | 2.6031  | 2.5449  |
| Es-254+E  | 3.8661  | 3.1616  | 3.7303  | 4.0555  | 3.4020  | 2.9691  | 3.8058  | 4.2000  |
| Fe-60+E   | 3.0714  | 2.3193  | 2.9429  | 3.2254  | 3.2526  | 3.0275  | 3.6034  | 3.6840  |
| Fr-220+E  | 0.4428  | 0.3623  | 0.4278  | 0.4672  | 0.3754  | 0.3227  | 0.4240  | 0.4774  |
| Fr-221+E  | 0.2918  | 0.2447  | 0.2855  | 0.3037  | 0.3007  | 0.2870  | 0.3261  | 0.3337  |
| Ge-68+E   | 1.3004  | 0.8986  | 1.2102  | 1.4263  | 0.8376  | 0.5370  | 1.0679  | 1.3981  |
| Hf-172+E  | 4.2088  | 3.3777  | 4.0553  | 4.4556  | 3.6255  | 3.1516  | 4.0814  | 4.5685  |
| Hf-182+E  | 5.4498  | 4.4374  | 5.3009  | 5.6886  | 5.6594  | 5.3778  | 6.1649  | 6.2994  |
| Hg-193+E  | 4.0869  | 3.2849  | 3.9535  | 4.2967  | 3.9132  | 3.5734  | 4.3388  | 4.6166  |
| Hg-194+E  | 4.2215  | 3.3607  | 4.0763  | 4.4442  | 4.0431  | 3.6776  | 4.4973  | 4.7907  |
| In-114m+E | 0.8432  | 0.7520  | 0.8295  | 0.8661  | 0.8323  | 0.7949  | 0.8821  | 0.9096  |
| Ir-192m+E | 4.0278  | 3.2248  | 3.9050  | 4.2235  | 4.1037  | 3.8420  | 4.5193  | 4.6740  |
| Kr-76+E   | 3.4336  | 2.8043  | 3.3279  | 3.6035  | 3.2005  | 2.8857  | 3.5602  | 3.8272  |
| Mg-28+E   | 3.6070  | 2.9381  | 3.5073  | 3.7215  | 4.0662  | 3.9625  | 4.3545  | 4.2737  |
| Nd-140+E  | 1.6902  | 1.5054  | 1.6630  | 1.7425  | 1.5962  | 1.5084  | 1.6887  | 1.7737  |
| Ni-66+E   | 0.1199  | 0.0932  | 0.1160  | 0.1245  | 0.1394  | 0.1358  | 0.1510  | 0.1472  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Np-235+E  | 0.9266 | 0.7626 | 0.8904 | 0.9800 | 0.6824 | 0.5328 | 0.7918 | 0.9527 |
| Np-237+E  | 4.5739 | 3.8667 | 4.4481 | 4.7789 | 4.0664 | 3.6213 | 4.5003 | 4.9243 |
| Os-194+E  | 0.9023 | 0.6844 | 0.8593 | 0.9653 | 0.7437 | 0.6119 | 0.8651 | 0.9970 |
| Pa-231+E  | 7.0706 | 5.8320 | 6.8485 | 7.4267 | 6.2694 | 5.5338 | 7.0039 | 7.7045 |
| Pb-202+E  | 3.6777 | 2.9317 | 3.5498 | 3.8806 | 3.4160 | 3.0667 | 3.8212 | 4.1305 |
| Pb-210+E  | 0.7062 | 0.5465 | 0.6713 | 0.7575 | 0.4974 | 0.3656 | 0.5969 | 0.7399 |
| Pd-103+E  | 1.1733 | 1.1036 | 1.1584 | 1.1952 | 1.0324 | 0.9515 | 1.0873 | 1.1695 |
| Pt-202+E  | 0.2993 | 0.2385 | 0.2909 | 0.3109 | 0.3400 | 0.3312 | 0.3679 | 0.3614 |
| Pu-239+E  | 0.1538 | 0.1230 | 0.1469 | 0.1637 | 0.1104 | 0.0836 | 0.1302 | 0.1592 |
| Pu-244+E  | 2.2852 | 1.9010 | 2.2130 | 2.3925 | 1.9976 | 1.7472 | 2.2296 | 2.4625 |
| Pu-246+E  | 4.6789 | 3.9269 | 4.5613 | 4.8620 | 4.6346 | 4.3379 | 5.0393 | 5.2370 |
| Ra-219+E  | 1.1701 | 0.9736 | 1.1430 | 1.2180 | 1.2103 | 1.1542 | 1.3142 | 1.3418 |
| Ra-221+E  | 1.0463 | 0.8612 | 1.0125 | 1.1012 | 0.9090 | 0.7930 | 1.0210 | 1.1353 |
| Ra-222+E  | 0.0459 | 0.0380 | 0.0450 | 0.0477 | 0.0505 | 0.0491 | 0.0545 | 0.0541 |
| Ra-223+E  | 2.7777 | 2.3014 | 2.7053 | 2.9023 | 2.7376 | 2.5555 | 2.9977 | 3.1344 |
| Ra-224+E  | 1.0915 | 0.9835 | 1.0940 | 1.1224 | 1.1757 | 1.1726 | 1.2280 | 1.1895 |
| Ra-226+E  | 4.3049 | 3.5339 | 4.2144 | 4.4775 | 4.6846 | 4.5393 | 5.0472 | 5.0333 |
| Ra-228+E  | 3.4278 | 2.8649 | 3.3581 | 3.5670 | 3.5102 | 3.3314 | 3.7929 | 3.8763 |
| Rb-81+E   | 2.7538 | 2.2963 | 2.6806 | 2.8753 | 2.6229 | 2.3995 | 2.8939 | 3.0715 |
| Rb-83+E   | 2.6568 | 2.1529 | 2.5659 | 2.7936 | 2.3683 | 2.0702 | 2.6688 | 2.9315 |
| Re-186m+E | 2.4655 | 1.8318 | 2.3326 | 2.6609 | 1.8354 | 1.4001 | 2.1959 | 2.6650 |
| Rn-219+E  | 0.2998 | 0.2483 | 0.2931 | 0.3116 | 0.3235 | 0.3132 | 0.3497 | 0.3503 |
| Rn-220+E  | 1.0140 | 0.9186 | 1.0182 | 1.0419 | 1.0936 | 1.0934 | 1.1392 | 1.0999 |
| Rn-222+E  | 0.0010 | 0.0008 | 0.0010 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0012 |
| Ru-103+E  | 1.3937 | 1.1372 | 1.3592 | 1.4465 | 1.5324 | 1.4859 | 1.6563 | 1.6454 |
| Ru-106+E  | 0.4277 | 0.3427 | 0.4165 | 0.4440 | 0.4885 | 0.4780 | 0.5278 | 0.5167 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.1264 | 1.8994 | 2.0933 | 2.1799 | 2.1302 | 2.0469 | 2.2517 | 2.3022 |
| Sn-121m+E | 0.2817 | 0.2489 | 0.2751 | 0.2918 | 0.2450 | 0.2209 | 0.2637 | 0.2898 |
| Sn-126+E  | 5.5114 | 4.5278 | 5.3803 | 5.7143 | 6.0661 | 5.9013 | 6.5342 | 6.4827 |
| Sr-82+E   | 1.3061 | 1.1189 | 1.2691 | 1.3636 | 1.0588 | 0.8889 | 1.1947 | 1.3615 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Te-118+E  | 1.2468 | 1.1578 | 1.2309 | 1.2720 | 1.1626 | 1.1015 | 1.2129 | 1.2757 |
| Te-129m+E | 0.7354 | 0.6447 | 0.7195 | 0.7600 | 0.6878 | 0.6394 | 0.7365 | 0.7815 |
| Th-229+E  | 5.6386 | 4.6918 | 5.4683 | 5.9150 | 4.9546 | 4.3679 | 5.5229 | 6.0926 |
| Th-232+E  | 8.7411 | 7.3299 | 8.5757 | 9.0951 | 9.0388 | 8.6441 | 9.7454 | 9.8989 |
| Th-234+E  | 0.4644 | 0.3911 | 0.4512 | 0.4859 | 0.4081 | 0.3614 | 0.4527 | 0.4983 |
| Ti-44+E   | 4.2131 | 3.5282 | 4.1264 | 4.3646 | 4.5555 | 4.4463 | 4.8803 | 4.8673 |
| U-228+E   | 0.5671 | 0.4769 | 0.5514 | 0.5929 | 0.5111 | 0.4573 | 0.5662 | 0.6162 |
| U-230+E   | 0.6304 | 0.5267 | 0.6101 | 0.6623 | 0.5188 | 0.4394 | 0.5858 | 0.6665 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.2447       | 2.8467       | 3.1752       | 3.3716       | 2.8349       | 2.5359       | 3.0939       | 3.3957       |
| U-238+E        | 1.1961       | 1.0574       | 1.1897       | 1.2418       | 1.1989       | 1.1472       | 1.2576       | 1.3050       |
| W-178+E        | 2.9170       | 2.3297       | 2.8110       | 3.0891       | 2.5472       | 2.2289       | 2.8656       | 3.1871       |
| Xe-122+E       | 1.7984       | 1.6058       | 1.7699       | 1.8461       | 1.7769       | 1.7020       | 1.8747       | 1.9296       |
| Zr-93+E        | 0.2063       | 0.1856       | 0.2020       | 0.2132       | 0.1668       | 0.1436       | 0.1829       | 0.2072       |

Table 5: Adobe 1cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4046  | 0.3540  | 0.4809  | 0.5517  | 0.3147  | 0.3083  | 0.4518  | 0.5436  |
| Ac-225+E  | 1.4932  | 1.4371  | 1.6629  | 1.7369  | 1.3211  | 1.3440  | 1.6191  | 1.7331  |
| Ac-227+E  | 4.9881  | 4.7409  | 5.5913  | 5.9284  | 4.3480  | 4.3888  | 5.4017  | 5.8927  |
| Ag-108m+E | 5.2029  | 5.3158  | 5.5227  | 5.3111  | 4.9745  | 5.1770  | 5.5402  | 5.3888  |
| Ag-110m+E | 5.1515  | 5.3553  | 5.4635  | 5.1069  | 5.0459  | 5.3489  | 5.5924  | 5.2590  |
| Am-242m+E | 1.3107  | 1.1414  | 1.5264  | 1.7583  | 0.9899  | 0.9434  | 1.4085  | 1.7150  |
| Am-243+E  | 4.7074  | 4.5470  | 5.1711  | 5.3824  | 4.2086  | 4.2409  | 5.0068  | 5.3471  |
| Ar-42+E   | 0.2861  | 0.2982  | 0.3026  | 0.2805  | 0.2814  | 0.3010  | 0.3138  | 0.2923  |
| At-211+E  | 1.0032  | 0.9446  | 1.1329  | 1.2118  | 0.8713  | 0.8749  | 1.0864  | 1.2010  |
| Ba-128+E  | 2.0813  | 2.0502  | 2.2100  | 2.2454  | 1.9339  | 1.9514  | 2.1643  | 2.2247  |
| Bi-210m+E | 1.7562  | 1.7832  | 1.8828  | 1.8409  | 1.6790  | 1.7414  | 1.8801  | 1.8609  |
| Bi-212+E  | 0.3281  | 0.3002  | 0.3823  | 0.4195  | 0.2724  | 0.2761  | 0.3694  | 0.4192  |
| Bi-213+E  | 0.5277  | 0.5380  | 0.5656  | 0.5476  | 0.5058  | 0.5272  | 0.5673  | 0.5559  |
| Bi-214+E  | 2.1265  | 2.2076  | 2.2555  | 2.1106  | 2.0811  | 2.2112  | 2.3164  | 2.1795  |
| Bi-215+E  | 1.3152  | 1.3249  | 1.4196  | 1.3998  | 1.2431  | 1.2873  | 1.4120  | 1.4133  |
| Bi-216+E  | 2.3670  | 2.4422  | 2.5181  | 2.3923  | 2.3000  | 2.4148  | 2.5500  | 2.4426  |
| Cd-118+E  | 0.1065  | 0.1110  | 0.1128  | 0.1049  | 0.1046  | 0.1114  | 0.1163  | 0.1087  |
| Ce-134+E  | 1.5488  | 1.4924  | 1.6516  | 1.7268  | 1.4130  | 1.4042  | 1.5994  | 1.6942  |
| Ce-144+E  | 0.4065  | 0.4092  | 0.4311  | 0.4261  | 0.3890  | 0.3979  | 0.4274  | 0.4268  |
| Cl-34m+E  | 1.8344  | 1.8992  | 1.9366  | 1.8224  | 1.8007  | 1.9062  | 1.9863  | 1.8784  |
| Cm-245+E  | 2.5289  | 2.4108  | 2.7987  | 2.9596  | 2.2095  | 2.2116  | 2.6933  | 2.9304  |
| Cm-247+E  | 1.9971  | 2.0116  | 2.1467  | 2.1154  | 1.8837  | 1.9442  | 2.1307  | 2.1327  |
| Cm-250+E  | 24.0340 | 24.8384 | 25.4569 | 24.0595 | 23.4429 | 24.7048 | 25.9271 | 24.6696 |
| Cs-137+E  | 2.6328  | 2.7274  | 2.7584  | 2.6446  | 2.5773  | 2.6865  | 2.7928  | 2.8038  |
| Es-254+E  | 3.4257  | 3.1584  | 3.8993  | 4.2392  | 2.8304  | 2.8255  | 3.7308  | 4.2148  |
| Fe-60+E   | 3.5596  | 3.5760  | 3.8878  | 3.8114  | 3.3467  | 3.5332  | 3.9458  | 3.9204  |
| Fr-220+E  | 0.3711  | 0.3351  | 0.4308  | 0.4809  | 0.3021  | 0.2987  | 0.4072  | 0.4735  |
| Fr-221+E  | 0.3162  | 0.3166  | 0.3415  | 0.3405  | 0.2969  | 0.3057  | 0.3380  | 0.3418  |
| Ge-68+E   | 0.7689  | 0.5318  | 1.0568  | 1.3905  | 0.4500  | 0.4054  | 0.9545  | 1.3715  |
| Hf-172+E  | 3.6049  | 3.2821  | 4.1319  | 4.5857  | 3.0555  | 3.0312  | 3.9520  | 4.5458  |
| Hf-182+E  | 6.0126  | 6.0286  | 6.4952  | 6.4433  | 5.6891  | 5.8922  | 6.4864  | 6.5190  |
| Hg-193+E  | 4.0620  | 3.9251  | 4.5205  | 4.6946  | 3.6641  | 3.7482  | 4.4347  | 4.7103  |
| Hg-194+E  | 4.2089  | 4.0654  | 4.6927  | 4.8769  | 3.7894  | 3.8832  | 4.6113  | 4.9013  |
| In-114m+E | 0.8489  | 0.8340  | 0.9039  | 0.9194  | 0.7764  | 0.7805  | 0.8784  | 0.9094  |
| Ir-192m+E | 4.3504  | 4.3247  | 4.7625  | 4.7841  | 4.0437  | 4.1823  | 4.7276  | 4.8330  |
| Kr-76+E   | 3.2851  | 3.1346  | 3.6859  | 3.8963  | 2.8701  | 2.9175  | 3.5778  | 3.8743  |
| Mg-28+E   | 4.4538  | 4.5935  | 4.6894  | 4.4306  | 4.3387  | 4.5725  | 4.7888  | 4.5448  |
| Nd-140+E  | 1.5939  | 1.5338  | 1.7015  | 1.7821  | 1.4564  | 1.4457  | 1.6465  | 1.7460  |
| Ni-66+E   | 0.1555  | 0.1619  | 0.1649  | 0.1533  | 0.1525  | 0.1622  | 0.1693  | 0.1586  |

| Element   | avg100 | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.6350 | 0.5132 | 0.7790  | 0.9492  | 0.4263 | 0.3936 | 0.7047  | 0.9199  |
| Np-237+E  | 4.0612 | 3.7799 | 4.5783  | 4.9641  | 3.4077 | 3.3852 | 4.3619  | 4.8940  |
| Os-194+E  | 0.7417 | 0.6545 | 0.8839  | 1.0054  | 0.5944 | 0.5912 | 0.8417  | 1.0000  |
| Pa-231+E  | 6.2956 | 5.8456 | 7.1604  | 7.7814  | 5.2980 | 5.2932 | 6.8472  | 7.6982  |
| Pb-202+E  | 3.5132 | 3.3418 | 3.9624  | 4.1909  | 3.1036 | 3.1553 | 3.8567  | 4.1933  |
| Pb-210+E  | 0.4620 | 0.3569 | 0.5904  | 0.7399  | 0.2998 | 0.2779 | 0.5351  | 0.7191  |
| Pd-103+E  | 0.9910 | 0.9172 | 1.0700  | 1.1609  | 0.8103 | 0.7721 | 0.9853  | 1.1284  |
| Pt-202+E  | 0.3739 | 0.3870 | 0.3972  | 0.3747  | 0.3647 | 0.3849 | 0.4045  | 0.3846  |
| Pu-239+E  | 0.1023 | 0.0806 | 0.1280  | 0.1584  | 0.0671 | 0.0615 | 0.1156  | 0.1541  |
| Pu-244+E  | 1.9963 | 1.8364 | 2.2726  | 2.4848  | 1.6344 | 1.6237 | 2.1635  | 2.4556  |
| Pu-246+E  | 4.8243 | 4.7416 | 5.2477  | 5.3294  | 4.3909 | 4.4875 | 5.1557  | 5.3404  |
| Ra-219+E  | 1.2774 | 1.2815 | 1.3810  | 1.3712  | 1.2001 | 1.2373 | 1.3671  | 1.3800  |
| Ra-221+E  | 0.9061 | 0.8310 | 1.0401  | 1.1455  | 0.7513 | 0.7467 | 0.9898  | 1.1302  |
| Ra-222+E  | 0.0543 | 0.0558 | 0.0578  | 0.0557  | 0.0525 | 0.0547 | 0.0581  | 0.0565  |
| Ra-223+E  | 2.8464 | 2.7941 | 3.1249  | 3.1897  | 2.6056 | 2.6646 | 3.0636  | 3.1946  |
| Ra-224+E  | 1.2276 | 1.2509 | 1.2624  | 1.2433  | 1.2056 | 1.2279 | 1.2583  | 1.2291  |
| Ra-226+E  | 5.0479 | 5.1485 | 5.3898  | 5.1800  | 4.8657 | 5.0734 | 5.4105  | 5.2384  |
| Ra-228+E  | 3.6960 | 3.6719 | 3.9912  | 4.0030  | 3.4391 | 3.5200 | 3.9389  | 4.0647  |
| Rb-81+E   | 2.7031 | 2.6099 | 3.0038  | 3.1347  | 2.3812 | 2.4287 | 2.9233  | 3.1105  |
| Rb-83+E   | 2.4082 | 2.2412 | 2.7596  | 2.9883  | 2.0032 | 2.0282 | 2.6539  | 2.9566  |
| Re-186m+E | 1.7599 | 1.4315 | 2.1992  | 2.6633  | 1.2843 | 1.2326 | 2.0460  | 2.6309  |
| Rn-219+E  | 0.3462 | 0.3530 | 0.3703  | 0.3598  | 0.3321 | 0.3452 | 0.3705  | 0.3642  |
| Rn-220+E  | 1.1404 | 1.1626 | 1.1690  | 1.1516  | 1.1226 | 1.1420 | 1.1652  | 1.1366  |
| Rn-222+E  | 0.0012 | 0.0013 | 0.0013  | 0.0012  | 0.0012 | 0.0012 | 0.0013  | 0.0012  |
| Ru-103+E  | 1.6585 | 1.6992 | 1.7681  | 1.6952  | 1.5945 | 1.6665 | 1.7804  | 1.7267  |
| Ru-106+E  | 0.5369 | 0.5570 | 0.5693  | 0.5355  | 0.5250 | 0.5535 | 0.5797  | 0.5489  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.1845 | 2.1613 | 2.3156  | 2.3321  | 2.0110 | 2.0278 | 2.2570  | 2.3118  |
| Sn-121m+E | 0.2378 | 0.2178 | 0.2625  | 0.2894  | 0.2010 | 0.1945 | 0.2473  | 0.2816  |
| Sn-126+E  | 6.5549 | 6.7209 | 6.9686  | 6.6781  | 6.3369 | 6.6188 | 7.0246  | 6.7897  |
| Sr-82+E   | 1.0253 | 0.9013 | 1.2041  | 1.3799  | 0.7581 | 0.7396 | 1.1163  | 1.3319  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001  | 0.0001  | 0.0001 | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 1.1454 | 1.0942 | 1.2142  | 1.2774  | 1.0168 | 0.9948 | 1.1565  | 1.2418  |
| Te-129m+E | 0.6905 | 0.6597 | 0.7483  | 0.7876  | 0.6144 | 0.6110 | 0.7211  | 0.7755  |
| Th-229+E  | 4.9451 | 4.5685 | 5.6240  | 6.1434  | 4.1365 | 4.1137 | 5.3613  | 6.0589  |
| Th-232+E  | 9.5351 | 9.5334 | 10.2322 | 10.2203 | 8.9766 | 9.2259 | 10.2068 | 10.2582 |
| Th-234+E  | 0.4061 | 0.3755 | 0.4595  | 0.5016  | 0.3392 | 0.3364 | 0.4374  | 0.4941  |
| Ti-44+E   | 4.8676 | 4.9714 | 5.1710  | 4.9820  | 4.7303 | 4.9134 | 5.1841  | 5.0520  |
| U-228+E   | 0.5140 | 0.4820 | 0.5780  | 0.6221  | 0.4358 | 0.4352 | 0.5537  | 0.6148  |
| U-230+E   | 0.5047 | 0.4470 | 0.5884  | 0.6689  | 0.3910 | 0.3799 | 0.5498  | 0.6547  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.7774        | 2.5602        | 3.1320        | 3.4106        | 2.3351        | 2.2708        | 2.9484        | 3.3736        |
| U-238+E        | 1.2268        | 1.2054        | 1.2614        | 1.3519        | 1.1491        | 1.1556        | 1.2862        | 1.2840        |
| W-178+E        | 2.5496        | 2.3421        | 2.9102        | 3.2035        | 2.1898        | 2.1855        | 2.7997        | 3.1821        |
| Xe-122+E       | 1.8108        | 1.7797        | 1.9188        | 1.9527        | 1.6723        | 1.6809        | 1.8720        | 1.9293        |
| Zr-93+E        | 0.1572        | 0.1377        | 0.1789        | 0.2048        | 0.1153        | 0.1073        | 0.1632        | 0.1985        |

Table 6: Adobe 1cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2467        | 0.2896        | 0.4397        | 0.5599        |
| Ac-225+E       | 1.1660        | 1.2854        | 1.5835        | 1.7597        |
| Ac-227+E       | 3.7900        | 4.1816        | 5.2765        | 5.9876        |
| Ag-108m+E      | 4.6252        | 4.9532        | 5.4484        | 5.4000        |
| Ag-110m+E      | 4.8406        | 5.2472        | 5.5825        | 5.3340        |
| Am-242m+E      | 0.7090        | 0.8278        | 1.3401        | 1.7410        |
| Am-243+E       | 3.7316        | 4.0278        | 4.8767        | 5.3892        |
| Ar-42+E        | 0.2717        | 0.2987        | 0.3167        | 0.2976        |
| At-211+E       | 0.7649        | 0.8420        | 1.0634        | 1.2202        |
| Ba-128+E       | 1.7460        | 1.8172        | 2.1065        | 2.2392        |
| Bi-210m+E      | 1.5817        | 1.6858        | 1.8549        | 1.8766        |
| Bi-212+E       | 0.2303        | 0.2661        | 0.3645        | 0.4331        |
| Bi-213+E       | 0.4770        | 0.5121        | 0.5602        | 0.5600        |
| Bi-214+E       | 1.9983        | 2.1770        | 2.3199        | 2.2101        |
| Bi-215+E       | 1.1621        | 1.2478        | 1.3936        | 1.4273        |
| Bi-216+E       | 2.1896        | 2.3505        | 2.5240        | 2.4567        |
| Cd-118+E       | 0.1007        | 0.1101        | 0.1168        | 0.1106        |
| Ce-134+E       | 1.2572        | 1.2959        | 1.5524        | 1.7084        |
| Ce-144+E       | 0.3659        | 0.3828        | 0.4201        | 0.4283        |
| Cl-34m+E       | 1.7361        | 1.8796        | 1.9907        | 1.9034        |
| Cm-245+E       | 1.9086        | 2.0800        | 2.6114        | 2.9559        |
| Cm-247+E       | 1.7478        | 1.8720        | 2.0939        | 2.1438        |
| Cm-250+E       | 22.4097       | 24.1732       | 25.8221       | 24.9553       |
| Cs-137+E       | 2.4710        | 2.5938        | 2.8243        | 2.8691        |
| Es-254+E       | 2.2990        | 2.6175        | 3.6309        | 4.3097        |
| Fe-60+E        | 3.1393        | 3.4893        | 3.9661        | 4.0243        |
| Fr-220+E       | 0.2485        | 0.2831        | 0.3962        | 0.4841        |
| Fr-221+E       | 0.2757        | 0.2948        | 0.3317        | 0.3450        |
| Ge-68+E        | 0.2570        | 0.3866        | 0.9502        | 1.4615        |
| Hf-172+E       | 2.6503        | 2.9136        | 3.8941        | 4.6610        |
| Hf-182+E       | 5.3509        | 5.7491        | 6.4291        | 6.6101        |
| Hg-193+E       | 3.3326        | 3.6453        | 4.3796        | 4.8041        |
| Hg-194+E       | 3.4403        | 3.7753        | 4.5596        | 5.0014        |
| In-114m+E      | 0.6827        | 0.7154        | 0.8457        | 0.9095        |
| Ir-192m+E      | 3.7395        | 4.0494        | 4.6702        | 4.9031        |
| Kr-76+E        | 2.5106        | 2.7891        | 3.4962        | 3.9409        |
| Mg-28+E        | 4.1261        | 4.4535        | 4.7780        | 4.6056        |
| Nd-140+E       | 1.3052        | 1.3445        | 1.5968        | 1.7576        |
| Ni-66+E        | 0.1467        | 0.1599        | 0.1698        | 0.1621        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2601        | 0.3394        | 0.6689        | 0.9458        |
| Np-237+E       | 2.8212        | 3.1465        | 4.2139        | 4.9594        |
| Os-194+E       | 0.4905        | 0.5678        | 0.8311        | 1.0368        |
| Pa-231+E       | 4.4547        | 4.9923        | 6.6610        | 7.8430        |
| Pb-202+E       | 2.7764        | 3.0574        | 3.8005        | 4.2806        |
| Pb-210+E       | 0.1868        | 0.2544        | 0.5172        | 0.7500        |
| Pd-103+E       | 0.5962        | 0.6291        | 0.9153        | 1.1021        |
| Pt-202+E       | 0.3488        | 0.3768        | 0.4027        | 0.3892        |
| Pu-239+E       | 0.0403        | 0.0536        | 0.1107        | 0.1595        |
| Pu-244+E       | 1.3103        | 1.4951        | 2.0896        | 2.4948        |
| Pu-246+E       | 3.9366        | 4.2724        | 5.0484        | 5.4006        |
| Ra-219+E       | 1.1148        | 1.1948        | 1.3453        | 1.3904        |
| Ra-221+E       | 0.6257        | 0.7061        | 0.9624        | 1.1529        |
| Ra-222+E       | 0.0497        | 0.0529        | 0.0573        | 0.0568        |
| Ra-223+E       | 2.3781        | 2.5712        | 3.0109        | 3.2327        |
| Ra-224+E       | 1.1596        | 1.1979        | 1.2746        | 1.4848        |
| Ra-226+E       | 4.6236        | 4.9738        | 5.4830        | 5.4861        |
| Ra-228+E       | 3.1642        | 3.4049        | 3.9360        | 4.1239        |
| Rb-81+E        | 2.0844        | 2.3150        | 2.8399        | 3.1514        |
| Rb-83+E        | 1.6650        | 1.9236        | 2.5748        | 3.0141        |
| Re-186m+E      | 0.9781        | 1.1839        | 2.0224        | 2.7529        |
| Rn-219+E       | 0.3131        | 0.3341        | 0.3654        | 0.3669        |
| Rn-220+E       | 1.0819        | 1.1151        | 1.1831        | 1.3915        |
| Rn-222+E       | 0.0011        | 0.0012        | 0.0013        | 0.0013        |
| Ru-103+E       | 1.4992        | 1.6085        | 1.7552        | 1.7351        |
| Ru-106+E       | 0.5021        | 0.5400        | 0.5751        | 0.5525        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.7734        | 1.8583        | 2.1727        | 2.3059        |
| Sn-121m+E      | 0.1637        | 0.1722        | 0.2363        | 0.2853        |
| Sn-126+E       | 6.0014        | 6.4196        | 6.9475        | 6.8351        |
| Sr-82+E        | 0.5329        | 0.6677        | 1.0523        | 1.3540        |
| Sr-90+E        | 0.0000        | 0.0001        | 0.0001        | 0.0001        |
| Te-118+E       | 0.8527        | 0.8744        | 1.0967        | 1.2411        |
| Te-129m+E      | 0.5299        | 0.5577        | 0.6964        | 0.7835        |
| Th-229+E       | 3.4543        | 3.8713        | 5.2004        | 6.1659        |
| Th-232+E       | 8.3658        | 8.9710        | 10.1274       | 10.8423       |
| Th-234+E       | 0.2817        | 0.3153        | 0.4229        | 0.5014        |
| Ti-44+E        | 4.5431        | 4.8239        | 5.1455        | 5.0853        |
| U-228+E        | 0.3656        | 0.4071        | 0.5359        | 0.6236        |
| U-230+E        | 0.2955        | 0.3461        | 0.5273        | 0.6678        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 1.9463        | 2.1216        | 2.9488        | 3.5254        |
| U-238+E        | 1.0674        | 1.1022        | 1.3778        | 1.5162        |
| W-178+E        | 1.9330        | 2.1218        | 2.7653        | 3.2623        |
| Xe-122+E       | 1.4906        | 1.5492        | 1.8123        | 1.9365        |
| Zr-93+E        | 0.0746        | 0.0878        | 0.1519        | 0.1993        |

Table 7: Adobe 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5039  | 0.4199  | 0.4713  | 0.5195  | 0.4295  | 0.3115  | 0.4223  | 0.4550  |
| Ac-225+E  | 1.6941  | 1.4998  | 1.5794  | 1.6786  | 1.6330  | 1.3237  | 1.5621  | 1.9402  |
| Ac-227+E  | 5.6362  | 4.9455  | 5.1718  | 5.5671  | 5.2990  | 4.1166  | 4.9296  | 5.9061  |
| Ag-108m+E | 5.7269  | 5.1914  | 5.2270  | 5.3321  | 6.0379  | 5.5383  | 5.9722  | 8.9197  |
| Ag-110m+E | 5.2746  | 4.6103  | 4.7165  | 4.6930  | 5.8205  | 5.5065  | 5.3885  | 9.7923  |
| Am-242m+E | 1.6756  | 1.4650  | 1.6192  | 1.7396  | 1.4645  | 1.0414  | 1.4905  | 1.2756  |
| Am-243+E  | 4.9968  | 4.5605  | 4.6431  | 5.0156  | 4.8582  | 3.6834  | 4.4178  | 5.0077  |
| Ar-42+E   | 0.2720  | 0.2291  | 0.2514  | 0.2483  | 0.3155  | 0.2850  | 0.3090  | 0.5477  |
| At-211+E  | 1.0626  | 0.9364  | 0.9255  | 1.0548  | 0.9700  | 0.6773  | 0.7809  | 1.1067  |
| Ba-128+E  | 2.3215  | 2.1577  | 2.2273  | 2.2840  | 2.3791  | 1.8739  | 2.2231  | 2.5539  |
| Bi-210m+E | 1.8943  | 1.6790  | 1.6784  | 1.7699  | 1.9433  | 1.6494  | 1.8710  | 2.3458  |
| Bi-212+E  | 0.3919  | 0.3197  | 0.3591  | 0.3864  | 0.3556  | 0.2919  | 0.3565  | 0.5049  |
| Bi-213+E  | 0.5937  | 0.5387  | 0.5434  | 0.5633  | 0.6060  | 0.5449  | 0.5963  | 0.8611  |
| Bi-214+E  | 2.1409  | 1.8519  | 1.9347  | 1.9312  | 2.3739  | 2.1999  | 2.2164  | 3.9832  |
| Bi-215+E  | 1.3962  | 1.2386  | 1.2369  | 1.3069  | 1.4131  | 1.1841  | 1.3057  | 1.8126  |
| Bi-216+E  | 2.6651  | 2.4003  | 2.4325  | 2.4969  | 2.7834  | 2.5972  | 2.7514  | 4.2014  |
| Cd-118+E  | 0.1038  | 0.0896  | 0.0955  | 0.0920  | 0.1180  | 0.1088  | 0.1099  | 0.2035  |
| Ce-134+E  | 1.6738  | 1.5681  | 1.6377  | 1.6879  | 1.6803  | 1.2147  | 1.4415  | 1.5309  |
| Ce-144+E  | 0.3960  | 0.3788  | 0.3723  | 0.3900  | 0.4059  | 0.3314  | 0.3928  | 0.4377  |
| Cl-34m+E  | 1.7206  | 1.5076  | 1.6006  | 1.5730  | 1.9003  | 1.7221  | 1.7861  | 2.8760  |
| Cm-245+E  | 2.7491  | 2.5179  | 2.6687  | 2.8067  | 2.6390  | 2.0355  | 2.5171  | 2.5208  |
| Cm-247+E  | 2.2127  | 2.0325  | 2.0331  | 2.1221  | 2.2309  | 1.9212  | 2.1444  | 2.8895  |
| Cm-250+E  | 24.5146 | 21.7393 | 22.5318 | 22.5824 | 26.6845 | 24.2075 | 25.4476 | 40.4199 |
| Cs-137+E  | 2.9825  | 2.6659  | 2.8098  | 2.8818  | 3.2368  | 3.1256  | 3.1379  | 4.2239  |
| Es-254+E  | 4.1241  | 3.5214  | 3.8848  | 4.0645  | 3.8726  | 3.0709  | 3.8856  | 4.7322  |
| Fe-60+E   | 3.6146  | 3.0109  | 3.3315  | 3.3161  | 3.8855  | 3.4494  | 3.7319  | 6.5614  |
| Fr-220+E  | 0.4243  | 0.3642  | 0.3866  | 0.4311  | 0.3727  | 0.2626  | 0.3292  | 0.3915  |
| Fr-221+E  | 0.3259  | 0.2967  | 0.3062  | 0.3219  | 0.3384  | 0.2740  | 0.3180  | 0.3743  |
| Ge-68+E   | 1.1928  | 0.8377  | 1.1028  | 1.2964  | 0.7976  | 0.5153  | 1.0079  | 1.0134  |
| Hf-172+E  | 3.9913  | 3.4281  | 3.7237  | 4.1858  | 3.6140  | 2.6220  | 3.6615  | 4.1793  |
| Hf-182+E  | 6.0801  | 5.3660  | 5.5167  | 5.8256  | 6.3947  | 5.3225  | 5.9020  | 8.2695  |
| Hg-193+E  | 4.2789  | 3.7040  | 3.8226  | 4.2147  | 4.2268  | 3.3330  | 3.8225  | 5.4198  |
| Hg-194+E  | 4.5448  | 3.8867  | 4.0614  | 4.4523  | 4.4422  | 3.5567  | 4.1623  | 5.7497  |
| In-114m+E | 0.9609  | 0.8995  | 0.9380  | 0.9558  | 0.9748  | 0.8128  | 1.0874  | 1.1489  |
| Ir-192m+E | 4.9300  | 4.2862  | 4.4541  | 4.6903  | 4.8461  | 4.1934  | 4.8408  | 6.3581  |
| Kr-76+E   | 3.7541  | 3.2614  | 3.4701  | 3.6727  | 3.5598  | 2.8953  | 3.4679  | 4.1821  |
| Mg-28+E   | 4.4557  | 3.9203  | 4.1571  | 4.1055  | 4.9665  | 4.3758  | 4.6772  | 7.6923  |
| Nd-140+E  | 1.7052  | 1.6045  | 1.6795  | 1.7324  | 1.6351  | 1.1993  | 1.5096  | 1.5156  |
| Ni-66+E   | 0.1516  | 0.1308  | 0.1379  | 0.1321  | 0.1729  | 0.1604  | 0.1576  | 0.2913  |

| Element   | avg10   | ctr10  | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|--------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 0.8771  | 0.7308 | 0.8401  | 0.9224  | 0.7106  | 0.4730  | 0.7055  | 0.5971  |
| Np-237+E  | 4.7481  | 4.2068 | 4.4823  | 4.7730  | 4.3925  | 3.3158  | 4.1272  | 4.3758  |
| Os-194+E  | 0.9330  | 0.7504 | 0.8581  | 0.9458  | 0.7866  | 0.6082  | 0.8428  | 0.9875  |
| Pa-231+E  | 7.3697  | 6.4019 | 6.8177  | 7.3638  | 6.7501  | 5.1295  | 6.3684  | 7.2626  |
| Pb-202+E  | 3.9877  | 3.4529 | 3.5826  | 3.9736  | 3.7565  | 2.9913  | 3.5758  | 4.8334  |
| Pb-210+E  | 0.6289  | 0.4926 | 0.5948  | 0.6716  | 0.4764  | 0.3077  | 0.4894  | 0.4746  |
| Pd-103+E  | 1.1760  | 1.1123 | 1.1585  | 1.1936  | 1.1606  | 0.8824  | 1.3616  | 1.0119  |
| Pt-202+E  | 0.3991  | 0.3552 | 0.3665  | 0.3666  | 0.4294  | 0.3979  | 0.4184  | 0.6747  |
| Pu-239+E  | 0.1451  | 0.1175 | 0.1381  | 0.1536  | 0.1136  | 0.0751  | 0.1187  | 0.1020  |
| Pu-244+E  | 2.4558  | 2.1327 | 2.3143  | 2.4534  | 2.2734  | 1.7936  | 2.2324  | 2.5773  |
| Pu-246+E  | 5.1596  | 4.6436 | 4.8916  | 5.0193  | 5.2201  | 4.3322  | 5.0440  | 6.3935  |
| Ra-219+E  | 1.3643  | 1.2179 | 1.2190  | 1.2874  | 1.3517  | 1.1199  | 1.2441  | 1.6520  |
| Ra-221+E  | 1.0287  | 0.8915 | 0.9602  | 1.0375  | 0.9289  | 0.6961  | 0.8439  | 0.9407  |
| Ra-222+E  | 0.0589  | 0.0526 | 0.0528  | 0.0543  | 0.0599  | 0.0528  | 0.0579  | 0.0772  |
| Ra-223+E  | 3.0584  | 2.7269 | 2.7550  | 2.9580  | 2.9774  | 2.3912  | 2.7064  | 3.5539  |
| Ra-224+E  | 1.6194  | 1.4671 | 1.6061  | 1.6543  | 1.7472  | 1.7287  | 1.8066  | 1.7731  |
| Ra-226+E  | 5.4401  | 4.7757 | 5.0226  | 5.1769  | 5.7968  | 5.2909  | 5.5840  | 7.9056  |
| Ra-228+E  | 4.1839  | 3.6798 | 3.9723  | 4.0813  | 4.3474  | 3.9262  | 4.2467  | 5.3857  |
| Rb-81+E   | 2.9390  | 2.6253 | 2.8195  | 2.9269  | 2.9371  | 2.3996  | 2.7223  | 3.2903  |
| Rb-83+E   | 2.9042  | 2.4916 | 2.7058  | 2.8767  | 2.7204  | 2.2438  | 2.6032  | 3.4518  |
| Re-186m+E | 2.2774  | 1.7684 | 2.1039  | 2.4406  | 1.7802  | 1.2204  | 1.9633  | 2.0407  |
| Rn-219+E  | 0.3807  | 0.3424 | 0.3427  | 0.3571  | 0.3915  | 0.3402  | 0.3833  | 0.4911  |
| Rn-220+E  | 1.5258  | 1.3833 | 1.5209  | 1.5651  | 1.6495  | 1.6470  | 1.7113  | 1.6640  |
| Rn-222+E  | 0.0014  | 0.0013 | 0.0013  | 0.0013  | 0.0015  | 0.0014  | 0.0015  | 0.0022  |
| Ru-103+E  | 1.9305  | 1.7320 | 1.7908  | 1.8350  | 1.9878  | 1.8466  | 2.0709  | 2.9419  |
| Ru-106+E  | 0.5958  | 0.5310 | 0.5419  | 0.5521  | 0.6328  | 0.5980  | 0.6218  | 0.9933  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 2.6106  | 2.4570 | 2.5053  | 2.5519  | 2.6139  | 2.2469  | 2.9829  | 3.2992  |
| Sn-121m+E | 0.2989  | 0.2727 | 0.2926  | 0.3068  | 0.2749  | 0.2078  | 0.3196  | 0.3004  |
| Sn-126+E  | 6.9983  | 6.3269 | 6.3154  | 6.5040  | 7.3885  | 6.7113  | 6.9654  | 11.0412 |
| Sr-82+E   | 1.2196  | 1.0620 | 1.1565  | 1.2247  | 1.1135  | 0.8040  | 0.8989  | 1.0589  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 1.3972  | 1.3294 | 1.3782  | 1.4062  | 1.3697  | 1.0806  | 1.6076  | 1.5600  |
| Te-129m+E | 0.8259  | 0.7563 | 0.7959  | 0.8244  | 0.8054  | 0.6416  | 0.8608  | 0.9453  |
| Th-229+E  | 5.7134  | 5.0244 | 5.3845  | 5.7995  | 5.1983  | 3.8900  | 4.8505  | 5.3964  |
| Th-232+E  | 10.7739 | 9.4907 | 10.1848 | 10.5845 | 11.2511 | 10.1841 | 11.0063 | 13.6729 |
| Th-234+E  | 0.4546  | 0.4024 | 0.4253  | 0.4654  | 0.4277  | 0.3108  | 0.3776  | 0.4218  |
| Ti-44+E   | 4.4817  | 4.0899 | 3.8170  | 4.2062  | 4.8627  | 3.8411  | 3.8237  | 6.7029  |
| U-228+E   | 0.5907  | 0.5226 | 0.5636  | 0.5930  | 0.5556  | 0.4306  | 0.5127  | 0.5513  |
| U-230+E   | 0.6297  | 0.5458 | 0.5978  | 0.6459  | 0.5529  | 0.3978  | 0.5235  | 0.5046  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.8187       | 3.4427       | 3.7177       | 3.9242       | 3.5969       | 3.0462       | 3.6084       | 3.4605       |
| U-238+E        | 1.7112       | 1.5483       | 1.6798       | 1.7495       | 1.7866       | 1.6634       | 1.7572       | 1.8160       |
| W-178+E        | 2.7282       | 2.3292       | 2.5173       | 2.8644       | 2.5388       | 1.8256       | 2.3954       | 2.9446       |
| Xe-122+E       | 2.0491       | 1.9161       | 1.9713       | 2.0167       | 2.0903       | 1.6775       | 2.0784       | 2.3782       |
| Zr-93+E        | 0.2204       | 0.2001       | 0.2154       | 0.2266       | 0.1938       | 0.1346       | 0.1822       | 0.1337       |

Table 8: Adobe 5cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.3963        | 0.3315        | 0.4447        | 0.4169        | 0.3158        | 0.2815        | 0.5526        | 0.4185        |
| Ac-225+E       | 1.5890        | 1.3021        | 1.7420        | 1.8144        | 1.4325        | 1.2072        | 2.7928        | 1.7718        |
| Ac-227+E       | 5.0571        | 4.1995        | 5.8287        | 5.4863        | 4.4991        | 3.9561        | 7.9002        | 4.7792        |
| Ag-108m+E      | 6.1895        | 4.7332        | 6.9899        | 8.2791        | 6.0067        | 4.3934        | 15.8770       | 10.4547       |
| Ag-110m+E      | 6.0858        | 4.8401        | 7.4141        | 8.3413        | 6.0443        | 4.0853        | 18.6734       | 12.1696       |
| Am-242m+E      | 1.3388        | 1.0695        | 1.2495        | 1.3414        | 0.9981        | 0.9564        | 1.4000        | 1.3419        |
| Am-243+E       | 4.6330        | 4.0137        | 5.1109        | 5.1282        | 4.1371        | 3.6132        | 6.9954        | 4.0606        |
| Ar-42+E        | 0.3243        | 0.2756        | 0.3333        | 0.3641        | 0.3204        | 0.2377        | 0.8537        | 0.3882        |
| At-211+E       | 0.9106        | 0.7179        | 1.0488        | 0.9754        | 0.7858        | 0.5405        | 1.5668        | 0.9406        |
| Ba-128+E       | 2.3043        | 1.8791        | 2.0884        | 2.8355        | 2.1500        | 1.6663        | 3.6538        | 2.2951        |
| Bi-210m+E      | 1.9013        | 1.6076        | 2.4072        | 2.1687        | 1.8882        | 1.7405        | 3.3149        | 1.6394        |
| Bi-212+E       | 0.3446        | 0.2802        | 0.4080        | 0.4256        | 0.3005        | 0.2242        | 0.8031        | 0.5640        |
| Bi-213+E       | 0.6243        | 0.4742        | 0.6865        | 0.7997        | 0.6129        | 0.4916        | 1.3653        | 0.8233        |
| Bi-214+E       | 2.4751        | 1.9982        | 2.8632        | 3.1661        | 2.4463        | 1.7268        | 6.9818        | 4.1934        |
| Bi-215+E       | 1.3874        | 1.1516        | 1.7986        | 1.6157        | 1.3582        | 1.1520        | 2.6964        | 1.4540        |
| Bi-216+E       | 2.8989        | 2.2217        | 3.2513        | 3.9420        | 2.8761        | 2.0563        | 7.7738        | 5.1404        |
| Cd-118+E       | 0.1251        | 0.1006        | 0.1415        | 0.1568        | 0.1219        | 0.0962        | 0.2826        | 0.1680        |
| Ce-134+E       | 1.5852        | 1.3470        | 1.3262        | 1.9560        | 1.4421        | 1.0786        | 2.1063        | 1.4645        |
| Ce-144+E       | 0.4058        | 0.3390        | 0.4629        | 0.4616        | 0.3870        | 0.3083        | 0.6889        | 0.3848        |
| Cl-34m+E       | 1.9758        | 1.6184        | 2.2194        | 2.1755        | 1.9293        | 1.5675        | 4.5275        | 2.1412        |
| Cm-245+E       | 2.5105        | 2.2558        | 2.6926        | 2.6560        | 2.2014        | 2.0988        | 3.5657        | 2.1654        |
| Cm-247+E       | 2.2619        | 1.7404        | 2.4956        | 2.7019        | 2.1781        | 1.9483        | 3.8991        | 2.0516        |
| Cm-250+E       | 27.4088       | 22.5079       | 31.6769       | 34.0381       | 27.0803       | 20.9109       | 67.6932       | 39.5183       |
| Cs-137+E       | 3.3670        | 3.0456        | 3.8611        | 4.0994        | 3.3275        | 2.7795        | 6.9456        | 5.2304        |
| Es-254+E       | 3.7451        | 2.9235        | 3.8198        | 4.1528        | 3.1194        | 2.4922        | 7.0897        | 5.9015        |
| Fe-60+E        | 4.0372        | 3.2840        | 4.5479        | 4.8567        | 3.8083        | 3.0654        | 8.6277        | 5.1360        |
| Fr-220+E       | 0.3440        | 0.2807        | 0.3867        | 0.3544        | 0.2807        | 0.2257        | 0.5026        | 0.3469        |
| Fr-221+E       | 0.3239        | 0.2918        | 0.3672        | 0.3474        | 0.3032        | 0.2612        | 0.5068        | 0.2728        |
| Ge-68+E        | 0.6990        | 0.5650        | 0.8400        | 0.7370        | 0.4353        | 0.3871        | 0.9421        | 0.9733        |
| Hf-172+E       | 3.3539        | 3.0726        | 3.7937        | 4.1513        | 2.8298        | 2.3308        | 4.7579        | 2.9750        |
| Hf-182+E       | 6.3381        | 5.4684        | 7.3161        | 7.6669        | 6.0356        | 5.2590        | 11.3434       | 6.2295        |
| Hg-193+E       | 4.0993        | 3.4356        | 4.7812        | 5.0733        | 3.7301        | 2.9514        | 7.7966        | 4.6454        |
| Hg-194+E       | 4.2871        | 3.6731        | 5.5279        | 5.3230        | 3.9921        | 3.4093        | 7.9039        | 4.3788        |
| In-114m+E      | 0.9553        | 0.7959        | 0.9027        | 1.0850        | 0.8509        | 0.6405        | 1.4929        | 0.9332        |
| Ir-192m+E      | 4.7478        | 4.0287        | 6.7212        | 5.8935        | 4.6908        | 4.1840        | 9.3811        | 5.2775        |
| Kr-76+E        | 3.3764        | 2.8845        | 4.2709        | 3.8003        | 3.1291        | 2.8646        | 5.5338        | 3.3767        |
| Mg-28+E        | 5.0817        | 4.1623        | 5.1694        | 6.0646        | 4.9627        | 3.7668        | 11.8280       | 6.2219        |
| Nd-140+E       | 1.5776        | 1.3891        | 1.3583        | 1.8979        | 1.4433        | 1.1248        | 1.8314        | 1.3399        |
| Ni-66+E        | 0.1808        | 0.1447        | 0.2086        | 0.2219        | 0.1792        | 0.1245        | 0.5282        | 0.3818        |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200 | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|--------|---------|---------|
| Np-235+E  | 0.6319  | 0.4954  | 0.6055  | 0.6033  | 0.4202  | 0.4054 | 0.5701  | 0.6879  |
| Np-237+E  | 4.1156  | 3.5086  | 4.7151  | 4.4057  | 3.5246  | 3.2892 | 5.6114  | 3.7376  |
| Os-194+E  | 0.7367  | 0.6274  | 0.9810  | 0.8454  | 0.6347  | 0.5761 | 1.1829  | 0.8045  |
| Pa-231+E  | 6.3745  | 5.2689  | 7.1991  | 6.8158  | 5.4691  | 4.8485 | 9.3437  | 6.1258  |
| Pb-202+E  | 3.6734  | 2.9098  | 4.1440  | 4.6124  | 3.3263  | 2.6398 | 6.8778  | 4.3046  |
| Pb-210+E  | 0.4076  | 0.3464  | 0.4514  | 0.3948  | 0.2708  | 0.2457 | 0.4298  | 0.4776  |
| Pd-103+E  | 1.0339  | 0.7285  | 0.7341  | 1.0478  | 0.8268  | 0.7824 | 0.9423  | 1.0075  |
| Pt-202+E  | 0.4496  | 0.3497  | 0.5019  | 0.5819  | 0.4445  | 0.3472 | 1.0816  | 0.6742  |
| Pu-239+E  | 0.1008  | 0.0788  | 0.0993  | 0.0978  | 0.0660  | 0.0634 | 0.0947  | 0.1130  |
| Pu-244+E  | 2.1776  | 1.7140  | 2.2516  | 2.4898  | 1.8087  | 1.4715 | 3.9452  | 3.1221  |
| Pu-246+E  | 5.1381  | 4.3532  | 5.5853  | 5.9086  | 4.6977  | 3.8995 | 9.8528  | 6.5677  |
| Ra-219+E  | 1.3038  | 1.1332  | 1.9382  | 1.5219  | 1.2957  | 1.1752 | 2.3292  | 1.1295  |
| Ra-221+E  | 0.8741  | 0.7135  | 0.9710  | 0.8773  | 0.7240  | 0.6409 | 1.2301  | 0.8250  |
| Ra-222+E  | 0.0587  | 0.0512  | 0.0933  | 0.0714  | 0.0608  | 0.0582 | 0.1075  | 0.0494  |
| Ra-223+E  | 2.9016  | 2.3756  | 3.4621  | 3.2521  | 2.7169  | 2.3185 | 5.0633  | 2.7419  |
| Ra-224+E  | 1.8117  | 1.8309  | 1.8804  | 1.8400  | 1.7806  | 1.8023 | 1.8931  | 1.7759  |
| Ra-226+E  | 5.9299  | 5.1651  | 6.9684  | 6.9506  | 5.8280  | 4.9333 | 11.9039 | 7.4562  |
| Ra-228+E  | 4.4049  | 3.9108  | 4.9105  | 4.9825  | 4.1716  | 3.6452 | 7.9866  | 5.9534  |
| Rb-81+E   | 2.7772  | 2.4151  | 3.1666  | 3.0440  | 2.4912  | 2.1269 | 4.6320  | 3.0876  |
| Rb-83+E   | 2.6015  | 2.0752  | 2.8491  | 3.1998  | 2.2910  | 1.6270 | 6.0492  | 4.7183  |
| Re-186m+E | 1.6108  | 1.3952  | 1.9041  | 1.8761  | 1.2019  | 1.0669 | 2.1181  | 1.7084  |
| Rn-219+E  | 0.3916  | 0.3147  | 0.4522  | 0.4494  | 0.3872  | 0.3582 | 0.6734  | 0.3351  |
| Rn-220+E  | 1.7164  | 1.7496  | 1.7823  | 1.7398  | 1.6891  | 1.7185 | 1.7419  | 1.6975  |
| Rn-222+E  | 0.0015  | 0.0012  | 0.0016  | 0.0021  | 0.0015  | 0.0010 | 0.0045  | 0.0031  |
| Ru-103+E  | 2.0527  | 1.5748  | 2.1451  | 2.8232  | 2.0139  | 1.3340 | 5.7503  | 4.0731  |
| Ru-106+E  | 0.6609  | 0.5137  | 0.7491  | 0.9204  | 0.6574  | 0.4255 | 1.9925  | 1.3795  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.6357  | 2.0192  | 2.4349  | 3.1025  | 2.4220  | 2.0037 | 3.8896  | 2.1901  |
| Sn-121m+E | 0.2647  | 0.2149  | 0.2079  | 0.3028  | 0.2197  | 0.1510 | 0.3255  | 0.2270  |
| Sn-126+E  | 7.6170  | 6.0005  | 8.9423  | 10.2203 | 7.4721  | 5.4849 | 19.5135 | 12.1200 |
| Sr-82+E   | 0.9860  | 0.8136  | 1.0645  | 1.0126  | 0.7520  | 0.6341 | 1.5080  | 1.3750  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 1.3465  | 1.0797  | 1.0031  | 1.5534  | 1.1517  | 0.7592 | 1.7644  | 1.1197  |
| Te-129m+E | 0.7868  | 0.6310  | 0.6886  | 0.9585  | 0.6957  | 0.4863 | 1.3022  | 0.8678  |
| Th-229+E  | 4.9195  | 4.1437  | 5.2480  | 5.2666  | 4.1461  | 3.5812 | 7.0802  | 4.9754  |
| Th-232+E  | 11.4110 | 10.2995 | 12.4986 | 12.6923 | 10.9017 | 9.5981 | 19.6840 | 14.0252 |
| Th-234+E  | 0.3993  | 0.3470  | 0.4242  | 0.4576  | 0.3314  | 0.2966 | 0.5618  | 0.3948  |
| Ti-44+E   | 4.8727  | 3.9409  | 5.6668  | 6.1457  | 4.6495  | 3.2979 | 9.9105  | 5.4629  |
| U-228+E   | 0.5291  | 0.4395  | 0.5624  | 0.5421  | 0.4437  | 0.4074 | 0.7145  | 0.4888  |
| U-230+E   | 0.5110  | 0.4216  | 0.5510  | 0.5193  | 0.3968  | 0.3745 | 0.6049  | 0.5024  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.4794        | 3.1671        | 3.4836        | 3.4596        | 3.0094        | 2.8819        | 3.6227        | 3.5564        |
| U-238+E        | 1.8109        | 1.7753        | 1.8391        | 1.9113        | 1.7242        | 1.6964        | 2.0184        | 1.7731        |
| W-178+E        | 2.3498        | 2.2219        | 2.7007        | 3.0841        | 2.0084        | 1.7138        | 3.3611        | 2.0080        |
| Xe-122+E       | 2.0437        | 1.6571        | 1.8650        | 2.5200        | 1.8725        | 1.3470        | 3.4642        | 2.1971        |
| Zr-93+E        | 0.1855        | 0.1365        | 0.1510        | 0.1813        | 0.1263        | 0.1257        | 0.1449        | 0.1778        |

Table 9: Adobe 5cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2570        | 0.2143        | 0.4369        | 0.5180        |
| Ac-225+E       | 1.3053        | 0.9166        | 1.4495        | 2.3351        |
| Ac-227+E       | 4.0618        | 3.1977        | 4.6998        | 6.1421        |
| Ag-108m+E      | 5.6218        | 3.3412        | 6.1600        | 10.9789       |
| Ag-110m+E      | 5.8728        | 3.3128        | 7.6247        | 11.3734       |
| Am-242m+E      | 0.7315        | 0.6785        | 1.4927        | 1.4982        |
| Am-243+E       | 3.7787        | 2.9502        | 3.9589        | 5.5708        |
| Ar-42+E        | 0.3146        | 0.1955        | 0.2954        | 0.7696        |
| At-211+E       | 0.7136        | 0.6072        | 0.8485        | 1.0262        |
| Ba-128+E       | 1.9579        | 1.5596        | 2.0787        | 2.6968        |
| Bi-210m+E      | 1.8255        | 1.4407        | 1.5606        | 1.9961        |
| Bi-212+E       | 0.2634        | 0.1781        | 0.4601        | 0.5737        |
| Bi-213+E       | 0.5865        | 0.3266        | 0.5672        | 1.1831        |
| Bi-214+E       | 2.3837        | 1.3912        | 2.7770        | 4.8212        |
| Bi-215+E       | 1.3052        | 0.9590        | 1.2319        | 1.7020        |
| Bi-216+E       | 2.7412        | 1.5123        | 2.6103        | 5.5101        |
| Cd-118+E       | 0.1231        | 0.0691        | 0.2012        | 0.2369        |
| Ce-134+E       | 1.2863        | 1.1107        | 1.2868        | 1.5277        |
| Ce-144+E       | 0.3691        | 0.3164        | 0.3460        | 0.3947        |
| Cl-34m+E       | 1.9070        | 1.4073        | 2.1990        | 2.7893        |
| Cm-245+E       | 1.9669        | 1.4554        | 2.2226        | 3.4298        |
| Cm-247+E       | 2.0674        | 1.2140        | 1.8816        | 4.1751        |
| Cm-250+E       | 26.3833       | 16.4748       | 29.0331       | 46.0404       |
| Cs-137+E       | 3.1835        | 2.5601        | 3.2314        | 4.9825        |
| Es-254+E       | 2.6272        | 1.9243        | 5.2537        | 5.0519        |
| Fe-60+E        | 3.7634        | 2.2191        | 6.5560        | 7.8002        |
| Fr-220+E       | 0.2383        | 0.2110        | 0.3540        | 0.3967        |
| Fr-221+E       | 0.2937        | 0.2340        | 0.2190        | 0.3075        |
| Ge-68+E        | 0.2551        | 0.2931        | 1.3544        | 1.1099        |
| Hf-172+E       | 2.4894        | 2.1520        | 3.7369        | 3.4502        |
| Hf-182+E       | 5.8648        | 4.3588        | 6.9683        | 8.1852        |
| Hg-193+E       | 3.4785        | 2.6553        | 4.3039        | 5.4807        |
| Hg-194+E       | 3.6942        | 2.7486        | 4.1002        | 5.9784        |
| In-114m+E      | 0.7618        | 0.6332        | 0.9101        | 0.8884        |
| Ir-192m+E      | 4.4028        | 2.9938        | 3.7962        | 6.5914        |
| Kr-76+E        | 2.8391        | 2.0922        | 3.1207        | 4.3522        |
| Mg-28+E        | 4.8201        | 3.0225        | 5.6415        | 9.5309        |
| Nd-140+E       | 1.3123        | 1.0195        | 1.1990        | 1.4252        |
| Ni-66+E        | 0.1778        | 0.0977        | 0.2948        | 0.3180        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2616        | 0.2907        | 0.7803        | 0.6814        |
| Np-237+E       | 3.0102        | 2.3509        | 3.7027        | 5.0737        |
| Os-194+E       | 0.5420        | 0.4119        | 0.8495        | 1.0242        |
| Pa-231+E       | 4.7630        | 3.8805        | 6.2200        | 7.5862        |
| Pb-202+E       | 3.0371        | 2.1106        | 3.6743        | 5.8177        |
| Pb-210+E       | 0.1719        | 0.1872        | 0.5977        | 0.5017        |
| Pd-103+E       | 0.6142        | 0.6103        | 1.2323        | 0.8750        |
| Pt-202+E       | 0.4344        | 0.2352        | 0.5416        | 0.8674        |
| Pu-239+E       | 0.0403        | 0.0458        | 0.1346        | 0.1143        |
| Pu-244+E       | 1.4911        | 1.1256        | 2.3465        | 3.0102        |
| Pu-246+E       | 4.3610        | 3.0180        | 5.8135        | 6.9307        |
| Ra-219+E       | 1.2306        | 0.8742        | 0.8813        | 1.5865        |
| Ra-221+E       | 0.6209        | 0.5652        | 0.8649        | 0.9815        |
| Ra-222+E       | 0.0583        | 0.0389        | 0.0358        | 0.0771        |
| Ra-223+E       | 2.5593        | 1.9054        | 2.5428        | 3.8294        |
| Ra-224+E       | 1.7201        | 1.7445        | 1.7566        | 2.0149        |
| Ra-226+E       | 5.6261        | 4.1929        | 5.8829        | 9.0502        |
| Ra-228+E       | 3.9254        | 3.0926        | 4.9445        | 6.0418        |
| Rb-81+E        | 2.2720        | 1.7019        | 2.2204        | 3.4273        |
| Rb-83+E        | 1.9724        | 1.3135        | 2.8610        | 4.1295        |
| Re-186m+E      | 0.9216        | 0.9104        | 2.2724        | 2.0532        |
| Rn-219+E       | 0.3748        | 0.2648        | 0.3337        | 0.5487        |
| Rn-220+E       | 1.6308        | 1.6693        | 1.6735        | 1.9293        |
| Rn-222+E       | 0.0014        | 0.0008        | 0.0015        | 0.0026        |
| Ru-103+E       | 1.8988        | 1.0792        | 2.0691        | 3.5065        |
| Ru-106+E       | 0.6271        | 0.3528        | 0.6432        | 1.2059        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 2.1728        | 1.5105        | 2.6635        | 3.7830        |
| Sn-121m+E      | 0.1805        | 0.1716        | 0.3137        | 0.2217        |
| Sn-126+E       | 7.1316        | 4.2112        | 7.3216        | 13.8010       |
| Sr-82+E        | 0.5618        | 0.4791        | 1.2052        | 1.2092        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0001        |
| Te-118+E       | 0.9738        | 0.9025        | 1.5881        | 1.0801        |
| Te-129m+E      | 0.6056        | 0.5028        | 0.8725        | 0.8693        |
| Th-229+E       | 3.5848        | 2.7656        | 4.6142        | 6.2415        |
| Th-232+E       | 10.3633       | 8.6834        | 11.8847       | 14.8283       |
| Th-234+E       | 0.2817        | 0.2260        | 0.3910        | 0.5038        |
| Ti-44+E        | 4.6076        | 3.4067        | 5.2832        | 6.3170        |
| U-228+E        | 0.3841        | 0.3250        | 0.4521        | 0.5843        |
| U-230+E        | 0.3091        | 0.2763        | 0.5147        | 0.5763        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.6198        | 2.6288        | 3.7885        | 3.8152        |
| U-238+E        | 1.6345        | 1.5763        | 1.8081        | 2.0509        |
| W-178+E        | 1.7986        | 1.4863        | 2.4826        | 2.6306        |
| Xe-122+E       | 1.6747        | 1.3694        | 1.9521        | 2.2730        |
| Zr-93+E        | 0.0828        | 0.0851        | 0.1658        | 0.1588        |

Table 10: Adobe 15cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4834  | 0.3973  | 0.4808  | 0.5207  | 0.4457  | 0.3276  | 0.4544  | 0.4856  |
| Ac-225+E  | 1.6706  | 1.5143  | 1.6154  | 1.5846  | 1.7716  | 1.3612  | 1.6267  | 1.8874  |
| Ac-227+E  | 5.3679  | 4.7821  | 5.2007  | 5.2654  | 5.5302  | 4.2832  | 5.4108  | 5.5219  |
| Ag-108m+E | 6.1894  | 5.7172  | 5.4049  | 5.1898  | 7.0063  | 5.3906  | 5.7278  | 7.8846  |
| Ag-110m+E | 5.3881  | 5.0637  | 4.4710  | 4.1526  | 6.1935  | 5.0126  | 5.3359  | 8.4126  |
| Am-242m+E | 1.5323  | 1.2859  | 1.6327  | 1.8765  | 1.4924  | 1.0811  | 1.3602  | 1.2213  |
| Am-243+E  | 4.7142  | 4.2488  | 4.3606  | 4.7383  | 4.8449  | 3.8343  | 4.9233  | 4.2871  |
| Ar-42+E   | 0.2783  | 0.2532  | 0.2365  | 0.2225  | 0.3188  | 0.2697  | 0.2926  | 0.4676  |
| At-211+E  | 0.9997  | 0.8753  | 0.8859  | 1.0097  | 1.0117  | 0.7211  | 1.0945  | 0.9260  |
| Ba-128+E  | 2.6959  | 2.2560  | 2.3395  | 2.5319  | 2.7811  | 2.0967  | 2.7040  | 2.7532  |
| Bi-210m+E | 1.9718  | 1.8196  | 1.7589  | 1.5794  | 2.1254  | 1.8197  | 2.0074  | 2.1667  |
| Bi-212+E  | 0.4039  | 0.3309  | 0.3682  | 0.3887  | 0.3870  | 0.2917  | 0.3772  | 0.5101  |
| Bi-213+E  | 0.6610  | 0.6186  | 0.6124  | 0.5242  | 0.7458  | 0.5636  | 0.6276  | 0.8489  |
| Bi-214+E  | 2.2353  | 2.0771  | 1.8696  | 1.7362  | 2.5609  | 2.0678  | 2.2788  | 3.5035  |
| Bi-215+E  | 1.4316  | 1.3162  | 1.2716  | 1.1807  | 1.5486  | 1.2403  | 1.5002  | 1.6115  |
| Bi-216+E  | 3.0504  | 2.8770  | 2.6764  | 2.3582  | 3.5050  | 2.6765  | 2.8956  | 4.1423  |
| Cd-118+E  | 0.1083  | 0.1033  | 0.0922  | 0.0848  | 0.1268  | 0.1011  | 0.1111  | 0.1770  |
| Ce-134+E  | 2.0089  | 1.5219  | 1.6088  | 1.9049  | 1.9323  | 1.3818  | 2.1192  | 1.8150  |
| Ce-144+E  | 0.4131  | 0.3712  | 0.3561  | 0.3756  | 0.4400  | 0.3284  | 0.4657  | 0.3968  |
| Cl-34m+E  | 1.7773  | 1.6624  | 1.5546  | 1.4428  | 2.0191  | 1.6416  | 1.9310  | 2.5559  |
| Cm-245+E  | 2.4962  | 2.2679  | 2.4816  | 2.6698  | 2.4980  | 1.9810  | 2.5733  | 2.2987  |
| Cm-247+E  | 2.2767  | 2.1097  | 2.2027  | 1.9010  | 2.5035  | 1.9034  | 2.1823  | 2.6727  |
| Cm-250+E  | 25.7256 | 24.0420 | 22.4828 | 20.4450 | 29.2129 | 23.5988 | 26.0380 | 36.2891 |
| Cs-137+E  | 3.9403  | 3.7957  | 3.4906  | 3.4603  | 4.3610  | 4.0334  | 4.0780  | 4.7685  |
| Es-254+E  | 3.9933  | 3.4245  | 3.9102  | 4.2468  | 4.0801  | 3.0314  | 3.5928  | 4.2644  |
| Fe-60+E   | 3.7509  | 3.3688  | 3.2165  | 3.1281  | 4.0624  | 3.2086  | 3.7098  | 5.8078  |
| Fr-220+E  | 0.3931  | 0.3346  | 0.3831  | 0.4274  | 0.3830  | 0.2763  | 0.4092  | 0.3758  |
| Fr-221+E  | 0.3058  | 0.2880  | 0.2713  | 0.2698  | 0.3326  | 0.2773  | 0.2922  | 0.3173  |
| Ge-68+E   | 1.3633  | 0.8918  | 1.2006  | 1.4292  | 0.9201  | 0.5933  | 1.0095  | 1.3585  |
| Hf-172+E  | 4.1339  | 3.2894  | 3.5700  | 4.2955  | 3.9083  | 2.9450  | 3.8221  | 3.6736  |
| Hf-182+E  | 6.2813  | 5.6620  | 5.2760  | 5.3306  | 6.6969  | 5.6678  | 6.3756  | 7.2233  |
| Hg-193+E  | 4.4413  | 3.8218  | 3.7308  | 4.0092  | 4.5184  | 3.6244  | 4.4483  | 4.8738  |
| Hg-194+E  | 4.8733  | 4.1362  | 4.1769  | 4.2644  | 4.8848  | 3.9045  | 4.9516  | 5.3710  |
| In-114m+E | 0.9883  | 0.9212  | 0.9372  | 1.0751  | 1.1033  | 0.8434  | 0.9086  | 0.8816  |
| Ir-192m+E | 5.4641  | 4.8384  | 4.8883  | 4.3688  | 5.6982  | 4.4370  | 5.4472  | 6.1998  |
| Kr-76+E   | 3.7781  | 3.3358  | 3.7319  | 3.5533  | 3.9553  | 3.0580  | 3.8858  | 4.2421  |
| Mg-28+E   | 4.7818  | 4.2935  | 4.1622  | 4.0023  | 5.3573  | 4.2986  | 4.9230  | 7.0168  |
| Nd-140+E  | 2.0398  | 1.5236  | 1.6243  | 1.8735  | 1.9669  | 1.3621  | 2.2381  | 1.6794  |
| Ni-66+E   | 0.1536  | 0.1465  | 0.1315  | 0.1187  | 0.1808  | 0.1443  | 0.1588  | 0.2446  |

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 0.7619  | 0.6201  | 0.8750  | 0.9946  | 0.7154  | 0.5032  | 0.6905  | 0.6718  |
| Np-237+E  | 4.4016  | 3.8860  | 4.5155  | 4.7094  | 4.4689  | 3.4081  | 4.5018  | 4.1916  |
| Os-194+E  | 1.0183  | 0.7889  | 0.9212  | 0.9550  | 0.8980  | 0.6487  | 0.9310  | 1.0646  |
| Pa-231+E  | 6.9351  | 6.0849  | 6.9306  | 7.1740  | 7.0280  | 5.3720  | 6.9098  | 7.0097  |
| Pb-202+E  | 4.3442  | 3.7218  | 3.8246  | 3.8939  | 4.3842  | 3.3185  | 4.1615  | 4.7844  |
| Pb-210+E  | 0.5985  | 0.4459  | 0.6366  | 0.7317  | 0.5074  | 0.3417  | 0.5563  | 0.6058  |
| Pd-103+E  | 1.3673  | 1.0982  | 1.2188  | 1.5955  | 1.4152  | 0.9692  | 0.9721  | 0.6593  |
| Pt-202+E  | 0.4382  | 0.4137  | 0.3932  | 0.3388  | 0.5041  | 0.3922  | 0.4226  | 0.6319  |
| Pu-239+E  | 0.1342  | 0.1038  | 0.1448  | 0.1669  | 0.1175  | 0.0811  | 0.1144  | 0.1186  |
| Pu-244+E  | 2.3441  | 2.0592  | 2.3684  | 2.5265  | 2.4549  | 1.8344  | 2.1830  | 2.4968  |
| Pu-246+E  | 4.9653  | 4.5217  | 4.6333  | 4.7905  | 5.3419  | 4.1968  | 4.9082  | 5.5366  |
| Ra-219+E  | 1.4056  | 1.2747  | 1.2727  | 1.1475  | 1.4869  | 1.1474  | 1.5304  | 1.4574  |
| Ra-221+E  | 0.9416  | 0.8248  | 0.9402  | 1.0132  | 0.9403  | 0.6933  | 0.9617  | 0.9034  |
| Ra-222+E  | 0.0636  | 0.0580  | 0.0581  | 0.0471  | 0.0685  | 0.0535  | 0.0679  | 0.0701  |
| Ra-223+E  | 3.0288  | 2.7445  | 2.7672  | 2.7084  | 3.1712  | 2.4609  | 3.1305  | 3.1919  |
| Ra-224+E  | 2.2856  | 2.2694  | 2.1444  | 2.1529  | 2.4908  | 2.5132  | 2.4098  | 2.3759  |
| Ra-226+E  | 5.9450  | 5.5563  | 5.2948  | 5.0243  | 6.5830  | 5.6538  | 6.1794  | 7.4891  |
| Ra-228+E  | 4.2717  | 4.0259  | 4.0455  | 3.9880  | 4.6898  | 4.0730  | 4.3664  | 5.1256  |
| Rb-81+E   | 2.7397  | 2.5683  | 2.7595  | 2.7113  | 3.0757  | 2.3781  | 2.7496  | 3.1884  |
| Rb-83+E   | 2.9992  | 2.7204  | 3.0100  | 3.0373  | 3.3021  | 2.4543  | 3.0510  | 3.8646  |
| Re-186m+E | 2.5129  | 1.7990  | 2.1749  | 2.5852  | 1.9760  | 1.4245  | 2.1415  | 2.3645  |
| Rn-219+E  | 0.3952  | 0.3701  | 0.3710  | 0.3154  | 0.4350  | 0.3619  | 0.3857  | 0.4659  |
| Rn-220+E  | 2.1945  | 2.1826  | 2.0616  | 2.0752  | 2.3908  | 2.4227  | 2.3231  | 2.2749  |
| Rn-222+E  | 0.0017  | 0.0016  | 0.0015  | 0.0014  | 0.0020  | 0.0015  | 0.0016  | 0.0023  |
| Ru-103+E  | 2.3812  | 2.2308  | 2.0403  | 1.9182  | 2.7360  | 2.0574  | 2.1960  | 3.0640  |
| Ru-106+E  | 0.6913  | 0.6546  | 0.5788  | 0.5326  | 0.8025  | 0.6177  | 0.6648  | 0.9682  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 2.7972  | 2.6081  | 2.8485  | 2.9090  | 3.1471  | 2.3723  | 2.5884  | 2.7932  |
| Sn-121m+E | 0.3302  | 0.2783  | 0.3172  | 0.3897  | 0.3319  | 0.2410  | 0.3175  | 0.2745  |
| Sn-126+E  | 7.3041  | 6.7941  | 6.3267  | 5.9254  | 8.1798  | 6.4315  | 7.1613  | 9.7012  |
| Sr-82+E   | 0.9026  | 0.8720  | 1.2282  | 1.2905  | 1.0815  | 0.8222  | 1.1233  | 1.1770  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 1.5027  | 1.3708  | 1.5101  | 1.8592  | 1.6552  | 1.2370  | 1.4921  | 1.2582  |
| Te-129m+E | 0.9220  | 0.7964  | 0.8545  | 0.9881  | 0.9591  | 0.7150  | 0.8893  | 0.9029  |
| Th-229+E  | 5.3446  | 4.6414  | 5.3126  | 5.6388  | 5.3832  | 4.0102  | 5.4555  | 5.2706  |
| Th-232+E  | 11.8153 | 11.1387 | 10.8992 | 10.8463 | 12.8836 | 11.5321 | 12.1887 | 13.8805 |
| Th-234+E  | 0.4161  | 0.3634  | 0.4090  | 0.4592  | 0.4207  | 0.3378  | 0.4338  | 0.3913  |
| Ti-44+E   | 4.5562  | 4.2176  | 3.4442  | 3.7871  | 5.1353  | 4.1054  | 5.1358  | 5.0382  |
| U-228+E   | 0.5253  | 0.4769  | 0.5370  | 0.5577  | 0.5527  | 0.4216  | 0.5088  | 0.5027  |
| U-230+E   | 0.5428  | 0.4763  | 0.6047  | 0.6464  | 0.5449  | 0.4089  | 0.5410  | 0.5138  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.7341       | 3.4926       | 3.8658       | 4.1365       | 3.8729       | 3.4031       | 3.7582       | 3.5970       |
| U-238+E        | 1.7538       | 1.6888       | 1.6610       | 1.7266       | 1.8902       | 1.8279       | 1.8455       | 1.8120       |
| W-178+E        | 2.8548       | 2.2427       | 2.3469       | 2.8458       | 2.6932       | 2.1371       | 2.7002       | 2.5934       |
| Xe-122+E       | 2.3029       | 2.0013       | 2.0694       | 2.3399       | 2.4494       | 1.8399       | 2.3144       | 2.2895       |
| Zr-93+E        | 0.1587       | 0.1502       | 0.2062       | 0.2251       | 0.1775       | 0.1312       | 0.1373       | 0.1017       |

Table 11: Adobe 15cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.4022        | 0.3578        | 0.4516        | 0.3518        | 0.3217        | 0.2907        | 0.5290        | 0.4063        |
| Ac-225+E       | 1.6620        | 1.5774        | 1.9645        | 1.5042        | 1.5292        | 1.3379        | 2.7992        | 1.5497        |
| Ac-227+E       | 5.1587        | 4.8558        | 5.7995        | 4.6562        | 4.6061        | 4.1961        | 7.7292        | 4.5338        |
| Ag-108m+E      | 6.5939        | 6.3226        | 8.6012        | 6.7638        | 6.3654        | 5.0178        | 16.4369       | 7.7746        |
| Ag-110m+E      | 6.0788        | 5.2470        | 9.2832        | 7.2698        | 6.0338        | 4.5146        | 17.3312       | 7.6698        |
| Am-242m+E      | 1.2544        | 1.1170        | 1.2505        | 0.9812        | 0.9566        | 0.9038        | 1.1910        | 1.2262        |
| Am-243+E       | 4.5299        | 4.2190        | 4.4754        | 3.9600        | 4.1006        | 3.6352        | 5.8426        | 3.5166        |
| Ar-42+E        | 0.3174        | 0.2274        | 0.3247        | 0.3711        | 0.3117        | 0.2541        | 0.7031        | 0.2973        |
| At-211+E       | 0.9313        | 0.8260        | 0.8857        | 0.8251        | 0.8255        | 0.7015        | 1.2100        | 0.7661        |
| Ba-128+E       | 2.5772        | 2.2814        | 2.4258        | 2.7068        | 2.4030        | 1.9030        | 3.5185        | 2.0334        |
| Bi-210m+E      | 2.0710        | 2.0861        | 2.5273        | 1.8798        | 1.9891        | 1.8682        | 3.7728        | 1.7517        |
| Bi-212+E       | 0.3596        | 0.2962        | 0.4904        | 0.3921        | 0.3099        | 0.2476        | 0.7350        | 0.4406        |
| Bi-213+E       | 0.7117        | 0.6775        | 0.9592        | 0.6974        | 0.7101        | 0.5897        | 1.4911        | 0.6888        |
| Bi-214+E       | 2.5305        | 2.1516        | 3.1693        | 2.8977        | 2.4728        | 1.7934        | 7.1394        | 3.0456        |
| Bi-215+E       | 1.4899        | 1.4034        | 1.8636        | 1.4568        | 1.4334        | 1.3075        | 2.7662        | 1.2899        |
| Bi-216+E       | 3.3589        | 3.2745        | 4.4761        | 3.3749        | 3.3545        | 2.6179        | 8.3193        | 3.8044        |
| Cd-118+E       | 0.1261        | 0.0934        | 0.1672        | 0.1552        | 0.1265        | 0.0875        | 0.3798        | 0.1530        |
| Ce-134+E       | 1.7562        | 1.4661        | 1.2741        | 1.8330        | 1.5888        | 1.0996        | 1.8733        | 1.2559        |
| Ce-144+E       | 0.4266        | 0.4009        | 0.3820        | 0.4250        | 0.4078        | 0.3429        | 0.6118        | 0.3376        |
| Cl-34m+E       | 2.0204        | 1.7367        | 2.0581        | 2.3973        | 1.9694        | 1.5990        | 4.3178        | 1.8988        |
| Cm-245+E       | 2.3379        | 2.1888        | 2.3006        | 2.0503        | 2.0619        | 1.8874        | 2.8640        | 1.8102        |
| Cm-247+E       | 2.3818        | 2.2869        | 3.0180        | 2.1813        | 2.3156        | 2.0077        | 4.4900        | 2.0627        |
| Cm-250+E       | 28.6363       | 25.3405       | 37.0820       | 31.7069       | 28.2805       | 22.7811       | 65.9954       | 29.4179       |
| Cs-137+E       | 4.3747        | 4.3940        | 4.8358        | 4.3747        | 4.2794        | 3.7960        | 8.1815        | 4.9793        |
| Es-254+E       | 3.6728        | 2.9654        | 5.0381        | 3.6259        | 3.1471        | 2.6958        | 5.8092        | 3.7887        |
| Fe-60+E        | 4.0096        | 2.8481        | 5.2092        | 4.8647        | 3.8569        | 2.7250        | 11.2128       | 4.7982        |
| Fr-220+E       | 0.3470        | 0.3091        | 0.3435        | 0.3024        | 0.2877        | 0.2553        | 0.4211        | 0.3156        |
| Fr-221+E       | 0.3236        | 0.3397        | 0.3482        | 0.2628        | 0.3054        | 0.2852        | 0.5001        | 0.2530        |
| Ge-68+E        | 0.8037        | 0.5815        | 1.0606        | 0.8055        | 0.4880        | 0.4082        | 0.9759        | 1.1176        |
| Hf-172+E       | 3.5633        | 2.9890        | 3.4429        | 3.9646        | 2.9993        | 2.4485        | 3.7069        | 3.2277        |
| Hf-182+E       | 6.5315        | 5.8835        | 7.6007        | 6.5547        | 6.2550        | 5.2112        | 12.2223       | 5.8808        |
| Hg-193+E       | 4.2794        | 3.7663        | 4.9800        | 4.1904        | 3.9470        | 3.2863        | 7.0041        | 3.9537        |
| Hg-194+E       | 4.6191        | 4.0247        | 5.4681        | 4.6240        | 4.2412        | 3.7027        | 7.7571        | 4.2020        |
| In-114m+E      | 1.0308        | 0.9320        | 0.8970        | 1.0421        | 0.9180        | 0.8775        | 1.2701        | 0.8575        |
| Ir-192m+E      | 5.4149        | 5.1095        | 7.2614        | 5.4370        | 5.1663        | 4.8451        | 10.2766       | 4.9472        |
| Kr-76+E        | 3.6996        | 3.4728        | 4.5353        | 3.5221        | 3.3400        | 3.0835        | 6.1670        | 3.4258        |
| Mg-28+E        | 5.2291        | 4.0420        | 5.8752        | 6.1777        | 5.0890        | 3.9022        | 11.1488       | 4.8614        |
| Nd-140+E       | 1.8200        | 1.4496        | 1.2580        | 1.7566        | 1.6429        | 1.1136        | 1.8035        | 1.2640        |
| Ni-66+E        | 0.1816        | 0.1346        | 0.3156        | 0.2203        | 0.1838        | 0.1410        | 0.4486        | 0.1849        |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 0.5896  | 0.5077  | 0.6128  | 0.4421  | 0.4008  | 0.3823  | 0.5354  | 0.6720  |
| Np-237+E  | 4.0505  | 3.6806  | 4.3856  | 3.5902  | 3.4753  | 3.2722  | 5.2105  | 3.4567  |
| Os-194+E  | 0.8268  | 0.7024  | 1.0450  | 0.8279  | 0.6836  | 0.6168  | 1.2995  | 0.8599  |
| Pa-231+E  | 6.4584  | 5.9757  | 7.1577  | 5.7644  | 5.5734  | 5.1095  | 9.1285  | 5.8965  |
| Pb-202+E  | 4.0946  | 3.7227  | 4.9216  | 3.8598  | 3.7823  | 3.1261  | 6.9107  | 3.9416  |
| Pb-210+E  | 0.4325  | 0.3466  | 0.4689  | 0.3914  | 0.2830  | 0.2471  | 0.4381  | 0.5275  |
| Pd-103+E  | 1.0870  | 1.0172  | 0.9700  | 0.8026  | 0.8863  | 0.8761  | 0.7623  | 0.9091  |
| Pt-202+E  | 0.4899  | 0.4271  | 0.7028  | 0.5352  | 0.4936  | 0.3885  | 1.1849  | 0.5170  |
| Pu-239+E  | 0.0973  | 0.0817  | 0.1054  | 0.0766  | 0.0646  | 0.0607  | 0.0905  | 0.1150  |
| Pu-244+E  | 2.1846  | 1.9983  | 2.5453  | 1.9652  | 1.8613  | 1.5742  | 3.8462  | 2.4627  |
| Pu-246+E  | 5.0493  | 4.4236  | 6.2719  | 5.1232  | 4.6918  | 3.9854  | 8.6598  | 4.6628  |
| Ra-219+E  | 1.4137  | 1.3171  | 1.7880  | 1.4052  | 1.3545  | 1.3343  | 2.3539  | 1.0754  |
| Ra-221+E  | 0.8604  | 0.8132  | 0.8537  | 0.7496  | 0.7275  | 0.6902  | 1.0467  | 0.7549  |
| Ra-222+E  | 0.0656  | 0.0623  | 0.0905  | 0.0672  | 0.0642  | 0.0650  | 0.1216  | 0.0512  |
| Ra-223+E  | 3.0193  | 2.8601  | 3.4611  | 2.7976  | 2.8284  | 2.5547  | 4.8904  | 2.5000  |
| Ra-224+E  | 2.5395  | 2.5617  | 2.5184  | 2.4376  | 2.5146  | 2.5133  | 2.6056  | 2.4003  |
| Ra-226+E  | 6.5005  | 6.0389  | 7.6213  | 6.7291  | 6.3366  | 5.5353  | 12.5736 | 6.6173  |
| Ra-228+E  | 4.5739  | 4.1736  | 5.7862  | 4.7085  | 4.3966  | 4.0066  | 7.2326  | 4.5289  |
| Rb-81+E   | 2.8732  | 2.8887  | 3.3160  | 2.4872  | 2.6285  | 2.4379  | 4.6525  | 2.6277  |
| Rb-83+E   | 3.0165  | 2.8121  | 3.7885  | 2.8936  | 2.7242  | 2.1924  | 6.1624  | 3.5753  |
| Re-186m+E | 1.7768  | 1.4388  | 1.9662  | 1.7349  | 1.3096  | 1.0925  | 1.9549  | 1.9829  |
| Rn-219+E  | 0.4237  | 0.4276  | 0.5344  | 0.3795  | 0.4119  | 0.3737  | 0.8103  | 0.3670  |
| Rn-220+E  | 2.4405  | 2.4555  | 2.4079  | 2.3584  | 2.4205  | 2.4275  | 2.4322  | 2.3160  |
| Rn-222+E  | 0.0019  | 0.0018  | 0.0026  | 0.0020  | 0.0019  | 0.0015  | 0.0044  | 0.0021  |
| Ru-103+E  | 2.5683  | 2.4339  | 3.4685  | 2.6523  | 2.5876  | 2.0522  | 5.6703  | 2.8027  |
| Ru-106+E  | 0.7714  | 0.7418  | 1.0329  | 0.8057  | 0.7718  | 0.5808  | 2.0340  | 0.9323  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 2.9442  | 2.5912  | 2.9512  | 2.9974  | 2.6824  | 2.4864  | 4.1664  | 2.4807  |
| Sn-121m+E | 0.3054  | 0.2356  | 0.2073  | 0.3386  | 0.2508  | 0.2231  | 0.2495  | 0.2497  |
| Sn-126+E  | 7.9153  | 7.4905  | 10.2244 | 8.3093  | 7.6882  | 5.9833  | 19.9351 | 9.0719  |
| Sr-82+E   | 0.9277  | 0.8156  | 1.1083  | 0.8135  | 0.7250  | 0.6547  | 1.3741  | 1.0990  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0001  | 0.0000  | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 1.5410  | 1.1891  | 0.9801  | 1.7761  | 1.3081  | 1.2010  | 1.3424  | 1.2086  |
| Te-129m+E | 0.8891  | 0.7383  | 0.7817  | 0.9881  | 0.7831  | 0.6627  | 1.1295  | 0.7832  |
| Th-229+E  | 4.9421  | 4.4614  | 5.0830  | 4.2377  | 4.2413  | 3.6839  | 6.5831  | 4.4540  |
| Th-232+E  | 12.7077 | 12.1549 | 14.4484 | 12.6281 | 12.2654 | 11.1769 | 19.6231 | 12.6318 |
| Th-234+E  | 0.3813  | 0.3367  | 0.3892  | 0.3257  | 0.3250  | 0.2800  | 0.4529  | 0.3346  |
| Ti-44+E   | 4.9689  | 4.1630  | 5.4093  | 5.0576  | 4.9315  | 3.8094  | 9.2566  | 4.2074  |
| U-228+E   | 0.5049  | 0.4958  | 0.5238  | 0.4156  | 0.4382  | 0.4214  | 0.6485  | 0.4325  |
| U-230+E   | 0.4801  | 0.4375  | 0.5125  | 0.3900  | 0.3805  | 0.3611  | 0.5666  | 0.4712  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.6479        | 3.4299        | 3.5237        | 3.3040        | 3.2419        | 3.1606        | 3.5049        | 3.6312        |
| U-238+E        | 1.8820        | 1.8423        | 1.8578        | 1.7937        | 1.8160        | 1.7826        | 1.9468        | 1.7902        |
| W-178+E        | 2.4673        | 2.0582        | 2.4289        | 2.6839        | 2.1183        | 1.6523        | 2.6626        | 2.1877        |
| Xe-122+E       | 2.2774        | 1.9682        | 1.9754        | 2.4936        | 2.0744        | 1.7175        | 3.1018        | 1.9063        |
| Zr-93+E        | 0.1433        | 0.1326        | 0.1375        | 0.0883        | 0.1066        | 0.1058        | 0.1128        | 0.1417        |

Table 12: Adobe 15cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2592        | 0.2346        | 0.4059        | 0.5106        |
| Ac-225+E       | 1.3842        | 1.1868        | 1.4318        | 1.4280        |
| Ac-227+E       | 4.1381        | 3.4096        | 5.0725        | 4.9696        |
| Ag-108m+E      | 6.0949        | 5.0544        | 5.1332        | 7.1264        |
| Ag-110m+E      | 5.9546        | 4.4932        | 6.2161        | 7.6217        |
| Am-242m+E      | 0.6949        | 0.6688        | 1.1752        | 1.4994        |
| Am-243+E       | 3.7203        | 2.9241        | 3.8701        | 3.5085        |
| Ar-42+E        | 0.3049        | 0.2166        | 0.7904        | 0.1667        |
| At-211+E       | 0.7478        | 0.5622        | 0.8397        | 0.8156        |
| Ba-128+E       | 2.2196        | 1.8971        | 2.2830        | 2.5509        |
| Bi-210m+E      | 1.9167        | 1.5371        | 2.1808        | 1.6342        |
| Bi-212+E       | 0.2733        | 0.2287        | 0.4150        | 0.5495        |
| Bi-213+E       | 0.6737        | 0.5707        | 0.5561        | 0.4866        |
| Bi-214+E       | 2.4390        | 1.8683        | 3.1254        | 2.3883        |
| Bi-215+E       | 1.3688        | 1.0685        | 1.6921        | 1.2804        |
| Bi-216+E       | 3.2171        | 2.7626        | 2.6434        | 2.7174        |
| Cd-118+E       | 0.1219        | 0.0877        | 0.1552        | 0.0858        |
| Ce-134+E       | 1.4602        | 1.2223        | 1.6175        | 2.0754        |
| Ce-144+E       | 0.3921        | 0.3185        | 0.3602        | 0.3850        |
| Cl-34m+E       | 1.9528        | 1.6101        | 2.2948        | 1.9241        |
| Cm-245+E       | 1.8050        | 1.4947        | 1.8812        | 2.0501        |
| Cm-247+E       | 2.1916        | 1.7933        | 1.7916        | 1.6188        |
| Cm-250+E       | 27.4844       | 21.6064       | 31.5834       | 24.3419       |
| Cs-137+E       | 4.2169        | 3.8687        | 3.9012        | 5.1355        |
| Es-254+E       | 2.6149        | 2.0994        | 3.8099        | 3.8606        |
| Fe-60+E        | 3.6328        | 2.5657        | 5.7481        | 2.9975        |
| Fr-220+E       | 0.2434        | 0.2029        | 0.3390        | 0.3970        |
| Fr-221+E       | 0.2891        | 0.2415        | 0.2165        | 0.2089        |
| Ge-68+E        | 0.2828        | 0.3343        | 1.0352        | 1.6975        |
| Hf-172+E       | 2.6383        | 2.0053        | 4.4535        | 3.7018        |
| Hf-182+E       | 5.9891        | 4.5440        | 6.7754        | 4.9902        |
| Hg-193+E       | 3.6887        | 2.8819        | 4.3394        | 4.1497        |
| Hg-194+E       | 3.9516        | 3.1064        | 6.0303        | 4.6713        |
| In-114m+E      | 0.8142        | 0.7114        | 0.8208        | 1.0408        |
| Ir-192m+E      | 4.8475        | 4.0150        | 7.0122        | 5.4722        |
| Kr-76+E        | 3.0160        | 2.5326        | 4.3152        | 3.8181        |
| Mg-28+E        | 4.9247        | 3.7996        | 7.5738        | 4.0961        |
| Nd-140+E       | 1.5091        | 1.1904        | 1.6501        | 1.9728        |
| Ni-66+E        | 0.1761        | 0.1180        | 0.2004        | 0.1174        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2486        | 0.2767        | 0.6296        | 0.9111        |
| Np-237+E       | 2.9588        | 2.5013        | 4.4107        | 4.3170        |
| Os-194+E       | 0.5801        | 0.4966        | 1.1077        | 1.1530        |
| Pa-231+E       | 4.8426        | 4.0983        | 6.5212        | 6.8354        |
| Pb-202+E       | 3.4655        | 2.8890        | 3.6094        | 3.6539        |
| Pb-210+E       | 0.1783        | 0.1903        | 0.5446        | 0.7624        |
| Pd-103+E       | 0.6627        | 0.6357        | 0.8716        | 0.8865        |
| Pt-202+E       | 0.4725        | 0.3767        | 0.4632        | 0.3522        |
| Pu-239+E       | 0.0393        | 0.0446        | 0.1073        | 0.1602        |
| Pu-244+E       | 1.5664        | 1.4036        | 2.1172        | 2.5528        |
| Pu-246+E       | 4.2824        | 3.3510        | 4.6733        | 4.5643        |
| Ra-219+E       | 1.2821        | 0.9972        | 1.9922        | 1.3673        |
| Ra-221+E       | 0.6225        | 0.5583        | 0.8247        | 1.1127        |
| Ra-222+E       | 0.0616        | 0.0488        | 0.1008        | 0.0659        |
| Ra-223+E       | 2.6479        | 2.1164        | 2.8460        | 2.6506        |
| Ra-224+E       | 2.4415        | 2.4049        | 2.3499        | 2.3962        |
| Ra-226+E       | 6.1520        | 5.2382        | 7.3382        | 6.1827        |
| Ra-228+E       | 4.1359        | 3.6030        | 4.7602        | 4.7496        |
| Rb-81+E        | 2.3642        | 2.1439        | 2.3833        | 2.8194        |
| Rb-83+E        | 2.3812        | 2.2011        | 2.8028        | 3.2227        |
| Re-186m+E      | 1.0106        | 0.9251        | 2.0921        | 2.8248        |
| Rn-219+E       | 0.3961        | 0.3245        | 0.3580        | 0.2891        |
| Rn-220+E       | 2.3511        | 2.3298        | 2.2881        | 2.3397        |
| Rn-222+E       | 0.0018        | 0.0016        | 0.0016        | 0.0013        |
| Ru-103+E       | 2.4144        | 2.1575        | 2.1452        | 1.8171        |
| Ru-106+E       | 0.7422        | 0.6332        | 0.6515        | 0.6670        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 2.4027        | 2.0472        | 2.3481        | 2.5120        |
| Sn-121m+E      | 0.2084        | 0.1829        | 0.2789        | 0.3735        |
| Sn-126+E       | 7.5099        | 5.9949        | 6.1947        | 8.7332        |
| Sr-82+E        | 0.5489        | 0.5229        | 0.9677        | 1.4646        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 1.1131        | 0.9546        | 1.3639        | 1.6770        |
| Te-129m+E      | 0.6908        | 0.5991        | 0.7860        | 1.0211        |
| Th-229+E       | 3.6436        | 3.0887        | 4.4479        | 5.0854        |
| Th-232+E       | 11.7150       | 10.4190       | 12.3043       | 12.1029       |
| Th-234+E       | 0.2781        | 0.2248        | 0.3600        | 0.3837        |
| Ti-44+E        | 4.8450        | 3.3250        | 4.9866        | 2.8062        |
| U-228+E        | 0.3776        | 0.3440        | 0.4448        | 0.5824        |
| U-230+E        | 0.2968        | 0.2735        | 0.4987        | 0.5885        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.8638        | 2.8951        | 3.6664        | 4.1206        |
| U-238+E        | 1.7338        | 1.7044        | 1.9202        | 1.7663        |
| W-178+E        | 1.9089        | 1.3971        | 3.1859        | 2.4715        |
| Xe-122+E       | 1.8908        | 1.6180        | 2.0704        | 2.5000        |
| Zr-93+E        | 0.0703        | 0.0727        | 0.1293        | 0.1654        |

Table 13: Adobe Infinite Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2569  | 0.2312  | 0.4573  | 0.2901  | 0.3219  | 0.2742  | 0.3378  | 0.4372  |
| Ac-225+E  | 0.9707  | 0.9330  | 1.2888  | 1.2254  | 1.3479  | 1.2413  | 1.5626  | 1.7876  |
| Ac-227+E  | 3.1240  | 3.0181  | 4.3773  | 3.8060  | 4.3132  | 3.8668  | 5.0781  | 5.7074  |
| Ag-108m+E | 3.7843  | 3.7510  | 3.8554  | 4.8907  | 5.5452  | 5.1004  | 6.3200  | 6.7622  |
| Ag-110m+E | 3.8872  | 4.0335  | 4.1095  | 5.4189  | 6.0657  | 5.4457  | 7.0984  | 7.0205  |
| Am-242m+E | 0.8898  | 0.7392  | 1.3416  | 0.8971  | 1.0338  | 0.8834  | 0.9373  | 1.1180  |
| Am-243+E  | 2.8032  | 2.6761  | 4.0609  | 3.2711  | 3.8247  | 3.3048  | 4.1910  | 4.4249  |
| Ar-42+E   | 0.2418  | 0.2296  | 0.2453  | 0.3373  | 0.3724  | 0.3568  | 0.4205  | 0.3300  |
| At-211+E  | 0.5881  | 0.5801  | 0.8774  | 0.6197  | 0.8155  | 0.6364  | 0.8798  | 0.9394  |
| Ba-128+E  | 1.3079  | 1.3291  | 1.5364  | 1.5380  | 2.1075  | 1.7484  | 2.2006  | 2.0561  |
| Bi-210m+E | 1.1197  | 1.1406  | 1.2777  | 1.5936  | 1.6830  | 1.6575  | 2.4141  | 2.5383  |
| Bi-212+E  | 0.2351  | 0.2226  | 0.3674  | 0.2870  | 0.3234  | 0.2717  | 0.3441  | 0.4006  |
| Bi-213+E  | 0.3652  | 0.3717  | 0.4028  | 0.4883  | 0.5425  | 0.5068  | 0.6807  | 0.7738  |
| Bi-214+E  | 1.6225  | 1.6372  | 1.6973  | 2.3085  | 2.5056  | 2.3076  | 2.9017  | 2.7825  |
| Bi-215+E  | 0.8308  | 0.8507  | 0.9648  | 1.0912  | 1.2521  | 1.1648  | 1.6761  | 1.7383  |
| Bi-216+E  | 1.7182  | 1.7575  | 1.8365  | 2.3798  | 2.5506  | 2.4230  | 3.2977  | 3.8836  |
| Cd-118+E  | 0.0733  | 0.0781  | 0.0797  | 0.1060  | 0.1177  | 0.1062  | 0.1355  | 0.1327  |
| Ce-134+E  | 0.8520  | 0.9129  | 1.1739  | 0.9762  | 1.5168  | 1.0844  | 1.3163  | 1.0867  |
| Ce-144+E  | 0.2026  | 0.2116  | 0.2593  | 0.2586  | 0.3179  | 0.2652  | 0.3133  | 0.3181  |
| Cl-34m+E  | 1.2791  | 1.2293  | 1.3129  | 1.7967  | 1.8483  | 1.7337  | 1.9849  | 1.9042  |
| Cm-245+E  | 1.5124  | 1.3902  | 2.3792  | 1.7181  | 1.9354  | 1.7543  | 1.9869  | 2.1700  |
| Cm-247+E  | 1.2935  | 1.3040  | 1.4867  | 1.6848  | 1.9241  | 1.7724  | 2.2094  | 2.3437  |
| Cm-250+E  | 17.1314 | 17.2871 | 18.1644 | 23.8859 | 26.1470 | 24.2802 | 31.2737 | 31.1195 |
| Cs-137+E  | 2.1224  | 2.1707  | 2.1861  | 2.5836  | 3.2175  | 3.0596  | 3.3848  | 3.5641  |
| Es-254+E  | 2.4367  | 2.2292  | 3.3568  | 2.9010  | 3.3329  | 2.8180  | 3.6461  | 3.8586  |
| Fe-60+E   | 2.4293  | 2.5082  | 3.1314  | 3.4357  | 3.8106  | 3.3779  | 4.2453  | 4.1704  |
| Fr-220+E  | 0.2261  | 0.2130  | 0.3648  | 0.2439  | 0.2953  | 0.2384  | 0.3045  | 0.3706  |
| Fr-221+E  | 0.1818  | 0.1745  | 0.2181  | 0.2531  | 0.2662  | 0.2694  | 0.3273  | 0.3248  |
| Ge-68+E   | 0.4640  | 0.3459  | 1.4995  | 0.4670  | 0.4593  | 0.3002  | 0.3768  | 0.7989  |
| Hf-172+E  | 2.0191  | 1.8811  | 3.7638  | 2.2252  | 2.7351  | 1.9266  | 2.6000  | 3.5660  |
| Hf-182+E  | 3.7044  | 3.7754  | 4.9228  | 5.2168  | 5.6050  | 4.9591  | 6.8226  | 7.4223  |
| Hg-193+E  | 2.5583  | 2.5137  | 3.6557  | 3.3076  | 3.7169  | 3.0710  | 4.1795  | 4.6923  |
| Hg-194+E  | 2.6762  | 2.6278  | 3.7834  | 3.4677  | 3.9118  | 3.3133  | 4.6667  | 5.2919  |
| In-114m+E | 0.5671  | 0.4892  | 0.5570  | 0.5581  | 0.7773  | 0.7205  | 0.7574  | 0.7091  |
| Ir-192m+E | 2.7494  | 2.7734  | 3.3972  | 3.6343  | 4.0962  | 3.8834  | 5.6806  | 6.4987  |
| Kr-76+E   | 2.1287  | 2.1014  | 2.7489  | 2.6618  | 3.0383  | 2.7676  | 3.7759  | 4.4325  |
| Mg-28+E   | 3.4225  | 3.3526  | 3.4518  | 4.6014  | 5.3557  | 4.8336  | 5.8731  | 4.8753  |
| Nd-140+E  | 0.8154  | 0.8972  | 1.2088  | 0.9391  | 1.5318  | 0.9999  | 1.2483  | 1.0487  |
| Ni-66+E   | 0.1138  | 0.1213  | 0.1222  | 0.1661  | 0.1902  | 0.1647  | 0.2431  | 0.2271  |

| Element   | avg10  | ctr10  | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|--------|--------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 0.4474 | 0.3722 | 0.7390  | 0.4566  | 0.5064  | 0.4158  | 0.4483  | 0.6391  |
| Np-237+E  | 2.5994 | 2.4249 | 3.6724  | 2.9249  | 3.4549  | 3.0552  | 3.8283  | 4.2988  |
| Os-194+E  | 0.4508 | 0.4192 | 0.8621  | 0.5324  | 0.6104  | 0.5058  | 0.6999  | 0.9047  |
| Pa-231+E  | 4.0193 | 3.8009 | 5.8113  | 4.7512  | 5.4087  | 4.7829  | 6.1551  | 7.1247  |
| Pb-202+E  | 2.2413 | 2.1915 | 3.3556  | 2.7972  | 3.1530  | 2.6232  | 3.6110  | 4.4426  |
| Pb-210+E  | 0.3067 | 0.2633 | 0.6331  | 0.3046  | 0.3535  | 0.2591  | 0.3078  | 0.5155  |
| Pd-103+E  | 0.7266 | 0.5214 | 0.6646  | 0.5483  | 0.7870  | 0.6870  | 0.6142  | 0.4385  |
| Pt-202+E  | 0.2676 | 0.2772 | 0.2863  | 0.3748  | 0.4141  | 0.3813  | 0.5114  | 0.5433  |
| Pu-239+E  | 0.0701 | 0.0568 | 0.1326  | 0.0708  | 0.0771  | 0.0615  | 0.0666  | 0.1009  |
| Pu-244+E  | 1.4274 | 1.3026 | 1.8893  | 1.6828  | 1.8584  | 1.6510  | 1.9964  | 2.3684  |
| Pu-246+E  | 3.1257 | 3.0277 | 3.9957  | 3.9139  | 4.5052  | 3.9926  | 4.9986  | 5.0262  |
| Ra-219+E  | 0.7559 | 0.7769 | 0.8858  | 0.9305  | 1.1465  | 1.0642  | 1.5660  | 1.6501  |
| Ra-221+E  | 0.5402 | 0.5039 | 0.8424  | 0.6211  | 0.6918  | 0.6053  | 0.7100  | 0.9175  |
| Ra-222+E  | 0.0325 | 0.0342 | 0.0329  | 0.0429  | 0.0515  | 0.0501  | 0.0744  | 0.0794  |
| Ra-223+E  | 1.7358 | 1.7315 | 2.3222  | 2.1521  | 2.4900  | 2.2419  | 3.0185  | 3.2455  |
| Ra-224+E  | 1.0865 | 1.0776 | 1.0837  | 1.1206  | 1.5912  | 1.5738  | 1.6035  | 1.6227  |
| Ra-226+E  | 3.8024 | 3.8380 | 4.0873  | 4.8215  | 5.7519  | 5.4221  | 6.6414  | 6.6902  |
| Ra-228+E  | 2.8444 | 2.8189 | 3.1900  | 3.3881  | 4.1667  | 3.8951  | 4.6931  | 4.7659  |
| Rb-81+E   | 1.7185 | 1.6393 | 1.9490  | 2.2125  | 2.3995  | 2.3268  | 2.7179  | 3.2227  |
| Rb-83+E   | 1.8284 | 1.7618 | 2.2770  | 2.2111  | 2.4335  | 2.1871  | 2.9635  | 3.9059  |
| Re-186m+E | 1.0016 | 0.8535 | 2.5437  | 1.1174  | 1.1856  | 0.8098  | 1.0606  | 1.8115  |
| Rn-219+E  | 0.2276 | 0.2317 | 0.2520  | 0.3247  | 0.3418  | 0.3372  | 0.4613  | 0.4852  |
| Rn-220+E  | 1.0300 | 1.0221 | 1.0176  | 1.0360  | 1.5092  | 1.4885  | 1.4888  | 1.5069  |
| Rn-222+E  | 0.0009 | 0.0009 | 0.0010  | 0.0012  | 0.0013  | 0.0013  | 0.0019  | 0.0023  |
| Ru-103+E  | 1.2642 | 1.2436 | 1.3638  | 1.6528  | 1.7742  | 1.7004  | 2.4845  | 3.0188  |
| Ru-106+E  | 0.4018 | 0.4112 | 0.4267  | 0.5611  | 0.5968  | 0.5654  | 0.7917  | 0.9302  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 1.5834 | 1.4275 | 1.4773  | 1.5833  | 2.2335  | 2.0119  | 2.2341  | 2.1445  |
| Sn-121m+E | 0.1627 | 0.1396 | 0.2083  | 0.1260  | 0.2272  | 0.1755  | 0.1858  | 0.1676  |
| Sn-126+E  | 4.5621 | 4.6805 | 5.0369  | 6.0748  | 6.9409  | 6.2566  | 7.8624  | 8.3151  |
| Sr-82+E   | 0.8154 | 0.7761 | 0.8669  | 0.8865  | 1.0525  | 0.8916  | 1.0541  | 1.3466  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 0.8386 | 0.7181 | 0.8036  | 0.6184  | 1.1788  | 0.9604  | 0.9972  | 0.8008  |
| Te-129m+E | 0.4774 | 0.4395 | 0.5654  | 0.4603  | 0.6932  | 0.5724  | 0.6654  | 0.6356  |
| Th-229+E  | 3.0789 | 2.9119 | 4.6517  | 3.5717  | 4.1796  | 3.5350  | 4.3210  | 5.0283  |
| Th-232+E  | 9.8654 | 9.8040 | 10.7824 | 11.3453 | 14.4306 | 13.8464 | 15.6372 | 16.0349 |
| Th-234+E  | 0.2623 | 0.2455 | 0.3953  | 0.3067  | 0.3475  | 0.2815  | 0.3567  | 0.4260  |
| Ti-44+E   | 2.8811 | 3.0741 | 3.4080  | 3.7702  | 4.5982  | 3.6253  | 5.2678  | 5.2426  |
| U-228+E   | 0.3158 | 0.2909 | 0.4319  | 0.3875  | 0.4151  | 0.3895  | 0.4413  | 0.5292  |
| U-230+E   | 0.3317 | 0.2986 | 0.4958  | 0.3745  | 0.4142  | 0.3621  | 0.4276  | 0.5341  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.4897       | 3.3458       | 4.0490       | 3.5259       | 4.8616       | 4.5837       | 4.6979       | 5.2256       |
| U-238+E        | 1.2272       | 1.2066       | 1.3518       | 1.2714       | 1.7676       | 1.6871       | 1.7629       | 1.9103       |
| W-178+E        | 1.4414       | 1.3846       | 2.7166       | 1.7311       | 2.0203       | 1.3813       | 1.9846       | 2.7645       |
| Xe-122+E       | 1.1973       | 1.1574       | 1.2954       | 1.2536       | 1.8345       | 1.5330       | 1.8197       | 1.6927       |
| Zr-93+E        | 0.1114       | 0.0927       | 0.1345       | 0.1255       | 0.1319       | 0.1192       | 0.1201       | 0.1331       |

Table 14: Adobe Infinite Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100 | ctr100 | mid100 | cnr100 | avg200  | ctr200  | mid200  | cnr200  |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Ac-223+E  | 0.0566 | 0.0476 | 0.0523 | 0.0752 | 0.2918  | 0.2666  | 0.3034  | 0.4350  |
| Ac-225+E  | 0.2471 | 0.2126 | 0.1994 | 0.2863 | 1.4217  | 1.2130  | 1.3755  | 1.6112  |
| Ac-227+E  | 0.7810 | 0.6760 | 0.6468 | 0.9034 | 4.4446  | 3.9146  | 4.3668  | 5.3320  |
| Ag-108m+E | 1.0004 | 0.8640 | 0.7183 | 0.9550 | 6.0102  | 4.6664  | 5.2672  | 7.5911  |
| Ag-110m+E | 1.0635 | 0.9251 | 0.8182 | 1.0684 | 6.5007  | 4.7426  | 5.8083  | 8.5825  |
| Am-242m+E | 0.1743 | 0.1522 | 0.1613 | 0.1824 | 0.8450  | 0.8122  | 0.9222  | 1.3878  |
| Am-243+E  | 0.6926 | 0.6176 | 0.5451 | 0.7863 | 3.9433  | 3.7179  | 3.8145  | 4.4242  |
| Ar-42+E   | 0.0662 | 0.0596 | 0.0609 | 0.0555 | 0.4225  | 0.2925  | 0.4280  | 0.3985  |
| At-211+E  | 0.1457 | 0.1313 | 0.1124 | 0.1707 | 0.7942  | 0.7849  | 0.8769  | 0.9810  |
| Ba-128+E  | 0.3588 | 0.3226 | 0.3046 | 0.2970 | 2.1349  | 1.8640  | 2.1425  | 1.7549  |
| Bi-210m+E | 0.3157 | 0.2775 | 0.2580 | 0.3294 | 1.9774  | 1.6015  | 1.6804  | 1.9574  |
| Bi-212+E  | 0.0553 | 0.0469 | 0.0491 | 0.0644 | 0.3089  | 0.2402  | 0.3001  | 0.4384  |
| Bi-213+E  | 0.1013 | 0.0848 | 0.0720 | 0.1125 | 0.6177  | 0.4868  | 0.5832  | 0.5985  |
| Bi-214+E  | 0.4459 | 0.3897 | 0.3651 | 0.4438 | 2.7543  | 2.0297  | 2.6374  | 3.3965  |
| Bi-215+E  | 0.2283 | 0.1990 | 0.1788 | 0.2485 | 1.3946  | 1.1441  | 1.2606  | 1.4947  |
| Bi-216+E  | 0.4774 | 0.4031 | 0.3278 | 0.5045 | 2.9374  | 2.2802  | 2.4234  | 3.1631  |
| Cd-118+E  | 0.0207 | 0.0179 | 0.0191 | 0.0251 | 0.1257  | 0.0910  | 0.1193  | 0.1550  |
| Ce-134+E  | 0.2432 | 0.2228 | 0.2216 | 0.1725 | 1.4088  | 1.3333  | 1.4896  | 1.1118  |
| Ce-144+E  | 0.0559 | 0.0486 | 0.0446 | 0.0635 | 0.3495  | 0.3083  | 0.3032  | 0.3207  |
| Cl-34m+E  | 0.3358 | 0.2849 | 0.2878 | 0.4291 | 2.1448  | 1.6798  | 2.2513  | 2.0383  |
| Cm-245+E  | 0.3552 | 0.3061 | 0.2854 | 0.4414 | 1.9819  | 1.9160  | 1.9553  | 2.3985  |
| Cm-247+E  | 0.3571 | 0.2998 | 0.2633 | 0.3934 | 2.1344  | 1.7352  | 2.2439  | 2.2623  |
| Cm-250+E  | 4.7019 | 4.0667 | 3.7999 | 5.0587 | 29.1385 | 22.3325 | 27.4945 | 31.3531 |
| Cs-137+E  | 2.0283 | 1.9580 | 1.9232 | 1.9568 | 3.5454  | 3.0656  | 3.3525  | 4.4733  |
| Es-254+E  | 0.5497 | 0.4845 | 0.5247 | 0.6203 | 2.9879  | 2.4229  | 3.0409  | 4.6574  |
| Fe-60+E   | 0.6613 | 0.5701 | 0.6521 | 0.8292 | 3.9536  | 2.8396  | 3.8378  | 5.1033  |
| Fr-220+E  | 0.0520 | 0.0453 | 0.0442 | 0.0663 | 0.2716  | 0.2618  | 0.2944  | 0.3900  |
| Fr-221+E  | 0.0511 | 0.0466 | 0.0443 | 0.0563 | 0.3076  | 0.2766  | 0.2729  | 0.2849  |
| Ge-68+E   | 0.0732 | 0.0513 | 0.1108 | 0.1718 | 0.2929  | 0.2524  | 0.2915  | 0.7225  |
| Hf-172+E  | 0.4555 | 0.4007 | 0.4055 | 0.5854 | 2.5301  | 2.2088  | 1.9063  | 2.8088  |
| Hf-182+E  | 1.0095 | 0.8985 | 0.8685 | 1.2409 | 6.1425  | 4.9851  | 5.1400  | 6.6877  |
| Hg-193+E  | 0.6531 | 0.5846 | 0.5390 | 0.7993 | 3.8172  | 3.1658  | 3.4248  | 4.3972  |
| Hg-194+E  | 0.6817 | 0.5957 | 0.5562 | 0.8325 | 4.0446  | 3.1965  | 3.5381  | 4.7203  |
| In-114m+E | 0.1335 | 0.1256 | 0.1179 | 0.1243 | 0.7819  | 0.7166  | 0.7220  | 0.7772  |
| Ir-192m+E | 0.7393 | 0.6158 | 0.5576 | 0.8768 | 4.5487  | 3.4980  | 3.6614  | 4.9763  |
| Kr-76+E   | 0.5411 | 0.4577 | 0.4487 | 0.6199 | 3.1226  | 2.5473  | 2.9219  | 3.8826  |
| Mg-28+E   | 0.9316 | 0.8303 | 0.8207 | 0.8370 | 5.8021  | 4.3254  | 6.2720  | 5.6386  |
| Nd-140+E  | 0.2373 | 0.2181 | 0.2287 | 0.1637 | 1.3811  | 1.3878  | 1.4736  | 1.0846  |
| Ni-66+E   | 0.0318 | 0.0283 | 0.0292 | 0.0381 | 0.1940  | 0.1404  | 0.1892  | 0.2750  |

| Element   | avg100  | ctr100 | mid100 | cnr100 | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|--------|--------|--------|---------|---------|---------|---------|
| Np-235+E  | 0.0826  | 0.0702 | 0.0826 | 0.0958 | 0.3588  | 0.3399  | 0.4347  | 0.7721  |
| Np-237+E  | 0.6055  | 0.5211 | 0.4971 | 0.6792 | 3.2937  | 2.9817  | 3.3655  | 4.4155  |
| Os-194+E  | 0.1039  | 0.0840 | 0.1001 | 0.1456 | 0.5744  | 0.4647  | 0.5193  | 0.8052  |
| Pa-231+E  | 0.9628  | 0.8312 | 0.8208 | 1.1142 | 5.3201  | 4.7124  | 5.3528  | 6.8723  |
| Pb-202+E  | 0.5664  | 0.4874 | 0.4406 | 0.7092 | 3.2655  | 2.7251  | 3.0053  | 3.6311  |
| Pb-210+E  | 0.0570  | 0.0463 | 0.0629 | 0.0841 | 0.2412  | 0.2256  | 0.2924  | 0.5498  |
| Pd-103+E  | 0.1295  | 0.1258 | 0.1208 | 0.0685 | 0.6543  | 0.6382  | 0.6344  | 0.8275  |
| Pt-202+E  | 0.0747  | 0.0635 | 0.0591 | 0.0846 | 0.4586  | 0.3418  | 0.4285  | 0.4978  |
| Pu-239+E  | 0.0125  | 0.0104 | 0.0134 | 0.0162 | 0.0536  | 0.0505  | 0.0629  | 0.1167  |
| Pu-244+E  | 0.3228  | 0.2792 | 0.2710 | 0.3316 | 1.7399  | 1.4669  | 1.6605  | 2.5842  |
| Pu-246+E  | 0.7883  | 0.6949 | 0.6757 | 0.8633 | 4.5993  | 3.8900  | 4.3786  | 5.4956  |
| Ra-219+E  | 0.2057  | 0.1741 | 0.1485 | 0.2382 | 1.2537  | 1.0318  | 1.1081  | 1.3834  |
| Ra-221+E  | 0.1249  | 0.1056 | 0.1069 | 0.1801 | 0.6756  | 0.6326  | 0.6569  | 0.9582  |
| Ra-222+E  | 0.0092  | 0.0075 | 0.0065 | 0.0106 | 0.0582  | 0.0439  | 0.0482  | 0.0636  |
| Ra-223+E  | 0.4587  | 0.3970 | 0.3577 | 0.5423 | 2.7094  | 2.3743  | 2.6332  | 2.9744  |
| Ra-224+E  | 1.6473  | 1.6357 | 1.6768 | 1.6777 | 1.7974  | 1.7419  | 1.7645  | 1.8144  |
| Ra-226+E  | 2.4739  | 2.3461 | 2.2915 | 2.4859 | 6.3718  | 5.2756  | 6.0651  | 7.1980  |
| Ra-228+E  | 2.0917  | 1.9858 | 1.9946 | 2.1063 | 4.4061  | 3.7017  | 4.2015  | 5.1975  |
| Rb-81+E   | 0.4415  | 0.3856 | 0.3667 | 0.5419 | 2.4982  | 2.1504  | 2.2904  | 3.0718  |
| Rb-83+E   | 0.4348  | 0.3704 | 0.3347 | 0.4892 | 2.3899  | 1.9602  | 2.1390  | 3.3060  |
| Re-186m+E | 0.1955  | 0.1591 | 0.2174 | 0.3513 | 0.9722  | 0.8532  | 0.7679  | 1.5377  |
| Rn-219+E  | 0.0648  | 0.0559 | 0.0522 | 0.0679 | 0.4027  | 0.3225  | 0.3784  | 0.3937  |
| Rn-220+E  | 1.6312  | 1.6211 | 1.6623 | 1.6619 | 1.6975  | 1.6561  | 1.6761  | 1.7258  |
| Rn-222+E  | 0.0002  | 0.0002 | 0.0002 | 0.0003 | 0.0016  | 0.0012  | 0.0011  | 0.0013  |
| Ru-103+E  | 0.3324  | 0.2839 | 0.2277 | 0.3505 | 2.0622  | 1.6397  | 1.5186  | 1.7304  |
| Ru-106+E  | 0.1106  | 0.0948 | 0.0768 | 0.1146 | 0.6839  | 0.5291  | 0.5200  | 0.7673  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 0.3823  | 0.3428 | 0.3159 | 0.3342 | 2.2507  | 1.9020  | 2.4230  | 2.2969  |
| Sn-121m+E | 0.0352  | 0.0336 | 0.0350 | 0.0268 | 0.1943  | 0.1905  | 0.2161  | 0.1875  |
| Sn-126+E  | 1.2535  | 1.0810 | 0.8973 | 1.2665 | 7.5705  | 5.9483  | 6.8687  | 9.5797  |
| Sr-82+E   | 0.1750  | 0.1531 | 0.1424 | 0.1759 | 0.8306  | 0.7111  | 1.0273  | 1.6642  |
| Sr-90+E   | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 0.1837  | 0.1799 | 0.1725 | 0.1193 | 1.0434  | 1.0032  | 1.1612  | 0.9572  |
| Te-129m+E | 0.1139  | 0.1050 | 0.1007 | 0.0944 | 0.6566  | 0.5880  | 0.6694  | 0.6307  |
| Th-229+E  | 0.7343  | 0.6380 | 0.6297 | 0.8514 | 3.9715  | 3.7189  | 4.1495  | 5.1899  |
| Th-232+E  | 10.0021 | 9.6646 | 9.7376 | 9.7660 | 15.8634 | 14.2074 | 15.4194 | 16.9242 |
| Th-234+E  | 0.0600  | 0.0537 | 0.0489 | 0.0711 | 0.3193  | 0.2935  | 0.3115  | 0.4484  |
| Ti-44+E   | 0.8054  | 0.7452 | 0.6223 | 0.9414 | 4.8266  | 4.1081  | 4.4272  | 5.3461  |
| U-228+E   | 0.0756  | 0.0651 | 0.0647 | 0.0976 | 0.4176  | 0.3826  | 0.3934  | 0.5441  |
| U-230+E   | 0.0712  | 0.0608 | 0.0625 | 0.0820 | 0.3606  | 0.3277  | 0.3838  | 0.5831  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 4.0628        | 3.9731        | 3.9150        | 4.0477        | 5.0180        | 4.8094        | 5.2838        | 5.5011        |
| U-238+E        | 1.5705        | 1.5557        | 1.4667        | 1.6031        | 1.9130        | 1.8357        | 1.7372        | 1.9147        |
| W-178+E        | 0.3373        | 0.3010        | 0.2898        | 0.4481        | 1.8852        | 1.6144        | 1.3314        | 2.1136        |
| Xe-122+E       | 0.3066        | 0.2807        | 0.2567        | 0.2498        | 1.8076        | 1.5980        | 1.7883        | 1.6800        |
| Zr-93+E        | 0.0216        | 0.0191        | 0.0186        | 0.0154        | 0.1021        | 0.0976        | 0.1155        | 0.1776        |

Table 15: Adobe Infinite Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2486        | 0.2079        | 0.1482        | 0.2529        |
| Ac-225+E       | 1.3325        | 0.9316        | 0.7635        | 1.0020        |
| Ac-227+E       | 4.0862        | 3.0761        | 2.3431        | 2.9303        |
| Ag-108m+E      | 5.9643        | 3.6990        | 3.6902        | 4.1086        |
| Ag-110m+E      | 6.4584        | 3.7483        | 3.6847        | 4.0748        |
| Am-242m+E      | 0.6439        | 0.6163        | 0.5764        | 0.9961        |
| Am-243+E       | 3.6775        | 2.7739        | 2.0244        | 2.5554        |
| Ar-42+E        | 0.4048        | 0.2237        | 0.2071        | 0.2619        |
| At-211+E       | 0.7338        | 0.6365        | 0.3935        | 0.5285        |
| Ba-128+E       | 2.0234        | 1.6065        | 1.4848        | 1.3512        |
| Bi-210m+E      | 1.9180        | 1.3401        | 1.0888        | 0.9806        |
| Bi-212+E       | 0.2816        | 0.1936        | 0.1683        | 0.2308        |
| Bi-213+E       | 0.6196        | 0.3761        | 0.3603        | 0.3754        |
| Bi-214+E       | 2.7375        | 1.5975        | 1.8075        | 1.7977        |
| Bi-215+E       | 1.3640        | 0.9648        | 0.7980        | 0.8261        |
| Bi-216+E       | 3.0011        | 1.7529        | 1.9053        | 1.8143        |
| Cd-118+E       | 0.1221        | 0.0718        | 0.0658        | 0.1043        |
| Ce-134+E       | 1.3133        | 1.1909        | 1.1054        | 0.9001        |
| Ce-144+E       | 0.3340        | 0.2336        | 0.1997        | 0.1651        |
| Cl-34m+E       | 2.1021        | 1.2604        | 1.8004        | 1.1944        |
| Cm-245+E       | 1.8230        | 1.2340        | 0.9236        | 1.3467        |
| Cm-247+E       | 2.0970        | 1.3299        | 1.0595        | 1.2851        |
| Cm-250+E       | 28.8467       | 17.6771       | 19.4194       | 18.2125       |
| Cs-137+E       | 3.5594        | 2.7788        | 2.8054        | 2.7325        |
| Es-254+E       | 2.6415        | 1.9963        | 2.0821        | 2.7188        |
| Fe-60+E        | 3.7667        | 2.2644        | 1.8705        | 3.3001        |
| Fr-220+E       | 0.2358        | 0.2046        | 0.1323        | 0.2094        |
| Fr-221+E       | 0.2908        | 0.2226        | 0.1537        | 0.2106        |
| Ge-68+E        | 0.1876        | 0.2412        | 0.0855        | 0.3557        |
| Hf-172+E       | 2.2651        | 1.9878        | 1.5007        | 1.5774        |
| Hf-182+E       | 5.8984        | 4.0551        | 3.0237        | 3.5674        |
| Hg-193+E       | 3.6097        | 2.7051        | 1.9580        | 2.4430        |
| Hg-194+E       | 3.8931        | 2.8769        | 2.3258        | 2.7085        |
| In-114m+E      | 0.7143        | 0.5932        | 0.5006        | 0.7034        |
| Ir-192m+E      | 4.5616        | 3.1555        | 2.9210        | 3.0777        |
| Kr-76+E        | 2.9124        | 2.1291        | 1.8452        | 2.1941        |
| Mg-28+E        | 5.6082        | 3.4607        | 3.7369        | 3.6892        |
| Nd-140+E       | 1.2903        | 1.1873        | 1.1768        | 0.8715        |
| Ni-66+E        | 0.1936        | 0.1145        | 0.1249        | 0.1277        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2299        | 0.2718        | 0.2382        | 0.5060        |
| Np-237+E       | 2.9462        | 2.3262        | 1.9376        | 2.7370        |
| Os-194+E       | 0.5283        | 0.4218        | 0.3395        | 0.4537        |
| Pa-231+E       | 4.7480        | 3.7294        | 2.8818        | 3.8967        |
| Pb-202+E       | 3.1332        | 2.2659        | 1.7277        | 2.1027        |
| Pb-210+E       | 0.1575        | 0.1895        | 0.1302        | 0.3019        |
| Pd-103+E       | 0.5060        | 0.5813        | 0.6996        | 1.0323        |
| Pt-202+E       | 0.4570        | 0.2670        | 0.2662        | 0.3050        |
| Pu-239+E       | 0.0338        | 0.0416        | 0.0344        | 0.0759        |
| Pu-244+E       | 1.5301        | 1.1485        | 1.1622        | 1.5840        |
| Pu-246+E       | 4.3052        | 2.9424        | 2.6957        | 3.2689        |
| Ra-219+E       | 1.2576        | 0.9255        | 0.7798        | 0.8533        |
| Ra-221+E       | 0.5875        | 0.4565        | 0.2905        | 0.4813        |
| Ra-222+E       | 0.0596        | 0.0417        | 0.0381        | 0.0401        |
| Ra-223+E       | 2.6026        | 1.8533        | 1.3562        | 1.5584        |
| Ra-224+E       | 1.7784        | 1.6280        | 1.7289        | 1.5160        |
| Ra-226+E       | 6.3008        | 4.5170        | 4.4430        | 4.4387        |
| Ra-228+E       | 4.2485        | 3.2856        | 3.0617        | 3.5051        |
| Rb-81+E        | 2.2852        | 1.7104        | 1.3393        | 2.1645        |
| Rb-83+E        | 2.2061        | 1.5168        | 1.6324        | 2.0110        |
| Re-186m+E      | 0.7923        | 0.7665        | 0.4059        | 0.7584        |
| Rn-219+E       | 0.3908        | 0.2547        | 0.2050        | 0.1987        |
| Rn-220+E       | 1.6851        | 1.5631        | 1.6805        | 1.4711        |
| Rn-222+E       | 0.0016        | 0.0009        | 0.0012        | 0.0010        |
| Ru-103+E       | 2.1000        | 1.2591        | 1.5993        | 1.3844        |
| Ru-106+E       | 0.7027        | 0.4087        | 0.4814        | 0.4333        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 2.0999        | 1.5478        | 1.3620        | 1.7657        |
| Sn-121m+E      | 0.1664        | 0.1651        | 0.1423        | 0.1739        |
| Sn-126+E       | 7.5802        | 4.6541        | 4.1377        | 4.5801        |
| Sr-82+E        | 0.6179        | 0.5462        | 0.4735        | 0.9547        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.9073        | 0.8581        | 0.7576        | 0.9493        |
| Te-129m+E      | 0.6007        | 0.5010        | 0.4531        | 0.5058        |
| Th-229+E       | 3.5275        | 2.7952        | 2.2066        | 3.1117        |
| Th-232+E       | 15.5594       | 12.9230       | 13.2310       | 12.9434       |
| Th-234+E       | 0.2806        | 0.2272        | 0.1674        | 0.2534        |
| Ti-44+E        | 4.7307        | 3.5570        | 2.4583        | 2.9989        |
| U-228+E        | 0.3669        | 0.2834        | 0.2109        | 0.3368        |
| U-230+E        | 0.2904        | 0.2515        | 0.2083        | 0.3532        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 4.7395        | 4.4220        | 4.5667        | 4.9178        |
| U-238+E        | 1.8667        | 1.8314        | 2.0181        | 1.4343        |
| W-178+E        | 1.7221        | 1.4871        | 1.0564        | 1.1209        |
| Xe-122+E       | 1.6990        | 1.3718        | 1.2623        | 1.2889        |
| Zr-93+E        | 0.0685        | 0.0734        | 0.0878        | 0.1399        |

## Appendix B

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 16: Concrete Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5887  | 0.3390  | 0.5101  | 0.5977  | 0.4831  | 0.3375  | 0.5549  | 0.6284  |
| Ac-225+E  | 1.5059  | 0.9684  | 1.3411  | 1.5260  | 1.4297  | 1.1430  | 1.5822  | 1.6983  |
| Ac-227+E  | 5.3399  | 3.3934  | 4.7382  | 5.4131  | 4.9584  | 3.9022  | 5.5128  | 5.9678  |
| Ag-108m+E | 3.6161  | 2.5850  | 3.3194  | 3.6461  | 4.1505  | 3.7413  | 4.4120  | 4.4227  |
| Ag-110m+E | 2.9697  | 2.1422  | 2.7400  | 2.9930  | 3.5679  | 3.2657  | 3.7782  | 3.7256  |
| Am-242m+E | 2.0099  | 1.2040  | 1.7575  | 2.0324  | 1.7358  | 1.2879  | 1.9574  | 2.1592  |
| Am-243+E  | 4.6804  | 3.1088  | 4.1955  | 4.7388  | 4.5670  | 3.7630  | 5.0089  | 5.3233  |
| Ar-42+E   | 0.1682  | 0.1194  | 0.1547  | 0.1692  | 0.2039  | 0.1865  | 0.2158  | 0.2115  |
| At-211+E  | 1.1242  | 0.7103  | 0.9944  | 1.1405  | 1.0231  | 0.7942  | 1.1418  | 1.2452  |
| Ba-128+E  | 1.9281  | 1.3105  | 1.7427  | 1.9402  | 2.0766  | 1.8206  | 2.2200  | 2.2652  |
| Bi-210m+E | 1.2409  | 0.8852  | 1.1363  | 1.2583  | 1.3546  | 1.1933  | 1.4586  | 1.5005  |
| Bi-212+E  | 0.4025  | 0.2312  | 0.3492  | 0.4086  | 0.3429  | 0.2451  | 0.3915  | 0.4377  |
| Bi-213+E  | 0.3697  | 0.2627  | 0.3386  | 0.3744  | 0.4105  | 0.3636  | 0.4403  | 0.4491  |
| Bi-214+E  | 1.2629  | 0.9036  | 1.1617  | 1.2724  | 1.5069  | 1.3737  | 1.5966  | 1.5779  |
| Bi-215+E  | 0.9946  | 0.6929  | 0.9046  | 1.0074  | 1.0565  | 0.9143  | 1.1430  | 1.1829  |
| Bi-216+E  | 1.4833  | 1.0768  | 1.3682  | 1.4994  | 1.7266  | 1.5654  | 1.8358  | 1.8395  |
| Cd-118+E  | 0.0621  | 0.0444  | 0.0571  | 0.0625  | 0.0750  | 0.0690  | 0.0793  | 0.0780  |
| Ce-134+E  | 1.6066  | 1.0577  | 1.4385  | 1.6160  | 1.6710  | 1.4352  | 1.7978  | 1.8502  |
| Ce-144+E  | 0.3122  | 0.2234  | 0.2858  | 0.3155  | 0.3439  | 0.3076  | 0.3687  | 0.3744  |
| Cl-34m+E  | 1.1227  | 0.8252  | 1.0386  | 1.1332  | 1.3362  | 1.2263  | 1.4181  | 1.4017  |
| Cm-245+E  | 2.6948  | 1.7661  | 2.4080  | 2.7268  | 2.5697  | 2.0834  | 2.8315  | 3.0288  |
| Cm-247+E  | 1.5414  | 1.0846  | 1.4059  | 1.5609  | 1.6618  | 1.4546  | 1.7899  | 1.8418  |
| Cm-250+E  | 14.9309 | 10.8488 | 13.7748 | 15.0696 | 17.5953 | 16.0544 | 18.6645 | 18.5617 |
| Cs-137+E  | 2.0007  | 1.4466  | 1.8453  | 2.0184  | 2.3806  | 2.1770  | 2.5266  | 2.4806  |
| Es-254+E  | 4.2213  | 2.5469  | 3.7031  | 4.2689  | 3.8237  | 2.9310  | 4.2786  | 4.6456  |
| Fe-60+E   | 2.7113  | 1.7294  | 2.4172  | 2.7418  | 2.8184  | 2.3604  | 3.0765  | 3.1987  |
| Fr-220+E  | 0.4933  | 0.2970  | 0.4316  | 0.5003  | 0.4228  | 0.3100  | 0.4790  | 0.5332  |
| Fr-221+E  | 0.2469  | 0.1730  | 0.2247  | 0.2505  | 0.2583  | 0.2226  | 0.2797  | 0.2909  |
| Ge-68+E   | 1.7409  | 0.8301  | 1.4488  | 1.7786  | 1.1656  | 0.5999  | 1.4335  | 1.7667  |
| Hf-172+E  | 4.4949  | 2.6466  | 3.9129  | 4.5738  | 3.9074  | 2.8770  | 4.4225  | 4.9606  |
| Hf-182+E  | 4.6499  | 3.1636  | 4.2031  | 4.7159  | 4.8808  | 4.1810  | 5.2957  | 5.5264  |
| Hg-193+E  | 3.9214  | 2.4811  | 3.4770  | 3.9812  | 3.7183  | 2.9536  | 4.1283  | 4.4595  |
| Hg-194+E  | 4.0596  | 2.5465  | 3.5932  | 4.1201  | 3.8333  | 3.0267  | 4.2656  | 4.6203  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| In-114m+E | 0.8196 | 0.5638 | 0.7433 | 0.8253 | 0.8790 | 0.7689 | 0.9390 | 0.9638 |
| Ir-192m+E | 3.5187 | 2.3251 | 3.1591 | 3.5683 | 3.5569 | 2.9552 | 3.9038 | 4.1285 |
| Kr-76+E   | 3.4913 | 2.2076 | 3.0965 | 3.5373 | 3.2389 | 2.5330 | 3.6029 | 3.9071 |
| Mg-28+E   | 2.9390 | 2.0986 | 2.7002 | 2.9542 | 3.5013 | 3.2077 | 3.6952 | 3.6404 |
| Nd-140+E  | 1.6556 | 1.0882 | 1.4805 | 1.6670 | 1.7077 | 1.4599 | 1.8419 | 1.9040 |
| Ni-66+E   | 0.0909 | 0.0650 | 0.0836 | 0.0915 | 0.1097 | 0.1008 | 0.1160 | 0.1140 |
| Np-235+E  | 1.1871 | 0.6736 | 1.0252 | 1.2018 | 0.9480 | 0.6470 | 1.0917 | 1.2396 |
| Np-237+E  | 4.8753 | 3.0730 | 4.3166 | 4.9300 | 4.4647 | 3.4878 | 4.9657 | 5.3794 |
| Os-194+E  | 1.0133 | 0.5617 | 0.8710 | 1.0312 | 0.8197 | 0.5557 | 0.9504 | 1.0895 |
| Pa-231+E  | 7.5190 | 4.6497 | 6.6274 | 7.6192 | 6.7452 | 5.1544 | 7.5568 | 8.2716 |
| Pb-202+E  | 3.6650 | 2.2624 | 3.2297 | 3.7241 | 3.3581 | 2.5917 | 3.7609 | 4.1171 |
| Pb-210+E  | 0.9316 | 0.5003 | 0.7946 | 0.9464 | 0.6953 | 0.4318 | 0.8183 | 0.9604 |
| Pd-103+E  | 1.2964 | 0.8543 | 1.1599 | 1.3042 | 1.3076 | 1.1035 | 1.4159 | 1.4707 |
| Pt-202+E  | 0.2301 | 0.1661 | 0.2120 | 0.2325 | 0.2710 | 0.2469 | 0.2878 | 0.2869 |
| Pu-239+E  | 0.1984 | 0.1090 | 0.1701 | 0.2012 | 0.1536 | 0.1006 | 0.1789 | 0.2062 |
| Pu-244+E  | 2.5086 | 1.5380 | 2.2082 | 2.5357 | 2.2629 | 1.7351 | 2.5290 | 2.7471 |
| Pu-246+E  | 4.3607 | 2.9129 | 3.9225 | 4.4072 | 4.4353 | 3.7375 | 4.8269 | 5.0390 |
| Ra-219+E  | 0.9950 | 0.6924 | 0.9041 | 1.0072 | 1.0446 | 0.8991 | 1.1326 | 1.1778 |
| Ra-221+E  | 1.1348 | 0.6960 | 0.9980 | 1.1507 | 0.9946 | 0.7452 | 1.1213 | 1.2371 |
| Ra-222+E  | 0.0354 | 0.0259 | 0.0326 | 0.0357 | 0.0401 | 0.0362 | 0.0430 | 0.0436 |
| Ra-223+E  | 2.5513 | 1.7020 | 2.2917 | 2.5873 | 2.5254 | 2.0886 | 2.7706 | 2.9381 |
| Ra-224+E  | 1.1976 | 0.8758 | 1.1055 | 1.2083 | 1.4218 | 1.3059 | 1.5057 | 1.4819 |
| Ra-226+E  | 3.7324 | 2.6237 | 3.4118 | 3.7688 | 4.2107 | 3.7431 | 4.5013 | 4.5530 |
| Ra-228+E  | 3.3548 | 2.2693 | 3.0334 | 3.3866 | 3.5688 | 3.0688 | 3.8533 | 3.9585 |
| Rb-81+E   | 2.7566 | 1.8054 | 2.4673 | 2.7898 | 2.6260 | 2.1068 | 2.8949 | 3.0949 |
| Rb-83+E   | 2.9413 | 1.8049 | 2.5909 | 2.9745 | 2.6168 | 1.9700 | 2.9322 | 3.2101 |
| Re-186m+E | 2.9894 | 1.5665 | 2.5360 | 3.0489 | 2.2359 | 1.3801 | 2.6510 | 3.1365 |
| Rn-219+E  | 0.2403 | 0.1733 | 0.2209 | 0.2437 | 0.2667 | 0.2372 | 0.2861 | 0.2924 |
| Rn-220+E  | 1.1347 | 0.8306 | 1.0478 | 1.1445 | 1.3534 | 1.2456 | 1.4322 | 1.4063 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.1146 | 0.7951 | 1.0229 | 1.1260 | 1.2726 | 1.1425 | 1.3570 | 1.3659 |
| Ru-106+E  | 0.3180 | 0.2324 | 0.2941 | 0.3209 | 0.3794 | 0.3477 | 0.4016 | 0.3982 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.0785 | 1.4432 | 1.8905 | 2.0905 | 2.2759 | 2.0139 | 2.4205 | 2.4694 |
| Sn-121m+E | 0.3211 | 0.2001 | 0.2838 | 0.3234 | 0.3096 | 0.2509 | 0.3382 | 0.3605 |
| Sn-126+E  | 4.3514 | 3.1231 | 3.9976 | 4.3942 | 4.9932 | 4.4990 | 5.3127 | 5.3455 |
| Sr-82+E   | 1.6414 | 1.0092 | 1.4454 | 1.6544 | 1.4035 | 1.0310 | 1.5761 | 1.7347 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |
| Te-118+E  | 1.3659 | 0.9146 | 1.2300 | 1.3693 | 1.4472 | 1.2583 | 1.5401 | 1.5832 |
| Te-129m+E | 0.7687 | 0.4976 | 0.6863 | 0.7739 | 0.7800 | 0.6553 | 0.8435 | 0.8820 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-229+E       | 6.0621       | 3.7532       | 5.3428       | 6.1391       | 5.4305       | 4.1540       | 6.0786       | 6.6450       |
| Th-232+E       | 8.4451       | 5.7816       | 7.6551       | 8.5316       | 9.1024       | 7.8939       | 9.8120       | 10.0373      |
| Th-234+E       | 0.5008       | 0.3132       | 0.4424       | 0.5068       | 0.4527       | 0.3498       | 0.5048       | 0.5506       |
| Ti-44+E        | 3.3671       | 2.4407       | 3.0907       | 3.4079       | 3.7980       | 3.4237       | 4.0490       | 4.1057       |
| U-228+E        | 0.5903       | 0.3749       | 0.5238       | 0.5976       | 0.5429       | 0.4255       | 0.6041       | 0.6529       |
| U-230+E        | 0.7305       | 0.4395       | 0.6396       | 0.7389       | 0.6257       | 0.4608       | 0.7077       | 0.7835       |
| U-235+E        | 3.9614       | 2.5752       | 3.5326       | 4.0121       | 3.7619       | 3.0410       | 4.1687       | 4.4140       |
| U-238+E        | 1.4916       | 1.0471       | 1.3592       | 1.5118       | 1.6275       | 1.4337       | 1.7412       | 1.7838       |
| W-178+E        | 3.0570       | 1.8090       | 2.6639       | 3.1122       | 2.6698       | 1.9726       | 3.0187       | 3.3870       |
| Xe-122+E       | 1.7452       | 1.1898       | 1.5791       | 1.7535       | 1.8881       | 1.6599       | 2.0120       | 2.0511       |
| Zr-93+E        | 0.2412       | 0.1506       | 0.2131       | 0.2428       | 0.2183       | 0.1713       | 0.2425       | 0.2594       |

Table 17: Concrete Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4829  | 0.3730  | 0.5862  | 0.6547  | 0.3440  | 0.3215  | 0.5678  | 0.6546  |
| Ac-225+E  | 1.5158  | 1.3284  | 1.7159  | 1.7821  | 1.2515  | 1.2532  | 1.7298  | 1.8364  |
| Ac-227+E  | 5.2036  | 4.4895  | 5.9419  | 6.2502  | 4.2127  | 4.1898  | 5.9398  | 6.3978  |
| Ag-108m+E | 4.7084  | 4.5797  | 4.9331  | 4.7058  | 4.3686  | 4.6038  | 5.1754  | 4.9752  |
| Ag-110m+E | 4.1649  | 4.1208  | 4.3198  | 4.0471  | 4.0543  | 4.3566  | 4.6622  | 4.3689  |
| Am-242m+E | 1.7422  | 1.4031  | 2.0375  | 2.2345  | 1.2263  | 1.1521  | 1.9557  | 2.2158  |
| Am-243+E  | 4.8573  | 4.3422  | 5.3998  | 5.5659  | 4.0699  | 4.0974  | 5.4400  | 5.7728  |
| Ar-42+E   | 0.2401  | 0.2381  | 0.2472  | 0.2300  | 0.2351  | 0.2531  | 0.2700  | 0.2503  |
| At-211+E  | 1.0652  | 0.9054  | 1.2243  | 1.2971  | 0.8578  | 0.8444  | 1.2229  | 1.3345  |
| Ba-128+E  | 2.3036  | 2.1730  | 2.4638  | 2.4161  | 2.0543  | 2.1534  | 2.5153  | 2.5172  |
| Bi-210m+E | 1.5167  | 1.4526  | 1.6374  | 1.5972  | 1.4112  | 1.4782  | 1.7038  | 1.6893  |
| Bi-212+E  | 0.3534  | 0.2831  | 0.4212  | 0.4603  | 0.2692  | 0.2615  | 0.4175  | 0.4655  |
| Bi-213+E  | 0.4630  | 0.4449  | 0.4956  | 0.4782  | 0.4333  | 0.4547  | 0.5216  | 0.5071  |
| Bi-214+E  | 1.7573  | 1.7342  | 1.8249  | 1.7115  | 1.7065  | 1.8295  | 1.9735  | 1.8496  |
| Bi-215+E  | 1.1716  | 1.1029  | 1.2711  | 1.2549  | 1.0679  | 1.1123  | 1.3200  | 1.3242  |
| Bi-216+E  | 1.9834  | 1.9455  | 2.0882  | 1.9765  | 1.9033  | 2.0189  | 2.2275  | 2.1101  |
| Cd-118+E  | 0.0880  | 0.0872  | 0.0910  | 0.0850  | 0.0859  | 0.0923  | 0.0989  | 0.0921  |
| Ce-134+E  | 1.8348  | 1.6976  | 1.9799  | 1.9754  | 1.6032  | 1.6782  | 2.0058  | 2.0565  |
| Ce-144+E  | 0.3843  | 0.3696  | 0.4089  | 0.3965  | 0.3572  | 0.3763  | 0.4266  | 0.4243  |
| Cl-34m+E  | 1.5471  | 1.5354  | 1.6099  | 1.5078  | 1.5075  | 1.6138  | 1.7404  | 1.6375  |
| Cm-245+E  | 2.7001  | 2.3741  | 3.0295  | 3.1588  | 2.1933  | 2.1849  | 3.0265  | 3.2646  |
| Cm-247+E  | 1.8443  | 1.7471  | 1.9874  | 1.9466  | 1.6777  | 1.7444  | 2.0606  | 2.0506  |
| Cm-250+E  | 20.3100 | 20.0195 | 21.2095 | 20.0003 | 19.5808 | 20.9026 | 22.7242 | 21.5467 |
| Cs-137+E  | 2.7600  | 2.7609  | 2.8866  | 2.7197  | 2.6720  | 2.8547  | 3.1159  | 2.9352  |
| Es-254+E  | 3.9724  | 3.3370  | 4.5609  | 4.8728  | 3.0417  | 2.9827  | 4.4955  | 4.8931  |
| Fe-60+E   | 3.1676  | 2.9232  | 3.4604  | 3.4513  | 2.8773  | 3.0070  | 3.6480  | 3.6370  |
| Fr-220+E  | 0.4289  | 0.3457  | 0.5074  | 0.5539  | 0.3203  | 0.3065  | 0.4974  | 0.5601  |
| Fr-221+E  | 0.2835  | 0.2661  | 0.3104  | 0.3076  | 0.2552  | 0.2625  | 0.3201  | 0.3273  |
| Ge-68+E   | 1.0798  | 0.6311  | 1.5010  | 1.8489  | 0.6081  | 0.4794  | 1.3930  | 1.7876  |
| Hf-172+E  | 4.0494  | 3.3315  | 4.7597  | 5.2061  | 3.2049  | 3.1601  | 4.7249  | 5.2270  |
| Hf-182+E  | 5.4227  | 5.0790  | 5.9027  | 5.8800  | 4.9613  | 5.1669  | 6.1441  | 6.1915  |
| Hg-193+E  | 3.9819  | 3.4955  | 4.5098  | 4.6964  | 3.3851  | 3.4195  | 4.5861  | 4.8572  |
| Hg-194+E  | 4.1079  | 3.5933  | 4.6620  | 4.8707  | 3.4851  | 3.5291  | 4.7417  | 5.0208  |
| In-114m+E | 0.9629  | 0.9078  | 1.0271  | 1.0071  | 0.8355  | 0.8615  | 1.0382  | 1.0456  |
| Ir-192m+E | 3.9054  | 3.5737  | 4.3325  | 4.3843  | 3.4765  | 3.5980  | 4.4700  | 4.5645  |
| Kr-76+E   | 3.4110  | 2.9401  | 3.8968  | 4.0860  | 2.7646  | 2.7667  | 3.9124  | 4.1885  |
| Mg-28+E   | 4.0591  | 4.0023  | 4.1999  | 3.9358  | 3.8901  | 4.1699  | 4.4932  | 4.2319  |
| Nd-140+E  | 1.8721  | 1.7275  | 2.0199  | 2.0218  | 1.6380  | 1.7194  | 2.0511  | 2.1243  |
| Ni-66+E   | 0.1285  | 0.1274  | 0.1333  | 0.1244  | 0.1255  | 0.1354  | 0.1444  | 0.1346  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.9209  | 0.6827 | 1.1251  | 1.2802  | 0.5880 | 0.5244 | 1.0616  | 1.2518  |
| Np-237+E  | 4.6218  | 3.9277 | 5.2762  | 5.6050  | 3.5814 | 3.5176 | 5.2055  | 5.6882  |
| Os-194+E  | 0.8282  | 0.6343 | 1.0188  | 1.1442  | 0.6089 | 0.5792 | 0.9954  | 1.1447  |
| Pa-231+E  | 6.9700  | 5.8422 | 8.0738  | 8.6386  | 5.4101 | 5.2940 | 7.9769  | 8.7551  |
| Pb-202+E  | 3.5505  | 3.0391 | 4.0937  | 4.3258  | 2.9381 | 2.9280 | 4.1257  | 4.4332  |
| Pb-210+E  | 0.6643  | 0.4564 | 0.8492  | 0.9927  | 0.4095 | 0.3547 | 0.8013  | 0.9729  |
| Pd-103+E  | 1.3752  | 1.2460 | 1.4772  | 1.5020  | 1.0610 | 1.0433 | 1.4352  | 1.5070  |
| Pt-202+E  | 0.3135  | 0.3086 | 0.3285  | 0.3095  | 0.3030 | 0.3231 | 0.3523  | 0.3323  |
| Pu-239+E  | 0.1481  | 0.1062 | 0.1848  | 0.2135  | 0.0928 | 0.0813 | 0.1738  | 0.2081  |
| Pu-244+E  | 2.3325  | 1.9521 | 2.6790  | 2.8667  | 1.7599 | 1.7115 | 2.6318  | 2.8770  |
| Pu-246+E  | 4.8143  | 4.4058 | 5.2641  | 5.3168  | 4.1398 | 4.2456 | 5.3724  | 5.5379  |
| Ra-219+E  | 1.1506  | 1.0761 | 1.2502  | 1.2446  | 1.0375 | 1.0798 | 1.2940  | 1.3103  |
| Ra-221+E  | 1.0164  | 0.8369 | 1.1911  | 1.2869  | 0.7736 | 0.7483 | 1.1729  | 1.3038  |
| Ra-222+E  | 0.0455  | 0.0443 | 0.0482  | 0.0464  | 0.0432 | 0.0459 | 0.0508  | 0.0493  |
| Ra-223+E  | 2.7232  | 2.4609 | 3.0329  | 3.0910  | 2.3595 | 2.4033 | 3.0933  | 3.2247  |
| Ra-224+E  | 1.6440  | 1.6801 | 1.7272  | 1.6061  | 1.5924 | 1.6949 | 1.8467  | 1.7492  |
| Ra-226+E  | 4.8045  | 4.6448 | 5.0967  | 4.8637  | 4.5413 | 4.8003 | 5.4078  | 5.2074  |
| Ra-228+E  | 3.9713  | 3.7714 | 4.2853  | 4.2209  | 3.5691 | 3.7224 | 4.4655  | 4.4271  |
| Rb-81+E   | 2.7715  | 2.4362 | 3.1261  | 3.2241  | 2.2590 | 2.2571 | 3.1536  | 3.3435  |
| Rb-83+E   | 2.6995  | 2.2373 | 3.1302  | 3.3373  | 2.0542 | 1.9990 | 3.1117  | 3.3872  |
| Re-186m+E | 2.1808  | 1.5264 | 2.8050  | 3.2802  | 1.4688 | 1.3194 | 2.6836  | 3.2336  |
| Rn-219+E  | 0.2999  | 0.2893 | 0.3223  | 0.3112  | 0.2808 | 0.2946 | 0.3364  | 0.3301  |
| Rn-220+E  | 1.5679  | 1.6072 | 1.6446  | 1.5257  | 1.5222 | 1.6220 | 1.7613  | 1.6638  |
| Rn-222+E  | 0.0010  | 0.0010 | 0.0011  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4494  | 1.4094 | 1.5318  | 1.4634  | 1.3639 | 1.4359 | 1.6230  | 1.5493  |
| Ru-106+E  | 0.4402  | 0.4359 | 0.4592  | 0.4306  | 0.4275 | 0.4561 | 0.4938  | 0.4618  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.5122  | 2.3875 | 2.6583  | 2.5788  | 2.2023 | 2.2858 | 2.6941  | 2.6681  |
| Sn-121m+E | 0.3287  | 0.2894 | 0.3654  | 0.3767  | 0.2648 | 0.2672 | 0.3593  | 0.3815  |
| Sn-126+E  | 5.6961  | 5.5467 | 5.9936  | 5.7189  | 5.3961 | 5.7178 | 6.3357  | 6.1025  |
| Sr-82+E   | 1.3936  | 1.1040 | 1.6277  | 1.7729  | 0.9453 | 0.8819 | 1.5730  | 1.7747  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0002  | 0.0002  | 0.0001 | 0.0001 | 0.0001  | 0.0002  |
| Te-118+E  | 1.5757  | 1.4672 | 1.6763  | 1.6512  | 1.3318 | 1.3740 | 1.6689  | 1.6889  |
| Te-129m+E | 0.8456  | 0.7697 | 0.9227  | 0.9291  | 0.7147 | 0.7337 | 0.9241  | 0.9514  |
| Th-229+E  | 5.5989  | 4.6849 | 6.4714  | 6.9268  | 4.3220 | 4.2242 | 6.3912  | 7.0529  |
| Th-232+E  | 10.1941 | 9.7660 | 10.9524 | 10.7037 | 9.3151 | 9.7425 | 11.5240 | 11.3631 |
| Th-234+E  | 0.4666  | 0.3928 | 0.5346  | 0.5722  | 0.3598 | 0.3512 | 0.5274  | 0.5806  |
| Ti-44+E   | 4.2993  | 4.1695 | 4.5240  | 4.3609  | 4.0993 | 4.3177 | 4.7905  | 4.6765  |
| U-228+E   | 0.5629  | 0.4814 | 0.6436  | 0.6815  | 0.4401 | 0.4325 | 0.6373  | 0.6926  |
| U-230+E   | 0.6282  | 0.5028 | 0.7402  | 0.8129  | 0.4473 | 0.4224 | 0.7157  | 0.8101  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.9576        | 3.4756        | 4.4497        | 4.6479        | 3.2117        | 3.1787        | 4.3981        | 4.7326        |
| U-238+E        | 1.8168        | 1.7294        | 1.9267        | 1.8567        | 1.6719        | 1.7476        | 2.0298        | 1.9656        |
| W-178+E        | 2.7783        | 2.2973        | 3.2552        | 3.5589        | 2.2301        | 2.2100        | 3.2485        | 3.5836        |
| Xe-122+E       | 2.0885        | 1.9720        | 2.2211        | 2.1725        | 1.8434        | 1.9268        | 2.2579        | 2.2539        |
| Zr-93+E        | 0.2194        | 0.1822        | 0.2486        | 0.2701        | 0.1519        | 0.1436        | 0.2363        | 0.2625        |

Table 18: Concrete Surface Contamination 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2466        | 0.3148        | 0.5664        | 0.6748        |
| Ac-225+E       | 1.0390        | 1.2526        | 1.7495        | 1.9537        |
| Ac-227+E       | 3.4319        | 4.1489        | 5.9643        | 6.7950        |
| Ag-108m+E      | 3.9283        | 4.6456        | 5.3144        | 5.5487        |
| Ag-110m+E      | 3.8549        | 4.5761        | 4.8804        | 5.0079        |
| Am-242m+E      | 0.8162        | 1.0611        | 1.9225        | 2.2729        |
| Am-243+E       | 3.3905        | 4.0314        | 5.4287        | 6.1560        |
| Ar-42+E        | 0.2257        | 0.2673        | 0.2862        | 0.2885        |
| At-211+E       | 0.7011        | 0.8403        | 1.2079        | 1.4202        |
| Ba-128+E       | 1.7632        | 2.0634        | 2.5418        | 2.7581        |
| Bi-210m+E      | 1.2958        | 1.5014        | 1.7553        | 1.8825        |
| Bi-212+E       | 0.2111        | 0.2683        | 0.4241        | 0.4910        |
| Bi-213+E       | 0.3992        | 0.4656        | 0.5386        | 0.5656        |
| Bi-214+E       | 1.6237        | 1.9153        | 2.0725        | 2.1164        |
| Bi-215+E       | 0.9660        | 1.1295        | 1.3504        | 1.4650        |
| Bi-216+E       | 1.7854        | 2.0815        | 2.3177        | 2.3770        |
| Cd-118+E       | 0.0822        | 0.0972        | 0.1048        | 0.1060        |
| Ce-134+E       | 1.3519        | 1.5995        | 2.0133        | 2.2160        |
| Ce-144+E       | 0.3246        | 0.3825        | 0.4365        | 0.4717        |
| Cl-34m+E       | 1.4396        | 1.6930        | 1.8391        | 1.8571        |
| Cm-245+E       | 1.7658        | 2.1268        | 3.0201        | 3.4450        |
| Cm-247+E       | 1.5025        | 1.7547        | 2.1026        | 2.2603        |
| Cm-250+E       | 18.4548       | 21.6532       | 23.7559       | 24.3519       |
| Cs-137+E       | 2.5236        | 2.9509        | 3.2782        | 3.3234        |
| Es-254+E       | 2.2917        | 2.8856        | 4.5093        | 5.1574        |
| Fe-60+E        | 2.6329        | 3.1622        | 3.8308        | 4.0582        |
| Fr-220+E       | 0.2419        | 0.3012        | 0.4926        | 0.5844        |
| Fr-221+E       | 0.2282        | 0.2651        | 0.3277        | 0.3479        |
| Ge-68+E        | 0.3335        | 0.4908        | 1.4036        | 1.7907        |
| Hf-172+E       | 2.6007        | 3.1506        | 4.7498        | 5.4641        |
| Hf-182+E       | 4.5310        | 5.2998        | 6.3195        | 6.7896        |
| Hg-193+E       | 2.9287        | 3.4970        | 4.6534        | 5.2090        |
| Hg-194+E       | 3.0130        | 3.6042        | 4.8365        | 5.3978        |
| In-114m+E      | 0.6901        | 0.8185        | 1.0458        | 1.1218        |
| Ir-192m+E      | 3.1045        | 3.6656        | 4.6221        | 4.9772        |
| Kr-76+E        | 2.2631        | 2.7658        | 3.9632        | 4.4616        |
| Mg-28+E        | 3.6199        | 4.2572        | 4.6881        | 4.8230        |
| Nd-140+E       | 1.3923        | 1.6776        | 2.0633        | 2.2661        |
| Ni-66+E        | 0.1198        | 0.1413        | 0.1515        | 0.1558        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3447        | 0.4796        | 1.0404        | 1.2674        |
| Np-237+E       | 2.7400        | 3.3785        | 5.1795        | 5.9692        |
| Os-194+E       | 0.4643        | 0.5870        | 1.0112        | 1.1892        |
| Pa-231+E       | 4.2105        | 5.1826        | 7.9753        | 9.2124        |
| Pb-202+E       | 2.4850        | 2.9788        | 4.1756        | 4.7360        |
| Pb-210+E       | 0.2420        | 0.3420        | 0.7921        | 0.9827        |
| Pd-103+E       | 0.7369        | 0.9223        | 1.3998        | 1.5604        |
| Pt-202+E       | 0.2863        | 0.3359        | 0.3692        | 0.3778        |
| Pu-239+E       | 0.0537        | 0.0753        | 0.1711        | 0.2101        |
| Pu-244+E       | 1.3011        | 1.6462        | 2.6257        | 3.0098        |
| Pu-246+E       | 3.5179        | 4.2329        | 5.4508        | 5.9673        |
| Ra-219+E       | 0.9288        | 1.0860        | 1.3211        | 1.4339        |
| Ra-221+E       | 0.5935        | 0.7369        | 1.1709        | 1.3581        |
| Ra-222+E       | 0.0401        | 0.0464        | 0.0530        | 0.0550        |
| Ra-223+E       | 2.0509        | 2.4184        | 3.1257        | 3.4919        |
| Ra-224+E       | 1.5059        | 1.7407        | 1.9070        | 2.0967        |
| Ra-226+E       | 4.2314        | 4.9746        | 5.7280        | 5.9235        |
| Ra-228+E       | 3.1828        | 3.8024        | 4.7227        | 4.8972        |
| Rb-81+E        | 1.8472        | 2.2520        | 3.1963        | 3.4876        |
| Rb-83+E        | 1.5720        | 1.9896        | 3.1239        | 3.5723        |
| Re-186m+E      | 1.0280        | 1.3411        | 2.7017        | 3.2976        |
| Rn-219+E       | 0.2584        | 0.2994        | 0.3470        | 0.3695        |
| Rn-220+E       | 1.4421        | 1.6669        | 1.8192        | 2.0027        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.2528        | 1.4704        | 1.6865        | 1.7268        |
| Ru-106+E       | 0.4045        | 0.4727        | 0.5158        | 0.5235        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8305        | 2.1672        | 2.7118        | 2.9365        |
| Sn-121m+E      | 0.2030        | 0.2463        | 0.3569        | 0.4083        |
| Sn-126+E       | 4.9914        | 5.8449        | 6.5217        | 6.8557        |
| Sr-82+E        | 0.6075        | 0.8332        | 1.5357        | 1.8334        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.0499        | 1.2518        | 1.6538        | 1.8457        |
| Te-129m+E      | 0.5794        | 0.6911        | 0.9261        | 1.0325        |
| Th-229+E       | 3.3388        | 4.1406        | 6.3715        | 7.3662        |
| Th-232+E       | 8.4473        | 9.9954        | 12.0367       | 12.8899       |
| Th-234+E       | 0.2762        | 0.3410        | 0.5223        | 0.6065        |
| Ti-44+E        | 3.8485        | 4.4370        | 4.8567        | 5.2388        |
| U-228+E        | 0.3417        | 0.4206        | 0.6386        | 0.7180        |
| U-230+E        | 0.3100        | 0.4000        | 0.7078        | 0.8367        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5877        | 3.1193        | 4.4051        | 5.2188        |
| U-238+E        | 1.5169        | 1.7779        | 2.2533        | 2.2814        |
| W-178+E        | 1.8501        | 2.2262        | 3.2689        | 3.7357        |
| Xe-122+E       | 1.5531        | 1.8256        | 2.2706        | 2.4717        |
| Zr-93+E        | 0.0939        | 0.1247        | 0.2296        | 0.2672        |

Table 19: Concrete 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4189  | 0.3387  | 0.3992  | 0.4371  | 0.3517  | 0.2583  | 0.3579  | 0.3902  |
| Ac-225+E  | 1.3367  | 1.1300  | 1.2750  | 1.3568  | 1.3254  | 1.1079  | 1.2815  | 1.6121  |
| Ac-227+E  | 4.5956  | 3.8886  | 4.3911  | 4.6366  | 4.4154  | 3.6122  | 4.2575  | 5.3216  |
| Ag-108m+E | 4.0033  | 3.4855  | 3.7338  | 3.9787  | 4.5769  | 4.1358  | 4.2657  | 5.8098  |
| Ag-110m+E | 3.7677  | 3.1181  | 3.4480  | 3.6832  | 4.5548  | 4.2230  | 4.2842  | 5.8121  |
| Am-242m+E | 1.3435  | 1.1457  | 1.3024  | 1.3977  | 1.1032  | 0.8080  | 1.2519  | 1.1416  |
| Am-243+E  | 4.2489  | 3.6839  | 4.0884  | 4.2859  | 4.1444  | 3.4731  | 3.9863  | 4.6726  |
| Ar-42+E   | 0.2035  | 0.1624  | 0.1901  | 0.1923  | 0.2530  | 0.2290  | 0.2466  | 0.3010  |
| At-211+E  | 0.9559  | 0.8174  | 0.9059  | 0.9633  | 0.8826  | 0.7002  | 0.8233  | 0.9703  |
| Ba-128+E  | 1.7395  | 1.5693  | 1.6883  | 1.7496  | 1.8353  | 1.4250  | 1.4731  | 2.5592  |
| Bi-210m+E | 1.4354  | 1.2253  | 1.3515  | 1.3893  | 1.5932  | 1.4232  | 1.4215  | 2.1506  |
| Bi-212+E  | 0.3094  | 0.2436  | 0.2886  | 0.3201  | 0.2842  | 0.2214  | 0.2791  | 0.3361  |
| Bi-213+E  | 0.4191  | 0.3617  | 0.3915  | 0.4155  | 0.4742  | 0.4279  | 0.4282  | 0.6376  |
| Bi-214+E  | 1.5551  | 1.2746  | 1.4350  | 1.5047  | 1.8816  | 1.7225  | 1.7620  | 2.3214  |
| Bi-215+E  | 1.0899  | 0.9296  | 1.0242  | 1.0613  | 1.1842  | 1.0406  | 1.0735  | 1.5308  |
| Bi-216+E  | 1.8032  | 1.5447  | 1.6695  | 1.7963  | 2.1220  | 1.9514  | 1.9146  | 2.7241  |
| Cd-118+E  | 0.0769  | 0.0619  | 0.0709  | 0.0728  | 0.0940  | 0.0862  | 0.0888  | 0.1206  |
| Ce-134+E  | 1.3477  | 1.2258  | 1.3252  | 1.3757  | 1.3542  | 0.9803  | 1.0323  | 1.9380  |
| Ce-144+E  | 0.3352  | 0.2952  | 0.3317  | 0.3226  | 0.3556  | 0.3066  | 0.3289  | 0.4705  |
| Cl-34m+E  | 1.3771  | 1.1347  | 1.3415  | 1.2967  | 1.6281  | 1.4742  | 1.5333  | 1.9742  |
| Cm-245+E  | 2.3235  | 2.0050  | 2.2802  | 2.3670  | 2.2224  | 1.8425  | 2.2312  | 2.3744  |
| Cm-247+E  | 1.6423  | 1.4384  | 1.5533  | 1.6229  | 1.7892  | 1.5864  | 1.6494  | 2.4333  |
| Cm-250+E  | 18.1549 | 15.2099 | 17.0534 | 17.6370 | 21.4037 | 19.5016 | 19.8505 | 27.4003 |
| Cs-137+E  | 2.4574  | 2.0275  | 2.3351  | 2.4995  | 2.8507  | 2.7057  | 2.8458  | 3.2488  |
| Es-254+E  | 3.1793  | 2.6199  | 3.0020  | 3.2279  | 2.8942  | 2.3036  | 3.1172  | 3.3890  |
| Fe-60+E   | 2.7822  | 2.1705  | 2.5673  | 2.6892  | 3.1160  | 2.7293  | 2.9908  | 3.9193  |
| Fr-220+E  | 0.3717  | 0.3103  | 0.3552  | 0.3811  | 0.3236  | 0.2443  | 0.3194  | 0.3536  |
| Fr-221+E  | 0.2700  | 0.2315  | 0.2621  | 0.2729  | 0.2870  | 0.2526  | 0.2646  | 0.3618  |
| Ge-68+E   | 1.0053  | 0.6950  | 0.9346  | 1.0988  | 0.6405  | 0.3352  | 0.6468  | 0.6613  |
| Hf-172+E  | 3.5280  | 2.8730  | 3.3233  | 3.6712  | 3.0784  | 2.3637  | 2.7534  | 3.6551  |
| Hf-182+E  | 4.9708  | 4.1448  | 4.6516  | 4.9022  | 5.3457  | 4.7104  | 4.8021  | 6.7364  |
| Hg-193+E  | 3.6088  | 2.9789  | 3.3477  | 3.6419  | 3.5801  | 2.9972  | 3.2676  | 4.3109  |
| Hg-194+E  | 3.7269  | 3.0456  | 3.4336  | 3.7349  | 3.7270  | 3.1083  | 3.3869  | 4.5880  |
| In-114m+E | 0.7179  | 0.6458  | 0.7053  | 0.7287  | 0.7221  | 0.5888  | 0.6513  | 0.8877  |
| Ir-192m+E | 3.6667  | 3.0436  | 3.4064  | 3.6228  | 3.9314  | 3.4122  | 3.5364  | 5.2174  |
| Kr-76+E   | 2.9780  | 2.4929  | 2.8231  | 2.9949  | 2.9181  | 2.3834  | 2.7592  | 3.7410  |
| Mg-28+E   | 3.2979  | 2.7692  | 3.1098  | 3.1728  | 3.9308  | 3.4450  | 3.5670  | 5.0843  |
| Nd-140+E  | 1.4037  | 1.2741  | 1.3850  | 1.4396  | 1.3596  | 1.0218  | 1.0641  | 2.0244  |
| Ni-66+E   | 0.1133  | 0.0910  | 0.1031  | 0.1069  | 0.1352  | 0.1262  | 0.1312  | 0.1792  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|--------|---------|
| Np-235+E  | 0.7123 | 0.5859 | 0.6832 | 0.7522 | 0.5314 | 0.3480 | 0.6323 | 0.5414  |
| Np-237+E  | 3.8444 | 3.2914 | 3.6957 | 3.9162 | 3.5583 | 2.8161 | 3.6003 | 4.0726  |
| Os-194+E  | 0.7528 | 0.5844 | 0.7044 | 0.7804 | 0.6460 | 0.4783 | 0.6078 | 0.8048  |
| Pa-231+E  | 5.9928 | 5.0404 | 5.7274 | 6.0976 | 5.5271 | 4.3744 | 5.4738 | 6.5473  |
| Pb-202+E  | 3.2080 | 2.6534 | 2.9738 | 3.2695 | 3.0982 | 2.5468 | 2.8173 | 3.7949  |
| Pb-210+E  | 0.5482 | 0.4254 | 0.5200 | 0.5870 | 0.3889 | 0.2321 | 0.4151 | 0.4070  |
| Pd-103+E  | 0.9028 | 0.8486 | 0.8921 | 0.9164 | 0.7973 | 0.6228 | 0.8872 | 0.8031  |
| Pt-202+E  | 0.2804 | 0.2349 | 0.2591 | 0.2730 | 0.3330 | 0.3066 | 0.3073 | 0.4467  |
| Pu-239+E  | 0.1181 | 0.0944 | 0.1127 | 0.1256 | 0.0854 | 0.0541 | 0.0995 | 0.0872  |
| Pu-244+E  | 1.8746 | 1.5821 | 1.7842 | 1.9270 | 1.7151 | 1.3566 | 1.8335 | 1.9240  |
| Pu-246+E  | 4.1021 | 3.4980 | 3.9424 | 4.1074 | 4.2073 | 3.6244 | 4.1487 | 5.1079  |
| Ra-219+E  | 1.0786 | 0.9242 | 1.0142 | 1.0517 | 1.1591 | 1.0074 | 1.0445 | 1.4939  |
| Ra-221+E  | 0.8846 | 0.7403 | 0.8598 | 0.9002 | 0.7958 | 0.6188 | 0.7972 | 0.8826  |
| Ra-222+E  | 0.0434 | 0.0372 | 0.0404 | 0.0416 | 0.0498 | 0.0446 | 0.0442 | 0.0694  |
| Ra-223+E  | 2.4962 | 2.1351 | 2.3791 | 2.4792 | 2.5460 | 2.1662 | 2.3442 | 3.1280  |
| Ra-224+E  | 1.4236 | 1.1611 | 1.3915 | 1.4702 | 1.6011 | 1.5735 | 1.6976 | 1.6977  |
| Ra-226+E  | 4.3404 | 3.5752 | 4.0932 | 4.3081 | 4.9387 | 4.5321 | 4.7756 | 5.9579  |
| Ra-228+E  | 3.4357 | 2.8201 | 3.2731 | 3.4740 | 3.7132 | 3.3780 | 3.8233 | 4.3348  |
| Rb-81+E   | 2.4192 | 2.0564 | 2.3403 | 2.4765 | 2.4257 | 2.0192 | 2.3593 | 2.9327  |
| Rb-83+E   | 2.2277 | 1.8518 | 2.0913 | 2.3013 | 2.1093 | 1.6690 | 2.1056 | 2.3437  |
| Re-186m+E | 1.9844 | 1.4893 | 1.8533 | 2.1135 | 1.4949 | 0.9949 | 1.4251 | 1.6600  |
| Rn-219+E  | 0.2791 | 0.2408 | 0.2639 | 0.2709 | 0.3138 | 0.2826 | 0.2828 | 0.4378  |
| Rn-220+E  | 1.3517 | 1.0993 | 1.3221 | 1.3994 | 1.5221 | 1.5025 | 1.6254 | 1.5929  |
| Rn-222+E  | 0.0009 | 0.0008 | 0.0009 | 0.0009 | 0.0011 | 0.0010 | 0.0010 | 0.0013  |
| Ru-103+E  | 1.2774 | 1.0927 | 1.1899 | 1.2886 | 1.4742 | 1.3484 | 1.3401 | 1.7759  |
| Ru-106+E  | 0.3999 | 0.3385 | 0.3683 | 0.3984 | 0.4789 | 0.4440 | 0.4345 | 0.5856  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 1.7982 | 1.6450 | 1.7333 | 1.7909 | 1.8500 | 1.5194 | 1.6514 | 2.5230  |
| Sn-121m+E | 0.2222 | 0.1981 | 0.2173 | 0.2296 | 0.1942 | 0.1305 | 0.1613 | 0.2474  |
| Sn-126+E  | 5.0684 | 4.3691 | 4.7106 | 5.0292 | 5.8227 | 5.2537 | 5.2443 | 7.4926  |
| Sr-82+E   | 1.0349 | 0.8916 | 0.9884 | 1.0695 | 0.8834 | 0.6318 | 1.0131 | 0.9304  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001  |
| Te-118+E  | 0.9897 | 0.9263 | 0.9754 | 1.0032 | 0.9287 | 0.6542 | 0.7605 | 1.1842  |
| Te-129m+E | 0.6030 | 0.5374 | 0.5838 | 0.6153 | 0.5850 | 0.4334 | 0.4880 | 0.7569  |
| Th-229+E  | 4.7494 | 4.0225 | 4.5722 | 4.8832 | 4.3095 | 3.3897 | 4.3034 | 4.9796  |
| Th-232+E  | 9.0099 | 7.4012 | 8.6163 | 9.1378 | 9.8111 | 8.9892 | 9.8969 | 11.2586 |
| Th-234+E  | 0.3885 | 0.3303 | 0.3678 | 0.4001 | 0.3525 | 0.2797 | 0.3554 | 0.3791  |
| Ti-44+E   | 3.9274 | 3.3872 | 3.6062 | 3.7998 | 4.3015 | 3.8346 | 3.7952 | 5.2058  |
| U-228+E   | 0.4831 | 0.4119 | 0.4716 | 0.4937 | 0.4540 | 0.3678 | 0.4639 | 0.5231  |
| U-230+E   | 0.5110 | 0.4300 | 0.4915 | 0.5268 | 0.4353 | 0.3264 | 0.4814 | 0.4801  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.3152       | 2.8344       | 3.2357       | 3.4478       | 3.1217       | 2.7138       | 3.3920       | 3.2449       |
| U-238+E        | 1.4300       | 1.1960       | 1.3855       | 1.4746       | 1.5149       | 1.4365       | 1.5921       | 1.5977       |
| W-178+E        | 2.4699       | 2.0019       | 2.2901       | 2.5825       | 2.1978       | 1.7228       | 1.9133       | 2.5832       |
| Xe-122+E       | 1.5099       | 1.3728       | 1.4675       | 1.5195       | 1.5646       | 1.2052       | 1.2770       | 2.0773       |
| Zr-93+E        | 0.1583       | 0.1424       | 0.1551       | 0.1634       | 0.1307       | 0.1004       | 0.1755       | 0.1409       |

Table 20: Concrete 1cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3493  | 0.2590  | 0.3548  | 0.4046  | 0.2731  | 0.2261  | 0.4920  | 0.4309  |
| Ac-225+E  | 1.3603  | 1.0998  | 1.3502  | 1.4491  | 1.2088  | 0.9469  | 2.3716  | 1.6612  |
| Ac-227+E  | 4.5200  | 3.5498  | 4.3698  | 4.8102  | 3.9533  | 3.1794  | 7.3849  | 5.2036  |
| Ag-108m+E | 4.8277  | 4.1910  | 5.4316  | 5.1903  | 4.6615  | 3.4684  | 11.1906 | 6.6799  |
| Ag-110m+E | 4.9391  | 4.3662  | 5.8768  | 5.0920  | 4.8640  | 3.7116  | 13.1176 | 7.2092  |
| Am-242m+E | 1.0563  | 0.7691  | 1.0048  | 1.3363  | 0.7974  | 0.6481  | 1.2158  | 1.2890  |
| Am-243+E  | 4.2724  | 3.3164  | 4.0355  | 4.3852  | 3.7904  | 3.0443  | 6.6216  | 4.4554  |
| Ar-42+E   | 0.2787  | 0.2471  | 0.2964  | 0.2760  | 0.2766  | 0.2149  | 0.6823  | 0.3183  |
| At-211+E  | 0.9168  | 0.6754  | 0.8107  | 0.9657  | 0.7963  | 0.5503  | 1.5450  | 1.0211  |
| Ba-128+E  | 1.7999  | 1.3614  | 2.3389  | 2.2937  | 1.6721  | 1.2818  | 3.3186  | 2.3885  |
| Bi-210m+E | 1.6713  | 1.4300  | 1.6744  | 1.6157  | 1.5889  | 1.3602  | 2.9170  | 1.8261  |
| Bi-212+E  | 0.2921  | 0.2314  | 0.3390  | 0.3323  | 0.2468  | 0.1937  | 0.5861  | 0.4074  |
| Bi-213+E  | 0.5030  | 0.4283  | 0.5186  | 0.5019  | 0.4825  | 0.3652  | 1.0204  | 0.6648  |
| Bi-214+E  | 2.0400  | 1.8039  | 2.3222  | 2.1111  | 2.0084  | 1.5502  | 5.1615  | 2.7761  |
| Bi-215+E  | 1.2505  | 1.0405  | 1.2386  | 1.2369  | 1.1748  | 0.9792  | 2.3221  | 1.3951  |
| Bi-216+E  | 2.2642  | 1.9704  | 2.4678  | 2.2901  | 2.2000  | 1.6781  | 4.7278  | 3.1808  |
| Cd-118+E  | 0.1019  | 0.0914  | 0.1150  | 0.1158  | 0.1013  | 0.0786  | 0.2592  | 0.1501  |
| Ce-134+E  | 1.2940  | 0.8604  | 1.8327  | 1.6579  | 1.1676  | 0.8647  | 2.3873  | 1.6902  |
| Ce-144+E  | 0.3676  | 0.2991  | 0.3952  | 0.3615  | 0.3454  | 0.2568  | 0.6508  | 0.4488  |
| Cl-34m+E  | 1.7249  | 1.5628  | 1.8175  | 1.6898  | 1.7014  | 1.3324  | 3.8276  | 2.0927  |
| Cm-245+E  | 2.2772  | 1.7578  | 2.1392  | 2.3832  | 1.9638  | 1.7352  | 3.1535  | 2.3654  |
| Cm-247+E  | 1.8844  | 1.5624  | 1.8800  | 1.8700  | 1.7791  | 1.3601  | 3.8869  | 2.3127  |
| Cm-250+E  | 22.8698 | 20.0930 | 25.0908 | 23.0833 | 22.3504 | 17.6742 | 51.9290 | 29.2285 |
| Cs-137+E  | 3.0911  | 2.9621  | 3.5085  | 3.1182  | 3.0220  | 2.7718  | 5.5460  | 3.7573  |
| Es-254+E  | 2.8916  | 2.3479  | 3.2135  | 3.4494  | 2.4373  | 1.9098  | 5.3522  | 4.0316  |
| Fe-60+E   | 3.3421  | 2.9434  | 3.8515  | 3.8034  | 3.2068  | 2.4970  | 8.2554  | 4.8603  |
| Fr-220+E  | 0.3266  | 0.2387  | 0.3047  | 0.3704  | 0.2667  | 0.2013  | 0.4920  | 0.3808  |
| Fr-221+E  | 0.2943  | 0.2522  | 0.2868  | 0.2890  | 0.2763  | 0.2126  | 0.5505  | 0.3137  |
| Ge-68+E   | 0.6016  | 0.4207  | 0.8432  | 0.7367  | 0.3544  | 0.2926  | 0.6704  | 0.9748  |
| Hf-172+E  | 3.0572  | 2.3797  | 3.6388  | 3.3526  | 2.6537  | 1.8071  | 5.0233  | 3.4304  |
| Hf-182+E  | 5.5721  | 4.7594  | 6.0906  | 5.6656  | 5.3022  | 4.1593  | 11.0092 | 6.5134  |
| Hg-193+E  | 3.6900  | 3.0184  | 4.0291  | 3.8176  | 3.3562  | 2.4709  | 7.2365  | 4.3510  |
| Hg-194+E  | 3.8523  | 3.1547  | 4.2497  | 3.9556  | 3.4789  | 2.8446  | 7.2234  | 4.2695  |
| In-114m+E | 0.7232  | 0.6232  | 0.7935  | 1.0148  | 0.6675  | 0.5109  | 1.3336  | 0.7438  |
| Ir-192m+E | 4.1095  | 3.4676  | 4.3978  | 4.0598  | 3.7932  | 3.4506  | 7.3209  | 4.5383  |
| Kr-76+E   | 2.9860  | 2.3846  | 3.0217  | 3.2878  | 2.6118  | 2.2666  | 4.9710  | 3.3905  |
| Mg-28+E   | 4.1650  | 3.5791  | 4.8302  | 4.5566  | 4.0885  | 3.1566  | 10.0276 | 5.3283  |
| Nd-140+E  | 1.3493  | 0.8633  | 1.7368  | 1.5934  | 1.1997  | 0.8960  | 2.4189  | 1.4096  |
| Ni-66+E   | 0.1464  | 0.1338  | 0.1760  | 0.1529  | 0.1450  | 0.1152  | 0.3932  | 0.2159  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.4951  | 0.3340 | 0.4754  | 0.6906  | 0.3267 | 0.2680 | 0.5043  | 0.6771  |
| Np-237+E  | 3.5839  | 2.6957 | 3.4413  | 4.0811  | 2.9891 | 2.6442 | 5.1301  | 3.9143  |
| Os-194+E  | 0.6513  | 0.5027 | 0.7541  | 0.7094  | 0.5273 | 0.4634 | 1.0475  | 0.7881  |
| Pa-231+E  | 5.5858  | 4.2992 | 5.4466  | 6.2550  | 4.7223 | 3.8372 | 8.6730  | 6.5751  |
| Pb-202+E  | 3.1901  | 2.5576 | 3.4142  | 3.3235  | 2.8445 | 2.0703 | 5.7974  | 3.9872  |
| Pb-210+E  | 0.3671  | 0.2414 | 0.3954  | 0.5109  | 0.2361 | 0.1922 | 0.4164  | 0.4961  |
| Pd-103+E  | 0.7275  | 0.6082 | 0.6797  | 0.9823  | 0.6221 | 0.3933 | 0.8883  | 0.7521  |
| Pt-202+E  | 0.3572  | 0.3154 | 0.3951  | 0.3699  | 0.3502 | 0.2700 | 0.8259  | 0.5023  |
| Pu-239+E  | 0.0793  | 0.0539 | 0.0824  | 0.1078  | 0.0513 | 0.0416 | 0.0804  | 0.1122  |
| Pu-244+E  | 1.7080  | 1.3315 | 1.7506  | 2.0469  | 1.4152 | 1.1156 | 2.7489  | 2.2958  |
| Pu-246+E  | 4.3535  | 3.5884 | 4.5601  | 4.6409  | 3.9755 | 3.1767 | 8.2705  | 5.2725  |
| Ra-219+E  | 1.2229  | 0.9934 | 1.1892  | 1.1844  | 1.1288 | 1.0392 | 2.1266  | 1.1758  |
| Ra-221+E  | 0.7950  | 0.6127 | 0.7603  | 0.8858  | 0.6626 | 0.5237 | 1.1981  | 0.9466  |
| Ra-222+E  | 0.0528  | 0.0446 | 0.0540  | 0.0499  | 0.0499 | 0.0485 | 0.0975  | 0.0505  |
| Ra-223+E  | 2.6610  | 2.1362 | 2.5567  | 2.6628  | 2.4288 | 1.9337 | 4.6998  | 2.9854  |
| Ra-224+E  | 1.7438  | 1.7993 | 1.8251  | 1.7389  | 1.7059 | 1.7617 | 1.9210  | 1.7901  |
| Ra-226+E  | 5.3266  | 4.8536 | 5.6621  | 5.3420  | 5.1422 | 4.5312 | 9.9953  | 6.2397  |
| Ra-228+E  | 3.9621  | 3.6412 | 4.2305  | 4.1113  | 3.7217 | 3.4083 | 6.5992  | 4.6895  |
| Rb-81+E   | 2.4325  | 2.0226 | 2.3907  | 2.7540  | 2.1552 | 1.7133 | 4.4517  | 2.8310  |
| Rb-83+E   | 2.1375  | 1.6766 | 2.1521  | 2.6582  | 1.7906 | 1.4397 | 3.3217  | 2.9604  |
| Re-186m+E | 1.4484  | 1.0740 | 1.8369  | 1.6309  | 1.0714 | 0.8156 | 1.9676  | 1.9037  |
| Rn-219+E  | 0.3303  | 0.2839 | 0.3297  | 0.3214  | 0.3165 | 0.2567 | 0.6259  | 0.3937  |
| Rn-220+E  | 1.6619  | 1.7279 | 1.7459  | 1.6586  | 1.6277 | 1.7003 | 1.7809  | 1.6950  |
| Rn-222+E  | 0.0012  | 0.0010 | 0.0012  | 0.0012  | 0.0011 | 0.0009 | 0.0020  | 0.0016  |
| Ru-103+E  | 1.5562  | 1.3615 | 1.6478  | 1.6082  | 1.5004 | 1.1486 | 2.6097  | 2.1739  |
| Ru-106+E  | 0.5132  | 0.4520 | 0.5749  | 0.5261  | 0.5017 | 0.3856 | 1.0754  | 0.7399  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.8906  | 1.6011 | 2.0713  | 2.6817  | 1.7560 | 1.3608 | 3.6709  | 2.1173  |
| Sn-121m+E | 0.1881  | 0.1397 | 0.2428  | 0.3269  | 0.1580 | 0.1225 | 0.2883  | 0.2067  |
| Sn-126+E  | 6.2174  | 5.3007 | 7.0436  | 6.5189  | 6.0152 | 4.5574 | 14.8145 | 8.3585  |
| Sr-82+E   | 0.8593  | 0.5910 | 0.7275  | 1.2820  | 0.6288 | 0.5310 | 1.2782  | 1.1257  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0001  | 0.0001  | 0.0001 | 0.0000 | 0.0001  | 0.0001  |
| Te-118+E  | 0.9105  | 0.7141 | 1.1393  | 1.7106  | 0.8070 | 0.6260 | 1.4943  | 0.9482  |
| Te-129m+E | 0.5766  | 0.4487 | 0.7386  | 0.8729  | 0.5150 | 0.3955 | 1.0212  | 0.7257  |
| Th-229+E  | 4.3636  | 3.2430 | 4.1983  | 4.8865  | 3.6353 | 2.9153 | 6.6932  | 4.9568  |
| Th-232+E  | 10.5049 | 9.7538 | 10.9967 | 10.7280 | 9.9735 | 9.0876 | 16.6506 | 12.0354 |
| Th-234+E  | 0.3537  | 0.2641 | 0.3517  | 0.4016  | 0.2945 | 0.2392 | 0.5289  | 0.3859  |
| Ti-44+E   | 4.5754  | 3.7776 | 4.6874  | 4.5737  | 4.4425 | 3.0355 | 9.9723  | 5.2942  |
| U-228+E   | 0.4508  | 0.3579 | 0.4318  | 0.4975  | 0.3849 | 0.3089 | 0.7163  | 0.5247  |
| U-230+E   | 0.4268  | 0.3114 | 0.4014  | 0.5178  | 0.3287 | 0.2810 | 0.5451  | 0.5258  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.1798        | 2.8814        | 3.1982        | 3.7127        | 2.7861        | 2.6941        | 3.4806        | 3.5671        |
| U-238+E        | 1.6109        | 1.5646        | 1.6292        | 1.6417        | 1.5271        | 1.5260        | 1.8881        | 1.6621        |
| W-178+E        | 2.1874        | 1.6959        | 2.6569        | 2.2987        | 1.9235        | 1.3239        | 3.7666        | 2.3299        |
| Xe-122+E       | 1.5447        | 1.2022        | 1.9792        | 2.1800        | 1.4276        | 1.1020        | 2.8821        | 1.9457        |
| Zr-93+E        | 0.1217        | 0.0842        | 0.1018        | 0.1551        | 0.0879        | 0.0686        | 0.1216        | 0.1687        |

Table 21: Concrete 1cm Contamination Thickness for 400x400x40 ft

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2198        | 0.2557        | 0.3716        | 0.4623        |
| Ac-225+E       | 1.0839        | 1.1840        | 1.4194        | 1.5526        |
| Ac-227+E       | 3.4864        | 3.8140        | 4.6632        | 5.2175        |
| Ag-108m+E      | 4.3496        | 4.6272        | 5.0640        | 5.0015        |
| Ag-110m+E      | 4.6653        | 5.0119        | 5.3256        | 5.1047        |
| Am-242m+E      | 0.5840        | 0.6860        | 1.0863        | 1.3802        |
| Am-243+E       | 3.4041        | 3.6575        | 4.3118        | 4.7119        |
| Ar-42+E        | 0.2630        | 0.2864        | 0.3079        | 0.2841        |
| At-211+E       | 0.6971        | 0.7613        | 0.9263        | 1.0530        |
| Ba-128+E       | 1.5226        | 1.5725        | 1.8094        | 1.9199        |
| Bi-210m+E      | 1.5038        | 1.5884        | 1.7327        | 1.7534        |
| Bi-212+E       | 0.2129        | 0.2429        | 0.3209        | 0.3707        |
| Bi-213+E       | 0.4547        | 0.4836        | 0.5243        | 0.5242        |
| Bi-214+E       | 1.9273        | 2.0807        | 2.2252        | 2.1116        |
| Bi-215+E       | 1.1002        | 1.1712        | 1.2914        | 1.3194        |
| Bi-216+E       | 2.1003        | 2.2335        | 2.3885        | 2.3351        |
| Cd-118+E       | 0.0973        | 0.1054        | 0.1134        | 0.1054        |
| Ce-134+E       | 1.0489        | 1.0711        | 1.2779        | 1.4072        |
| Ce-144+E       | 0.3357        | 0.3483        | 0.3797        | 0.3872        |
| Cl-34m+E       | 1.6708        | 1.7933        | 1.9167        | 1.8219        |
| Cm-245+E       | 1.7336        | 1.8869        | 2.2951        | 2.5615        |
| Cm-247+E       | 1.6450        | 1.7481        | 1.9285        | 1.9695        |
| Cm-250+E       | 21.4653       | 22.9648       | 24.5578       | 23.6960       |
| Cs-137+E       | 2.8893        | 3.0786        | 3.2249        | 3.3255        |
| Es-254+E       | 2.0494        | 2.3171        | 3.1268        | 3.6091        |
| Fe-60+E        | 3.0134        | 3.3127        | 3.7731        | 3.7042        |
| Fr-220+E       | 0.2226        | 0.2519        | 0.3374        | 0.4058        |
| Fr-221+E       | 0.2602        | 0.2759        | 0.3075        | 0.3165        |
| Ge-68+E        | 0.2083        | 0.3110        | 0.7566        | 1.1277        |
| Hf-172+E       | 2.3432        | 2.5481        | 3.3185        | 3.8749        |
| Hf-182+E       | 5.0425        | 5.3708        | 5.9595        | 6.0468        |
| Hg-193+E       | 3.1014        | 3.3562        | 3.9457        | 4.2473        |
| Hg-194+E       | 3.2132        | 3.4871        | 4.1241        | 4.4329        |
| In-114m+E      | 0.6001        | 0.6264        | 0.7348        | 0.7787        |
| Ir-192m+E      | 3.5519        | 3.8047        | 4.3253        | 4.4968        |
| Kr-76+E        | 2.3260        | 2.5636        | 3.1169        | 3.4608        |
| Mg-28+E        | 3.8863        | 4.1638        | 4.4973        | 4.2847        |
| Nd-140+E       | 1.0886        | 1.1117        | 1.3128        | 1.4473        |
| Ni-66+E        | 0.1416        | 0.1531        | 0.1626        | 0.1552        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2014        | 0.2684        | 0.5210        | 0.7288        |
| Np-237+E       | 2.5224        | 2.8021        | 3.6215        | 4.1993        |
| Os-194+E       | 0.4463        | 0.5089        | 0.7185        | 0.8695        |
| Pa-231+E       | 4.0384        | 4.4884        | 5.7757        | 6.6889        |
| Pb-202+E       | 2.5763        | 2.8034        | 3.3897        | 3.7476        |
| Pb-210+E       | 0.1495        | 0.2068        | 0.4073        | 0.5826        |
| Pd-103+E       | 0.4585        | 0.4926        | 0.7450        | 0.8470        |
| Pt-202+E       | 0.3354        | 0.3590        | 0.3843        | 0.3701        |
| Pu-239+E       | 0.0311        | 0.0421        | 0.0863        | 0.1225        |
| Pu-244+E       | 1.1657        | 1.3220        | 1.7896        | 2.0879        |
| Pu-246+E       | 3.6319        | 3.9197        | 4.5525        | 4.7961        |
| Ra-219+E       | 1.0522        | 1.1191        | 1.2406        | 1.2806        |
| Ra-221+E       | 0.5671        | 0.6350        | 0.8322        | 0.9793        |
| Ra-222+E       | 0.0475        | 0.0501        | 0.0540        | 0.0538        |
| Ra-223+E       | 2.2236        | 2.3848        | 2.7290        | 2.9093        |
| Ra-224+E       | 1.6324        | 1.7448        | 1.7884        | 1.9988        |
| Ra-226+E       | 4.8936        | 5.2685        | 5.7088        | 5.8158        |
| Ra-228+E       | 3.4749        | 3.7785        | 4.2264        | 4.4207        |
| Rb-81+E        | 1.9450        | 2.1445        | 2.5625        | 2.7923        |
| Rb-83+E        | 1.5345        | 1.7607        | 2.2592        | 2.5968        |
| Re-186m+E      | 0.8518        | 1.0146        | 1.6747        | 2.2076        |
| Rn-219+E       | 0.2984        | 0.3155        | 0.3423        | 0.3441        |
| Rn-220+E       | 1.5586        | 1.6668        | 1.7029        | 1.9120        |
| Rn-222+E       | 0.0011        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.4270        | 1.5178        | 1.6524        | 1.6271        |
| Ru-106+E       | 0.4830        | 0.5145        | 0.5473        | 0.5286        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.5604        | 1.6295        | 1.8833        | 1.9829        |
| Sn-121m+E      | 0.1299        | 0.1360        | 0.1856        | 0.2237        |
| Sn-126+E       | 5.6859        | 6.0353        | 6.4794        | 6.4009        |
| Sr-82+E        | 0.4569        | 0.5803        | 0.8585        | 1.0993        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.6827        | 0.6970        | 0.8676        | 0.9835        |
| Te-129m+E      | 0.4495        | 0.4702        | 0.5795        | 0.6478        |
| Th-229+E       | 3.0960        | 3.4486        | 4.4661        | 5.2141        |
| Th-232+E       | 9.3770        | 10.1577       | 11.2227       | 11.9159       |
| Th-234+E       | 0.2509        | 0.2798        | 0.3613        | 0.4214        |
| Ti-44+E        | 4.2638        | 4.4908        | 4.7659        | 4.6976        |
| U-228+E        | 0.3321        | 0.3668        | 0.4680        | 0.5343        |
| U-230+E        | 0.2570        | 0.2998        | 0.4380        | 0.5458        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4376        | 2.6523        | 3.2554        | 3.8789        |
| U-238+E        | 1.4395        | 1.5729        | 1.8081        | 1.9657        |
| W-178+E        | 1.7257        | 1.8735        | 2.3781        | 2.7354        |
| Xe-122+E       | 1.2869        | 1.3289        | 1.5399        | 1.6428        |
| Zr-93+E        | 0.0572        | 0.0677        | 0.1170        | 0.1530        |

Table 22: Concrete 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4066  | 0.3433  | 0.3798  | 0.4172  | 0.3536  | 0.2535  | 0.3227  | 0.3482  |
| Ac-225+E  | 1.4519  | 1.2946  | 1.3346  | 1.4084  | 1.4103  | 1.1168  | 1.2580  | 1.5437  |
| Ac-227+E  | 4.7384  | 4.2025  | 4.3296  | 4.6310  | 4.5172  | 3.4314  | 3.8758  | 4.5544  |
| Ag-108m+E | 5.1462  | 4.7010  | 4.6695  | 4.6745  | 5.3549  | 4.8376  | 5.3819  | 7.5683  |
| Ag-110m+E | 4.8594  | 4.3671  | 4.4642  | 4.2848  | 5.2542  | 5.0154  | 5.4542  | 8.7759  |
| Am-242m+E | 1.3055  | 1.1466  | 1.2611  | 1.3541  | 1.1695  | 0.8296  | 1.0754  | 0.9064  |
| Am-243+E  | 4.0976  | 3.8224  | 3.8557  | 4.1231  | 4.0666  | 3.0211  | 3.3963  | 3.9073  |
| Ar-42+E   | 0.2548  | 0.2179  | 0.2328  | 0.2297  | 0.2861  | 0.2579  | 0.2790  | 0.4902  |
| At-211+E  | 0.8397  | 0.7828  | 0.7773  | 0.8666  | 0.7897  | 0.5363  | 0.6368  | 0.8254  |
| Ba-128+E  | 1.9284  | 1.7764  | 1.8066  | 1.8503  | 1.8125  | 1.5341  | 1.9900  | 2.0066  |
| Bi-210m+E | 1.7277  | 1.5182  | 1.4871  | 1.5654  | 1.7527  | 1.4282  | 1.4987  | 1.9148  |
| Bi-212+E  | 0.3306  | 0.2757  | 0.3056  | 0.3216  | 0.3034  | 0.2526  | 0.3128  | 0.4284  |
| Bi-213+E  | 0.5425  | 0.4879  | 0.4765  | 0.4902  | 0.5476  | 0.4685  | 0.5007  | 0.6976  |
| Bi-214+E  | 1.9823  | 1.7515  | 1.8009  | 1.7674  | 2.1461  | 1.9885  | 2.1364  | 3.5504  |
| Bi-215+E  | 1.2436  | 1.1130  | 1.0943  | 1.1466  | 1.2583  | 1.0202  | 1.0846  | 1.4790  |
| Bi-216+E  | 2.4633  | 2.2205  | 2.1798  | 2.2219  | 2.5361  | 2.2653  | 2.4772  | 3.5388  |
| Cd-118+E  | 0.0961  | 0.0848  | 0.0876  | 0.0839  | 0.1064  | 0.0982  | 0.1012  | 0.1800  |
| Ce-134+E  | 1.3062  | 1.2260  | 1.2755  | 1.3130  | 1.1854  | 0.9631  | 1.3752  | 1.1799  |
| Ce-144+E  | 0.3325  | 0.3246  | 0.3151  | 0.3271  | 0.3429  | 0.2768  | 0.3320  | 0.3635  |
| Cl-34m+E  | 1.5844  | 1.4036  | 1.4407  | 1.4233  | 1.7219  | 1.5315  | 1.5423  | 2.5523  |
| Cm-245+E  | 2.2529  | 2.0912  | 2.1887  | 2.2946  | 2.2313  | 1.6733  | 1.8681  | 2.0049  |
| Cm-247+E  | 1.9787  | 1.7956  | 1.7537  | 1.8117  | 1.9871  | 1.6320  | 1.7121  | 2.2839  |
| Cm-250+E  | 22.5289 | 20.1164 | 20.4470 | 20.2412 | 24.0000 | 21.5666 | 22.9324 | 35.0496 |
| Cs-137+E  | 2.7337  | 2.5037  | 2.6196  | 2.6280  | 2.9086  | 2.8217  | 3.0461  | 3.7707  |
| Es-254+E  | 3.3927  | 2.9291  | 3.2218  | 3.2955  | 3.1861  | 2.6243  | 3.2437  | 3.8052  |
| Fe-60+E   | 3.2595  | 2.7841  | 2.9852  | 2.9409  | 3.4398  | 3.0903  | 3.3420  | 5.7665  |
| Fr-220+E  | 0.3365  | 0.2983  | 0.3144  | 0.3474  | 0.3030  | 0.2098  | 0.2583  | 0.2920  |
| Fr-221+E  | 0.2844  | 0.2626  | 0.2687  | 0.2800  | 0.2943  | 0.2356  | 0.2512  | 0.3001  |
| Ge-68+E   | 0.9249  | 0.6530  | 0.8525  | 1.0037  | 0.6125  | 0.3992  | 0.7279  | 0.7838  |
| Hf-172+E  | 3.1479  | 2.7418  | 2.9105  | 3.2550  | 2.7436  | 2.1222  | 2.7997  | 2.9092  |
| Hf-182+E  | 5.3359  | 4.7568  | 4.7644  | 4.9741  | 5.4907  | 4.5891  | 4.9157  | 6.8908  |
| Hg-193+E  | 3.6099  | 3.2061  | 3.2442  | 3.5015  | 3.5230  | 2.8203  | 3.2454  | 4.4718  |
| Hg-194+E  | 3.9169  | 3.3916  | 3.4323  | 3.7258  | 3.7748  | 3.0292  | 3.4591  | 4.7723  |
| In-114m+E | 0.7913  | 0.7461  | 0.7695  | 0.7827  | 0.7779  | 0.6589  | 0.8265  | 0.8904  |
| Ir-192m+E | 4.4758  | 3.8697  | 3.8667  | 4.0881  | 4.3704  | 3.6311  | 3.9601  | 5.2327  |
| Kr-76+E   | 3.2620  | 2.8158  | 2.9149  | 3.0871  | 3.1007  | 2.4684  | 2.7722  | 3.2862  |
| Mg-28+E   | 4.0328  | 3.5581  | 3.7069  | 3.6233  | 4.2670  | 3.8892  | 4.2994  | 6.6979  |
| Nd-140+E  | 1.3125  | 1.2364  | 1.2918  | 1.3322  | 1.2221  | 0.9338  | 1.3020  | 1.1303  |
| Ni-66+E   | 0.1401  | 0.1239  | 0.1310  | 0.1200  | 0.1526  | 0.1484  | 0.1603  | 0.2581  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Np-235+E       | 0.6734       | 0.5616       | 0.6437       | 0.7080       | 0.5571       | 0.3728       | 0.5228       | 0.4136       |
| Np-237+E       | 3.9011       | 3.4742       | 3.6444       | 3.8785       | 3.6720       | 2.7276       | 3.1717       | 3.3546       |
| Os-194+E       | 0.7806       | 0.6304       | 0.7006       | 0.7720       | 0.6650       | 0.5074       | 0.6527       | 0.7800       |
| Pa-231+E       | 6.1032       | 5.3503       | 5.6145       | 6.0354       | 5.6699       | 4.2410       | 4.9734       | 5.5435       |
| Pb-202+E       | 3.3828       | 2.9715       | 2.9945       | 3.2782       | 3.1690       | 2.4835       | 2.9256       | 3.8458       |
| Pb-210+E       | 0.4831       | 0.3791       | 0.4556       | 0.5159       | 0.3663       | 0.2419       | 0.3686       | 0.3331       |
| Pd-103+E       | 0.9017       | 0.8526       | 0.8872       | 0.9152       | 0.8928       | 0.6918       | 0.8883       | 0.6463       |
| Pt-202+E       | 0.3705       | 0.3296       | 0.3305       | 0.3262       | 0.3892       | 0.3527       | 0.3735       | 0.5745       |
| Pu-239+E       | 0.1113       | 0.0903       | 0.1058       | 0.1179       | 0.0886       | 0.0589       | 0.0867       | 0.0716       |
| Pu-244+E       | 2.0254       | 1.7741       | 1.8983       | 1.9978       | 1.9054       | 1.5042       | 1.8291       | 2.0420       |
| Pu-246+E       | 4.3865       | 3.9971       | 4.1804       | 4.2167       | 4.4668       | 3.7320       | 4.1878       | 5.2529       |
| Ra-219+E       | 1.2136       | 1.0881       | 1.0613       | 1.1233       | 1.2110       | 0.9578       | 0.9996       | 1.3292       |
| Ra-221+E       | 0.8339       | 0.7394       | 0.7811       | 0.8440       | 0.7723       | 0.5635       | 0.6539       | 0.7178       |
| Ra-222+E       | 0.0549       | 0.0482       | 0.0465       | 0.0484       | 0.0554       | 0.0461       | 0.0470       | 0.0635       |
| Ra-223+E       | 2.6245       | 2.3767       | 2.3664       | 2.5165       | 2.5878       | 2.0018       | 2.1651       | 2.8122       |
| Ra-224+E       | 1.4861       | 1.3705       | 1.4846       | 1.5017       | 1.5712       | 1.5568       | 1.6194       | 1.5690       |
| Ra-226+E       | 4.9694       | 4.4192       | 4.5777       | 4.6581       | 5.2150       | 4.7266       | 5.0107       | 6.8453       |
| Ra-228+E       | 3.7362       | 3.3273       | 3.5527       | 3.5805       | 3.8474       | 3.5076       | 3.7938       | 4.6383       |
| Rb-81+E        | 2.5341       | 2.2818       | 2.3897       | 2.4774       | 2.5284       | 2.0554       | 2.2361       | 2.6377       |
| Rb-83+E        | 2.4809       | 2.1505       | 2.2674       | 2.4017       | 2.3385       | 1.9082       | 2.2801       | 2.8138       |
| Re-186m+E      | 1.7857       | 1.4037       | 1.6332       | 1.8938       | 1.3776       | 0.9644       | 1.4651       | 1.5666       |
| Rn-219+E       | 0.3503       | 0.3094       | 0.3031       | 0.3143       | 0.3555       | 0.2942       | 0.3055       | 0.3962       |
| Rn-220+E       | 1.4016       | 1.2955       | 1.4088       | 1.4229       | 1.4840       | 1.4861       | 1.5450       | 1.4808       |
| Rn-222+E       | 0.0013       | 0.0012       | 0.0011       | 0.0012       | 0.0013       | 0.0012       | 0.0013       | 0.0018       |
| Ru-103+E       | 1.7614       | 1.5845       | 1.5729       | 1.6151       | 1.7964       | 1.5925       | 1.7954       | 2.4330       |
| Ru-106+E       | 0.5508       | 0.4973       | 0.4932       | 0.4982       | 0.5759       | 0.5268       | 0.5856       | 0.8560       |
| Si-32+E        | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       |
| Sn-113+E       | 2.2211       | 2.0465       | 2.0447       | 2.0759       | 2.1383       | 1.8224       | 2.2395       | 2.5198       |
| Sn-121m+E      | 0.2292       | 0.2094       | 0.2241       | 0.2351       | 0.1946       | 0.1563       | 0.2447       | 0.2209       |
| Sn-126+E       | 6.2966       | 5.7669       | 5.6979       | 5.7293       | 6.5458       | 5.8711       | 6.4522       | 9.4725       |
| Sr-82+E        | 0.9745       | 0.8565       | 0.9295       | 0.9706       | 0.9085       | 0.6788       | 0.8015       | 0.8277       |
| Sr-90+E        | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0000       |
| Te-118+E       | 1.0812       | 1.0302       | 1.0648       | 1.0848       | 0.9692       | 0.8186       | 1.2330       | 1.1578       |
| Te-129m+E      | 0.6660       | 0.6104       | 0.6362       | 0.6562       | 0.6028       | 0.5113       | 0.7144       | 0.7363       |
| Th-229+E       | 4.6332       | 4.1346       | 4.3799       | 4.6921       | 4.3359       | 3.1739       | 3.7731       | 4.1351       |
| Th-232+E       | 9.6494       | 8.6310       | 9.1583       | 9.3683       | 9.9933       | 9.0562       | 9.7322       | 11.7424      |
| Th-234+E       | 0.3637       | 0.3274       | 0.3406       | 0.3691       | 0.3455       | 0.2534       | 0.2984       | 0.3307       |
| Ti-44+E        | 3.7792       | 3.6254       | 3.3707       | 3.5843       | 4.0461       | 3.2484       | 3.4773       | 5.5437       |
| U-228+E        | 0.4877       | 0.4365       | 0.4612       | 0.4864       | 0.4686       | 0.3555       | 0.3950       | 0.4207       |
| U-230+E        | 0.5043       | 0.4396       | 0.4758       | 0.5135       | 0.4549       | 0.3244       | 0.4015       | 0.3772       |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.1596       | 2.8743       | 3.0886       | 3.2350       | 2.9821       | 2.5641       | 2.9156       | 2.7525       |
| U-238+E        | 1.4939       | 1.3762       | 1.4750       | 1.5233       | 1.5484       | 1.4407       | 1.5032       | 1.5597       |
| W-178+E        | 2.1606       | 1.8699       | 1.9585       | 2.2153       | 1.9200       | 1.4879       | 1.8752       | 2.1049       |
| Xe-122+E       | 1.6783       | 1.5691       | 1.5942       | 1.6272       | 1.5785       | 1.3560       | 1.8062       | 1.8762       |
| Zr-93+E        | 0.1691       | 0.1534       | 0.1650       | 0.1735       | 0.1559       | 0.1071       | 0.1338       | 0.0844       |

Table 23: Concrete 5cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3229  | 0.2728  | 0.3400  | 0.3342  | 0.2610  | 0.2338  | 0.4259  | 0.3878  |
| Ac-225+E  | 1.3602  | 1.1042  | 1.4306  | 1.5457  | 1.2375  | 1.0429  | 2.3900  | 1.6696  |
| Ac-227+E  | 4.2393  | 3.7916  | 4.7846  | 4.5248  | 3.8197  | 3.4017  | 6.4868  | 4.7254  |
| Ag-108m+E | 5.4653  | 4.0877  | 6.1544  | 7.4240  | 5.2971  | 3.8615  | 14.7859 | 9.1700  |
| Ag-110m+E | 5.4715  | 4.2965  | 6.7834  | 7.5165  | 5.4402  | 3.6079  | 18.2615 | 10.5960 |
| Am-242m+E | 1.0294  | 0.8565  | 0.9072  | 1.0514  | 0.7812  | 0.7423  | 0.9826  | 1.1251  |
| Am-243+E  | 3.8102  | 3.5035  | 4.0983  | 3.7253  | 3.4307  | 3.0852  | 4.9520  | 3.6772  |
| Ar-42+E   | 0.2979  | 0.2409  | 0.2939  | 0.3506  | 0.2972  | 0.2029  | 0.8745  | 0.4150  |
| At-211+E  | 0.7473  | 0.6569  | 0.8550  | 0.6568  | 0.6544  | 0.5278  | 1.1218  | 0.7190  |
| Ba-128+E  | 1.9152  | 1.5275  | 1.7543  | 2.3398  | 1.7951  | 1.3997  | 2.9987  | 2.2532  |
| Bi-210m+E | 1.6802  | 1.6115  | 2.1214  | 1.9947  | 1.6712  | 1.4710  | 3.1616  | 2.1471  |
| Bi-212+E  | 0.2954  | 0.2345  | 0.3424  | 0.3733  | 0.2606  | 0.1895  | 0.7440  | 0.5069  |
| Bi-213+E  | 0.5601  | 0.4103  | 0.5960  | 0.7132  | 0.5427  | 0.4395  | 1.2162  | 0.7419  |
| Bi-214+E  | 2.2383  | 1.7575  | 2.5643  | 2.9213  | 2.2269  | 1.4832  | 7.0287  | 3.9063  |
| Bi-215+E  | 1.2178  | 1.0905  | 1.5385  | 1.4073  | 1.1973  | 1.0131  | 2.4634  | 1.5181  |
| Bi-216+E  | 2.6226  | 1.9030  | 2.8406  | 3.5207  | 2.5809  | 1.8052  | 7.1839  | 4.4525  |
| Cd-118+E  | 0.1127  | 0.0876  | 0.1294  | 0.1546  | 0.1132  | 0.0741  | 0.3588  | 0.2069  |
| Ce-134+E  | 1.2694  | 1.0158  | 1.0621  | 1.4871  | 1.1591  | 0.8518  | 1.4987  | 1.2457  |
| Ce-144+E  | 0.3394  | 0.3015  | 0.3699  | 0.3793  | 0.3304  | 0.2768  | 0.5376  | 0.3463  |
| Cl-34m+E  | 1.7464  | 1.5326  | 1.9651  | 2.0148  | 1.7428  | 1.3873  | 4.2866  | 2.1495  |
| Cm-245+E  | 2.0566  | 1.9211  | 2.0803  | 1.9729  | 1.8054  | 1.7326  | 2.2921  | 1.9014  |
| Cm-247+E  | 1.9900  | 1.5344  | 2.1382  | 2.3748  | 1.8880  | 1.7467  | 3.2491  | 1.9661  |
| Cm-250+E  | 24.5043 | 19.9163 | 27.8810 | 30.9430 | 24.2959 | 18.1994 | 64.9276 | 37.1477 |
| Cs-137+E  | 3.0231  | 2.7019  | 3.4376  | 3.6461  | 2.9822  | 2.4851  | 6.4993  | 4.5570  |
| Es-254+E  | 3.0428  | 2.4363  | 3.1076  | 3.5623  | 2.6031  | 2.0615  | 6.4575  | 4.7053  |
| Fe-60+E   | 3.5975  | 2.8268  | 4.0635  | 4.7784  | 3.5068  | 2.3644  | 10.8302 | 6.3694  |
| Fr-220+E  | 0.2778  | 0.2451  | 0.3045  | 0.2603  | 0.2308  | 0.1998  | 0.3648  | 0.2874  |
| Fr-221+E  | 0.2811  | 0.2461  | 0.3019  | 0.3118  | 0.2681  | 0.2263  | 0.4640  | 0.3354  |
| Ge-68+E   | 0.5550  | 0.4150  | 0.5774  | 0.6308  | 0.3398  | 0.2950  | 0.7110  | 0.9935  |
| Hf-172+E  | 2.5854  | 2.3498  | 2.8072  | 2.8693  | 2.2140  | 1.9335  | 3.0941  | 2.7599  |
| Hf-182+E  | 5.4229  | 4.9530  | 6.4367  | 6.3979  | 5.2539  | 4.2870  | 11.1593 | 7.3197  |
| Hg-193+E  | 3.4535  | 2.9302  | 4.0706  | 3.8778  | 3.1884  | 2.5590  | 6.7303  | 4.4098  |
| Hg-194+E  | 3.6569  | 3.1038  | 4.5639  | 4.1684  | 3.4372  | 2.9233  | 6.8110  | 4.3047  |
| In-114m+E | 0.7690  | 0.6182  | 0.6940  | 0.9389  | 0.7206  | 0.5911  | 1.3233  | 0.9858  |
| Ir-192m+E | 4.2132  | 3.4894  | 5.4768  | 5.1948  | 4.1499  | 3.6368  | 8.3320  | 5.2274  |
| Kr-76+E   | 2.9042  | 2.5291  | 3.4756  | 3.4392  | 2.7051  | 2.4143  | 4.9295  | 3.4373  |
| Mg-28+E   | 4.5110  | 3.5577  | 4.5885  | 5.5739  | 4.4348  | 3.2262  | 11.7005 | 6.2238  |
| Nd-140+E  | 1.2444  | 1.0413  | 1.0219  | 1.4553  | 1.1606  | 0.8724  | 1.2947  | 1.0261  |
| Ni-66+E   | 0.1605  | 0.1297  | 0.1912  | 0.2072  | 0.1602  | 0.1092  | 0.5324  | 0.3023  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.4753  | 0.3842 | 0.4271  | 0.4742  | 0.3230 | 0.3058 | 0.4287  | 0.5750  |
| Np-237+E  | 3.3600  | 2.9595 | 3.6541  | 3.4382  | 2.9151 | 2.7418 | 4.1557  | 3.3238  |
| Os-194+E  | 0.6211  | 0.5122 | 0.7529  | 0.7363  | 0.5391 | 0.4820 | 1.0011  | 0.7965  |
| Pa-231+E  | 5.2624  | 4.6485 | 5.7930  | 5.5862  | 4.5951 | 4.1172 | 7.6238  | 5.9490  |
| Pb-202+E  | 3.1320  | 2.4451 | 3.4631  | 3.6162  | 2.8391 | 2.3295 | 5.6347  | 3.8756  |
| Pb-210+E  | 0.3137  | 0.2592 | 0.3144  | 0.3283  | 0.2086 | 0.1860 | 0.3215  | 0.4185  |
| Pd-103+E  | 0.7904  | 0.5720 | 0.5408  | 0.9854  | 0.6348 | 0.5830 | 0.7294  | 0.8210  |
| Pt-202+E  | 0.4053  | 0.3027 | 0.4487  | 0.5402  | 0.4003 | 0.2974 | 1.0920  | 0.6446  |
| Pu-239+E  | 0.0761  | 0.0604 | 0.0692  | 0.0779  | 0.0506 | 0.0477 | 0.0697  | 0.0984  |
| Pu-244+E  | 1.7866  | 1.4191 | 1.8032  | 2.0989  | 1.5225 | 1.1904 | 3.5159  | 2.6696  |
| Pu-246+E  | 4.3231  | 3.7203 | 4.6386  | 5.0437  | 4.0172 | 3.2657 | 8.8247  | 5.9028  |
| Ra-219+E  | 1.1415  | 1.0060 | 1.5553  | 1.2576  | 1.1327 | 1.0549 | 1.8967  | 1.0676  |
| Ra-221+E  | 0.7072  | 0.6405 | 0.7783  | 0.6876  | 0.6019 | 0.5538 | 0.9124  | 0.7190  |
| Ra-222+E  | 0.0527  | 0.0449 | 0.0750  | 0.0634  | 0.0541 | 0.0518 | 0.0930  | 0.0501  |
| Ra-223+E  | 2.4885  | 2.2136 | 2.9202  | 2.6597  | 2.3381 | 2.0672 | 4.1162  | 2.6575  |
| Ra-224+E  | 1.6226  | 1.6554 | 1.6833  | 1.6160  | 1.5964 | 1.6102 | 1.7284  | 1.6735  |
| Ra-226+E  | 5.3028  | 4.6435 | 6.1112  | 6.2070  | 5.2330 | 4.3752 | 11.3375 | 7.0113  |
| Ra-228+E  | 3.8554  | 3.4375 | 4.2961  | 4.3405  | 3.6874 | 3.2110 | 7.3086  | 5.1608  |
| Rb-81+E   | 2.3841  | 1.8925 | 2.5437  | 2.7670  | 2.1877 | 1.8205 | 4.2482  | 2.9530  |
| Rb-83+E   | 2.2467  | 1.6959 | 2.3530  | 2.8175  | 2.0056 | 1.3352 | 5.6122  | 3.9445  |
| Re-186m+E | 1.2668  | 1.0677 | 1.3948  | 1.3814  | 0.9474 | 0.8464 | 1.4361  | 1.6961  |
| Rn-219+E  | 0.3492  | 0.3107 | 0.4052  | 0.4261  | 0.3425 | 0.3075 | 0.6363  | 0.4238  |
| Rn-220+E  | 1.5388  | 1.5721 | 1.5922  | 1.5176  | 1.5151 | 1.5419 | 1.5734  | 1.5534  |
| Rn-222+E  | 0.0014  | 0.0010 | 0.0014  | 0.0019  | 0.0014 | 0.0008 | 0.0042  | 0.0027  |
| Ru-103+E  | 1.8445  | 1.3145 | 1.8438  | 2.4954  | 1.8098 | 1.1304 | 5.3235  | 3.4533  |
| Ru-106+E  | 0.5982  | 0.4397 | 0.6575  | 0.8172  | 0.5946 | 0.3676 | 1.8831  | 1.1690  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.1722  | 1.6582 | 1.9655  | 2.7720  | 2.0422 | 1.8558 | 3.3754  | 2.3792  |
| Sn-121m+E | 0.1997  | 0.1624 | 0.1480  | 0.2394  | 0.1746 | 0.1405 | 0.2524  | 0.2425  |
| Sn-126+E  | 6.7397  | 5.2434 | 7.9043  | 8.8391  | 6.5841 | 4.9309 | 17.7923 | 10.7352 |
| Sr-82+E   | 0.7895  | 0.6634 | 0.8683  | 0.8638  | 0.6216 | 0.5009 | 1.4415  | 1.0947  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0001  | 0.0001  | 0.0001 | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 1.0150  | 0.8295 | 0.7330  | 1.2454  | 0.9273 | 0.7370 | 1.4936  | 1.2692  |
| Te-129m+E | 0.6294  | 0.4968 | 0.5459  | 0.7835  | 0.5744 | 0.4392 | 1.0947  | 0.8587  |
| Th-229+E  | 4.0155  | 3.4520 | 4.0915  | 4.1245  | 3.4484 | 3.0055 | 5.4617  | 4.3024  |
| Th-232+E  | 10.0680 | 9.2473 | 10.9754 | 11.1469 | 9.7016 | 8.4957 | 18.0016 | 12.8223 |
| Th-234+E  | 0.3173  | 0.2847 | 0.3379  | 0.3095  | 0.2669 | 0.2395 | 0.3981  | 0.3298  |
| Ti-44+E   | 4.1166  | 3.5350 | 5.0222  | 4.4215  | 4.0238 | 2.9702 | 9.2129  | 5.0903  |
| U-228+E   | 0.4305  | 0.3742 | 0.4482  | 0.4433  | 0.3735 | 0.3425 | 0.5737  | 0.4526  |
| U-230+E   | 0.4040  | 0.3491 | 0.4148  | 0.4044  | 0.3226 | 0.3035 | 0.4608  | 0.4412  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.8555        | 2.6672        | 2.7836        | 2.7943        | 2.5252        | 2.4271        | 2.9256        | 2.9731        |
| U-238+E        | 1.5575        | 1.5412        | 1.5449        | 1.5469        | 1.4943        | 1.4660        | 1.6629        | 1.4694        |
| W-178+E        | 1.8135        | 1.6772        | 2.0738        | 1.9774        | 1.5659        | 1.3610        | 2.1820        | 1.8684        |
| Xe-122+E       | 1.6613        | 1.3212        | 1.5151        | 2.0448        | 1.5584        | 1.1956        | 2.8748        | 2.1066        |
| Zr-93+E        | 0.1341        | 0.1095        | 0.1055        | 0.1256        | 0.0965        | 0.0957        | 0.1029        | 0.1356        |

Table 24: Concrete 5cm Contamination Thickness for 400x400x40 ft

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2134        | 0.1929        | 0.3667        | 0.4241        |
| Ac-225+E       | 1.1276        | 0.8379        | 1.9166        | 1.3291        |
| Ac-227+E       | 3.4530        | 2.8532        | 4.4984        | 4.5912        |
| Ag-108m+E      | 5.0078        | 3.0551        | 9.8173        | 5.0606        |
| Ag-110m+E      | 5.2926        | 3.0713        | 9.8949        | 7.1482        |
| Am-242m+E      | 0.5732        | 0.5795        | 0.9961        | 1.2453        |
| Am-243+E       | 3.1093        | 2.7148        | 3.5015        | 3.8079        |
| Ar-42+E        | 0.2940        | 0.1751        | 0.5679        | 0.3549        |
| At-211+E       | 0.5864        | 0.5036        | 0.7450        | 0.8243        |
| Ba-128+E       | 1.6307        | 1.2867        | 2.2496        | 1.9629        |
| Bi-210m+E      | 1.6107        | 1.2884        | 1.5922        | 1.7028        |
| Bi-212+E       | 0.2311        | 0.1570        | 0.4744        | 0.4357        |
| Bi-213+E       | 0.5202        | 0.3092        | 1.0787        | 0.4295        |
| Bi-214+E       | 2.1700        | 1.2818        | 4.1741        | 2.6170        |
| Bi-215+E       | 1.1443        | 0.8738        | 1.3548        | 1.3627        |
| Bi-216+E       | 2.4576        | 1.4733        | 5.2506        | 1.8575        |
| Cd-118+E       | 0.1102        | 0.0616        | 0.2186        | 0.1816        |
| Ce-134+E       | 1.0233        | 0.8812        | 1.2067        | 1.3481        |
| Ce-144+E       | 0.3120        | 0.2654        | 0.3603        | 0.3076        |
| Cl-34m+E       | 1.7212        | 1.2122        | 2.5652        | 2.0067        |
| Cm-245+E       | 1.6017        | 1.4917        | 1.8112        | 2.0832        |
| Cm-247+E       | 1.8145        | 1.1313        | 3.3863        | 1.6200        |
| Cm-250+E       | 23.5976       | 15.1565       | 39.9263       | 27.6459       |
| Cs-137+E       | 2.8786        | 2.3664        | 4.3479        | 3.1529        |
| Es-254+E       | 2.2050        | 1.6130        | 4.2272        | 4.6144        |
| Fe-60+E        | 3.3692        | 1.9408        | 6.8140        | 6.1890        |
| Fr-220+E       | 0.1951        | 0.1792        | 0.2810        | 0.3325        |
| Fr-221+E       | 0.2543        | 0.2094        | 0.2454        | 0.2899        |
| Ge-68+E        | 0.2031        | 0.2297        | 0.8263        | 1.3234        |
| Hf-172+E       | 1.9617        | 1.6079        | 2.7400        | 3.2499        |
| Hf-182+E       | 5.0537        | 3.7192        | 6.8239        | 6.6334        |
| Hg-193+E       | 2.9776        | 2.1715        | 4.6923        | 4.2253        |
| Hg-194+E       | 3.2102        | 2.3705        | 4.8909        | 4.5237        |
| In-114m+E      | 0.6346        | 0.5151        | 0.7511        | 0.8786        |
| Ir-192m+E      | 3.9159        | 2.8997        | 5.4907        | 4.6524        |
| Kr-76+E        | 2.4667        | 1.9232        | 3.4915        | 3.2080        |
| Mg-28+E        | 4.3133        | 2.6300        | 7.8106        | 5.6165        |
| Nd-140+E       | 1.0214        | 0.8160        | 1.2242        | 1.1348        |
| Ni-66+E        | 0.1564        | 0.0892        | 0.2864        | 0.2711        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.2010        | 0.2307        | 0.4965        | 0.6600        |
| Np-237+E       | 2.4990        | 2.2320        | 3.1929        | 3.8034        |
| Os-194+E       | 0.4666        | 0.3729        | 0.7939        | 0.9320        |
| Pa-231+E       | 4.0176        | 3.4219        | 5.5365        | 5.9824        |
| Pb-202+E       | 2.6090        | 1.7870        | 5.1619        | 3.1159        |
| Pb-210+E       | 0.1314        | 0.1470        | 0.3747        | 0.5339        |
| Pd-103+E       | 0.4717        | 0.4313        | 0.7563        | 0.8648        |
| Pt-202+E       | 0.3877        | 0.2195        | 0.7968        | 0.4529        |
| Pu-239+E       | 0.0309        | 0.0359        | 0.0840        | 0.1173        |
| Pu-244+E       | 1.2707        | 0.9893        | 2.5142        | 1.9430        |
| Pu-246+E       | 3.6960        | 2.7552        | 5.3488        | 5.3890        |
| Ra-219+E       | 1.0765        | 0.8610        | 1.0938        | 1.3087        |
| Ra-221+E       | 0.5190        | 0.4899        | 0.7029        | 0.7969        |
| Ra-222+E       | 0.0522        | 0.0393        | 0.0574        | 0.0600        |
| Ra-223+E       | 2.1989        | 1.7313        | 2.8314        | 2.5475        |
| Ra-224+E       | 1.5441        | 1.5547        | 1.6338        | 1.8740        |
| Ra-226+E       | 5.0589        | 3.8346        | 7.6548        | 5.9818        |
| Ra-228+E       | 3.4721        | 2.8299        | 5.0365        | 4.7808        |
| Rb-81+E        | 1.9826        | 1.5471        | 3.0436        | 2.4458        |
| Rb-83+E        | 1.7222        | 1.2295        | 3.9860        | 2.0662        |
| Re-186m+E      | 0.7363        | 0.7015        | 1.6072        | 2.1435        |
| Rn-219+E       | 0.3323        | 0.2380        | 0.4549        | 0.3105        |
| Rn-220+E       | 1.4660        | 1.4899        | 1.5637        | 1.7965        |
| Rn-222+E       | 0.0013        | 0.0008        | 0.0028        | 0.0009        |
| Ru-103+E       | 1.6761        | 1.0529        | 3.6771        | 1.2672        |
| Ru-106+E       | 0.5628        | 0.3455        | 1.1872        | 0.4604        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8408        | 1.2349        | 3.1383        | 2.1170        |
| Sn-121m+E      | 0.1394        | 0.1263        | 0.1673        | 0.2680        |
| Sn-126+E       | 6.3363        | 3.9132        | 11.6772       | 6.5112        |
| Sr-82+E        | 0.4681        | 0.4059        | 0.9892        | 0.9971        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.7610        | 0.6605        | 0.8298        | 1.3018        |
| Te-129m+E      | 0.4951        | 0.3976        | 0.7159        | 0.7572        |
| Th-229+E       | 2.9611        | 2.5053        | 4.5298        | 4.2588        |
| Th-232+E       | 9.2199        | 7.8136        | 12.5090       | 11.5506       |
| Th-234+E       | 0.2272        | 0.1989        | 0.3374        | 0.3525        |
| Ti-44+E        | 3.9171        | 2.6927        | 5.7095        | 4.9971        |
| U-228+E        | 0.3247        | 0.2885        | 0.4330        | 0.4495        |
| U-230+E        | 0.2534        | 0.2452        | 0.3971        | 0.4767        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.2116        | 2.2457        | 2.8186        | 3.4397        |
| U-238+E        | 1.4176        | 1.3912        | 1.7559        | 1.8496        |
| W-178+E        | 1.4191        | 1.1058        | 2.0712        | 2.2181        |
| Xe-122+E       | 1.3876        | 1.1114        | 1.8695        | 1.7969        |
| Zr-93+E        | 0.0636        | 0.0678        | 0.1120        | 0.1264        |

Table 25: Concrete 15cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3327  | 0.3002  | 0.3535  | 0.4083  | 0.3368  | 0.2549  | 0.3233  | 0.4074  |
| Ac-225+E  | 1.3030  | 1.1960  | 1.2574  | 1.2456  | 1.3642  | 1.1052  | 1.1977  | 1.5371  |
| Ac-227+E  | 4.0141  | 3.6624  | 3.8255  | 4.0995  | 4.2140  | 3.4167  | 3.7767  | 4.6425  |
| Ag-108m+E | 5.0114  | 4.6833  | 4.7610  | 4.1768  | 5.7050  | 4.5040  | 4.6769  | 5.9728  |
| Ag-110m+E | 4.5651  | 4.2953  | 4.1491  | 3.4748  | 5.3174  | 4.0868  | 4.4774  | 6.7556  |
| Am-242m+E | 1.0270  | 0.9546  | 1.1696  | 1.4889  | 1.1169  | 0.8259  | 1.0057  | 1.0538  |
| Am-243+E  | 3.4531  | 3.1741  | 3.2168  | 3.6459  | 3.7541  | 2.9163  | 3.3011  | 3.7352  |
| Ar-42+E   | 0.2390  | 0.2288  | 0.2010  | 0.1916  | 0.2737  | 0.2211  | 0.2325  | 0.3927  |
| At-211+E  | 0.7208  | 0.6374  | 0.6371  | 0.7514  | 0.7386  | 0.5507  | 0.7035  | 0.7348  |
| Ba-128+E  | 1.8972  | 1.8060  | 1.8703  | 2.2094  | 2.0974  | 1.6546  | 2.0975  | 2.0416  |
| Bi-210m+E | 1.5647  | 1.4237  | 1.2915  | 1.2372  | 1.6655  | 1.4735  | 1.4003  | 1.7154  |
| Bi-212+E  | 0.2936  | 0.2649  | 0.2950  | 0.3115  | 0.3123  | 0.2326  | 0.2975  | 0.4096  |
| Bi-213+E  | 0.5501  | 0.5069  | 0.5048  | 0.4148  | 0.5780  | 0.4918  | 0.4812  | 0.6269  |
| Bi-214+E  | 1.8976  | 1.7901  | 1.7282  | 1.4563  | 2.1798  | 1.6988  | 1.8623  | 2.8490  |
| Bi-215+E  | 1.1297  | 1.0357  | 0.9597  | 0.9317  | 1.2070  | 1.0164  | 1.0235  | 1.2434  |
| Bi-216+E  | 2.5932  | 2.4087  | 2.4834  | 1.9115  | 2.8074  | 2.2766  | 2.3247  | 3.1414  |
| Cd-118+E  | 0.0913  | 0.0891  | 0.0803  | 0.0723  | 0.1090  | 0.0819  | 0.0865  | 0.1490  |
| Ce-134+E  | 1.2971  | 1.2046  | 1.3102  | 1.7303  | 1.4226  | 1.0540  | 1.6534  | 1.4029  |
| Ce-144+E  | 0.3120  | 0.2866  | 0.2781  | 0.3039  | 0.3399  | 0.2543  | 0.3139  | 0.3728  |
| Cl-34m+E  | 1.4910  | 1.4047  | 1.2996  | 1.2272  | 1.6725  | 1.3407  | 1.5062  | 2.6939  |
| Cm-245+E  | 1.7826  | 1.7063  | 1.8751  | 2.0849  | 1.9960  | 1.4903  | 1.6878  | 2.2518  |
| Cm-247+E  | 1.8189  | 1.6732  | 1.6411  | 1.4728  | 1.9121  | 1.6747  | 1.5882  | 1.9661  |
| Cm-250+E  | 21.5558 | 20.1558 | 19.1358 | 16.9536 | 24.0555 | 19.4714 | 20.5881 | 30.1042 |
| Cs-137+E  | 3.2922  | 3.1989  | 3.2647  | 2.9346  | 3.6561  | 3.3103  | 3.4280  | 3.8281  |
| Es-254+E  | 2.8955  | 2.6752  | 2.9137  | 3.4680  | 3.1826  | 2.3688  | 2.8267  | 3.6236  |
| Fe-60+E   | 2.9674  | 2.8576  | 2.6373  | 2.6387  | 3.4656  | 2.5717  | 2.8551  | 4.9420  |
| Fr-220+E  | 0.2771  | 0.2483  | 0.2790  | 0.3265  | 0.2836  | 0.2110  | 0.2762  | 0.3265  |
| Fr-221+E  | 0.2461  | 0.2235  | 0.2036  | 0.2121  | 0.2588  | 0.2136  | 0.2160  | 0.2763  |
| Ge-68+E   | 0.7555  | 0.6438  | 0.8384  | 1.1406  | 0.6937  | 0.4510  | 0.7589  | 1.1347  |
| Hf-172+E  | 2.7942  | 2.4492  | 2.5411  | 3.2940  | 2.9789  | 2.2435  | 2.9713  | 3.0690  |
| Hf-182+E  | 4.8789  | 4.4555  | 4.0331  | 4.2252  | 5.3964  | 4.3898  | 4.7337  | 6.5332  |
| Hg-193+E  | 3.3373  | 2.9603  | 2.8257  | 3.1248  | 3.5234  | 2.8114  | 3.3166  | 4.0555  |
| Hg-194+E  | 3.6356  | 3.2539  | 3.1457  | 3.3722  | 3.8097  | 3.1396  | 3.5508  | 4.1652  |
| In-114m+E | 0.7462  | 0.7094  | 0.7052  | 0.8608  | 0.8710  | 0.6396  | 0.6821  | 0.7515  |
| Ir-192m+E | 4.2436  | 3.8979  | 3.8248  | 3.5507  | 4.4371  | 3.7886  | 3.7745  | 4.5031  |
| Kr-76+E   | 2.9087  | 2.6523  | 2.8075  | 2.7754  | 3.0437  | 2.5335  | 2.7614  | 3.2440  |
| Mg-28+E   | 3.8702  | 3.7047  | 3.4426  | 3.4648  | 4.3962  | 3.5399  | 3.9472  | 5.6202  |
| Nd-140+E  | 1.3769  | 1.1756  | 1.2860  | 1.6438  | 1.4636  | 1.0576  | 1.6972  | 1.4116  |
| Ni-66+E   | 0.1320  | 0.1247  | 0.1097  | 0.1020  | 0.1527  | 0.1154  | 0.1278  | 0.2092  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Np-235+E       | 0.5095       | 0.4634       | 0.6275       | 0.7869       | 0.5193       | 0.3835       | 0.5201       | 0.5582       |
| Np-237+E       | 3.1856       | 2.9743       | 3.3321       | 3.7373       | 3.4081       | 2.6974       | 3.0645       | 3.4165       |
| Os-194+E       | 0.6868       | 0.6072       | 0.6730       | 0.7640       | 0.6887       | 0.5352       | 0.6631       | 0.8282       |
| Pa-231+E       | 5.0932       | 4.6495       | 5.0779       | 5.6137       | 5.3216       | 4.2563       | 4.8675       | 5.8352       |
| Pb-202+E       | 3.2563       | 2.8953       | 2.9496       | 3.0100       | 3.3348       | 2.7070       | 3.0885       | 3.6640       |
| Pb-210+E       | 0.3831       | 0.3355       | 0.4578       | 0.5640       | 0.3727       | 0.2603       | 0.4152       | 0.4859       |
| Pd-103+E       | 0.8486       | 0.8001       | 0.8123       | 1.2581       | 1.0567       | 0.7583       | 0.8053       | 0.5006       |
| Pt-202+E       | 0.3709       | 0.3480       | 0.3335       | 0.2780       | 0.4087       | 0.3339       | 0.3355       | 0.4933       |
| Pu-239+E       | 0.0856       | 0.0768       | 0.1029       | 0.1326       | 0.0856       | 0.0619       | 0.0867       | 0.0990       |
| Pu-244+E       | 1.7525       | 1.6233       | 1.8910       | 2.0291       | 1.9029       | 1.4531       | 1.7024       | 2.0415       |
| Pu-246+E       | 3.8237       | 3.5661       | 3.5924       | 3.8580       | 4.2967       | 3.2796       | 3.6784       | 4.8814       |
| Ra-219+E       | 1.0840       | 1.0020       | 0.9427       | 0.9188       | 1.1404       | 0.9760       | 0.9589       | 1.0420       |
| Ra-221+E       | 0.6748       | 0.6217       | 0.7031       | 0.7969       | 0.7081       | 0.5320       | 0.6575       | 0.9782       |
| Ra-222+E       | 0.0504       | 0.0469       | 0.0434       | 0.0389       | 0.0530       | 0.0475       | 0.0431       | 0.0469       |
| Ra-223+E       | 2.3029       | 2.1050       | 2.0549       | 2.0980       | 2.4330       | 1.9919       | 2.1134       | 2.6970       |
| Ra-224+E       | 1.9118       | 1.9065       | 1.8881       | 1.8340       | 2.0501       | 2.0558       | 2.0212       | 1.9897       |
| Ra-226+E       | 4.9206       | 4.6539       | 4.5342       | 4.1864       | 5.3963       | 4.7067       | 4.8296       | 5.9886       |
| Ra-228+E       | 3.4996       | 3.3349       | 3.3717       | 3.3323       | 3.8197       | 3.3336       | 3.5008       | 4.2425       |
| Rb-81+E        | 2.2531       | 2.0826       | 2.2186       | 2.1463       | 2.3714       | 1.8970       | 2.1006       | 2.8252       |
| Rb-83+E        | 2.4365       | 2.2511       | 2.6418       | 2.3801       | 2.5796       | 1.9700       | 2.3811       | 2.9547       |
| Re-186m+E      | 1.5375       | 1.3140       | 1.5451       | 2.0267       | 1.4992       | 1.0681       | 1.5976       | 2.0514       |
| Rn-219+E       | 0.3203       | 0.2929       | 0.2727       | 0.2446       | 0.3383       | 0.3040       | 0.2800       | 0.3608       |
| Rn-220+E       | 1.8378       | 1.8395       | 1.8277       | 1.7742       | 1.9708       | 1.9865       | 1.9554       | 1.8996       |
| Rn-222+E       | 0.0015       | 0.0014       | 0.0014       | 0.0011       | 0.0016       | 0.0013       | 0.0013       | 0.0018       |
| Ru-103+E       | 2.0134       | 1.8729       | 1.9410       | 1.5764       | 2.1739       | 1.7072       | 1.7893       | 2.3745       |
| Ru-106+E       | 0.5938       | 0.5545       | 0.5753       | 0.4402       | 0.6566       | 0.5103       | 0.5445       | 0.7575       |
| Si-32+E        | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       |
| Sn-113+E       | 2.1416       | 2.0311       | 2.0449       | 2.2768       | 2.4429       | 1.9609       | 1.9138       | 1.9188       |
| Sn-121m+E      | 0.2206       | 0.2090       | 0.2295       | 0.3174       | 0.2552       | 0.1767       | 0.2320       | 0.1999       |
| Sn-126+E       | 5.9478       | 5.5398       | 5.5452       | 4.7454       | 6.7087       | 5.3419       | 5.6395       | 7.4336       |
| Sr-82+E        | 0.7612       | 0.7135       | 0.9572       | 0.9725       | 0.8186       | 0.6297       | 0.8502       | 0.8755       |
| Sr-90+E        | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       |
| Te-118+E       | 1.0601       | 1.0402       | 1.0947       | 1.5040       | 1.2926       | 0.9016       | 1.0806       | 0.8706       |
| Te-129m+E      | 0.6480       | 0.6214       | 0.6618       | 0.8206       | 0.7433       | 0.5449       | 0.6759       | 0.6599       |
| Th-229+E       | 3.9276       | 3.5387       | 4.0023       | 4.4200       | 4.0919       | 3.1294       | 3.8567       | 4.5808       |
| Th-232+E       | 9.7042       | 9.2110       | 9.2232       | 9.0135       | 10.4927      | 9.3905       | 9.8906       | 11.4007      |
| Th-234+E       | 0.3021       | 0.2738       | 0.3050       | 0.3556       | 0.3245       | 0.2519       | 0.3115       | 0.3409       |
| Ti-44+E        | 3.6318       | 3.2453       | 2.6278       | 2.8987       | 4.0006       | 3.1388       | 3.6014       | 4.1370       |
| U-228+E        | 0.3951       | 0.3665       | 0.4077       | 0.4503       | 0.4187       | 0.3292       | 0.3703       | 0.5402       |
| U-230+E        | 0.3917       | 0.3619       | 0.4428       | 0.5106       | 0.4069       | 0.3170       | 0.3821       | 0.4315       |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.8122       | 2.7184       | 3.0220       | 3.3172       | 2.9741       | 2.6325       | 2.8760       | 2.9206       |
| U-238+E        | 1.4145       | 1.3844       | 1.4140       | 1.4367       | 1.5367       | 1.4704       | 1.4686       | 1.5408       |
| W-178+E        | 1.9529       | 1.6776       | 1.6958       | 2.1787       | 2.0689       | 1.6121       | 2.1554       | 2.2273       |
| Xe-122+E       | 1.6424       | 1.5860       | 1.6556       | 1.9911       | 1.8867       | 1.4204       | 1.7607       | 1.7100       |
| Zr-93+E        | 0.1176       | 0.1111       | 0.1482       | 0.1889       | 0.1258       | 0.1022       | 0.1086       | 0.1011       |

Table 26: Concrete 15cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3148  | 0.2773  | 0.3534  | 0.3334  | 0.2556  | 0.2203  | 0.4019  | 0.3794  |
| Ac-225+E  | 1.3304  | 1.2208  | 1.6408  | 1.3312  | 1.2211  | 1.0924  | 1.9051  | 1.3025  |
| Ac-227+E  | 4.1061  | 3.7978  | 4.7081  | 3.9925  | 3.6920  | 3.0863  | 6.0888  | 4.7141  |
| Ag-108m+E | 5.4252  | 5.1274  | 7.2085  | 5.4071  | 5.2088  | 4.8385  | 8.0054  | 4.5086  |
| Ag-110m+E | 5.1240  | 4.5674  | 7.4188  | 5.4574  | 5.0534  | 4.5017  | 8.7048  | 3.9902  |
| Am-242m+E | 0.9617  | 0.8745  | 0.9641  | 0.8370  | 0.7484  | 0.7012  | 0.9731  | 1.0308  |
| Am-243+E  | 3.5456  | 3.2542  | 3.7478  | 3.3307  | 3.2953  | 2.7217  | 4.5708  | 3.0881  |
| Ar-42+E   | 0.2697  | 0.1905  | 0.2859  | 0.3136  | 0.2642  | 0.2279  | 0.4560  | 0.2161  |
| At-211+E  | 0.7311  | 0.6336  | 0.7439  | 0.7761  | 0.6632  | 0.4988  | 0.8064  | 0.6196  |
| Ba-128+E  | 2.0155  | 1.7279  | 1.9228  | 2.0311  | 1.8899  | 1.6960  | 2.7111  | 2.0207  |
| Bi-210m+E | 1.6970  | 1.6570  | 2.0476  | 1.6063  | 1.6206  | 1.3412  | 3.0378  | 2.4565  |
| Bi-212+E  | 0.2921  | 0.2503  | 0.3647  | 0.3260  | 0.2538  | 0.2128  | 0.4487  | 0.3245  |
| Bi-213+E  | 0.5801  | 0.5461  | 0.7763  | 0.5897  | 0.5638  | 0.5242  | 0.8403  | 0.5588  |
| Bi-214+E  | 2.1198  | 1.7634  | 2.8291  | 2.3642  | 2.0743  | 1.9011  | 3.4350  | 1.6217  |
| Bi-215+E  | 1.2159  | 1.1462  | 1.4814  | 1.2129  | 1.1622  | 0.9705  | 2.0578  | 1.5387  |
| Bi-216+E  | 2.7372  | 2.5439  | 3.8439  | 2.9448  | 2.7003  | 2.5829  | 4.0757  | 2.5465  |
| Cd-118+E  | 0.1045  | 0.0841  | 0.1557  | 0.1202  | 0.1041  | 0.1038  | 0.1521  | 0.0716  |
| Ce-134+E  | 1.3172  | 1.0330  | 0.9333  | 1.3602  | 1.2252  | 1.0316  | 1.6349  | 1.2140  |
| Ce-144+E  | 0.3228  | 0.2857  | 0.3703  | 0.3190  | 0.3129  | 0.2534  | 0.6059  | 0.2363  |
| Cl-34m+E  | 1.6485  | 1.2946  | 2.1301  | 1.8608  | 1.6293  | 1.2803  | 3.9401  | 1.4367  |
| Cm-245+E  | 1.8036  | 1.6776  | 2.0060  | 1.6617  | 1.6506  | 1.4290  | 2.5435  | 1.4159  |
| Cm-247+E  | 1.9431  | 1.8784  | 2.3917  | 1.7985  | 1.8388  | 1.6623  | 2.6812  | 1.7686  |
| Cm-250+E  | 23.6770 | 20.6603 | 31.4170 | 25.2342 | 23.2117 | 20.4488 | 41.4888 | 21.7378 |
| Cs-137+E  | 3.6272  | 3.5330  | 4.1609  | 3.6805  | 3.5669  | 3.4871  | 4.5641  | 3.0806  |
| Es-254+E  | 2.9285  | 2.4960  | 3.8145  | 2.9257  | 2.4806  | 2.4182  | 3.3659  | 2.8379  |
| Fe-60+E   | 3.3136  | 2.5705  | 4.7474  | 3.9060  | 3.1717  | 3.1314  | 4.6179  | 2.4796  |
| Fr-220+E  | 0.2692  | 0.2342  | 0.2859  | 0.2787  | 0.2284  | 0.1820  | 0.3347  | 0.2741  |
| Fr-221+E  | 0.2621  | 0.2468  | 0.3221  | 0.2521  | 0.2487  | 0.2140  | 0.4177  | 0.2312  |
| Ge-68+E   | 0.6187  | 0.4586  | 0.7233  | 0.9016  | 0.3790  | 0.3158  | 0.6632  | 1.0927  |
| Hf-172+E  | 2.7318  | 2.2506  | 2.5793  | 2.7677  | 2.3474  | 1.9044  | 2.9031  | 2.7400  |
| Hf-182+E  | 5.2655  | 4.6454  | 6.5685  | 5.2725  | 5.0845  | 4.3950  | 7.9724  | 5.2508  |
| Hg-193+E  | 3.4428  | 2.9724  | 3.9918  | 3.5525  | 3.2041  | 2.6375  | 4.7373  | 3.2746  |
| Hg-194+E  | 3.7339  | 3.2701  | 4.1871  | 3.8772  | 3.4374  | 2.8758  | 5.6005  | 4.4550  |
| In-114m+E | 0.8153  | 0.7366  | 0.8489  | 0.7733  | 0.7253  | 0.6767  | 1.0163  | 0.5819  |
| Ir-192m+E | 4.4092  | 4.2059  | 5.5144  | 4.5375  | 4.1392  | 3.6455  | 7.8532  | 6.3334  |
| Kr-76+E   | 2.9657  | 2.7940  | 3.5071  | 2.8744  | 2.6541  | 2.3119  | 4.7910  | 3.9707  |
| Mg-28+E   | 4.3433  | 3.3805  | 4.8808  | 4.7050  | 4.2016  | 3.7745  | 6.8059  | 3.4232  |
| Nd-140+E  | 1.3287  | 1.0475  | 0.8425  | 1.3349  | 1.2248  | 0.9510  | 1.4747  | 1.1707  |
| Ni-66+E   | 0.1514  | 0.1233  | 0.2476  | 0.1654  | 0.1473  | 0.1481  | 0.2068  | 0.1057  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200  | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|---------|--------|---------|---------|
| Np-235+E  | 0.4501  | 0.3945 | 0.4514  | 0.4157  | 0.3102  | 0.2937 | 0.4346  | 0.5862  |
| Np-237+E  | 3.1831  | 2.9561 | 3.3716  | 2.9620  | 2.7692  | 2.4149 | 4.3918  | 3.7031  |
| Os-194+E  | 0.6549  | 0.5753 | 0.7498  | 0.7394  | 0.5389  | 0.4566 | 0.9800  | 0.9795  |
| Pa-231+E  | 5.1124  | 4.6853 | 5.7254  | 4.9688  | 4.4483  | 3.7724 | 7.2459  | 6.0321  |
| Pb-202+E  | 3.2733  | 2.9244 | 3.9017  | 3.4431  | 3.0109  | 2.6135 | 4.1233  | 3.3260  |
| Pb-210+E  | 0.3288  | 0.2672 | 0.3321  | 0.3671  | 0.2172  | 0.1884 | 0.3264  | 0.4775  |
| Pd-103+E  | 0.8376  | 0.8092 | 0.7585  | 0.5708  | 0.6862  | 0.6942 | 0.6156  | 0.7507  |
| Pt-202+E  | 0.4039  | 0.3610 | 0.5775  | 0.4270  | 0.3970  | 0.3793 | 0.6020  | 0.3519  |
| Pu-239+E  | 0.0742  | 0.0634 | 0.0760  | 0.0754  | 0.0499  | 0.0463 | 0.0724  | 0.1038  |
| Pu-244+E  | 1.7314  | 1.5615 | 2.0789  | 1.6974  | 1.4923  | 1.4024 | 2.2263  | 1.8003  |
| Pu-246+E  | 4.0282  | 3.5993 | 5.0768  | 3.9037  | 3.7586  | 3.3524 | 5.8771  | 3.3570  |
| Ra-219+E  | 1.1478  | 1.1083 | 1.3230  | 1.1340  | 1.0881  | 0.9019 | 2.0790  | 1.6308  |
| Ra-221+E  | 0.6616  | 0.5861 | 0.7958  | 0.6621  | 0.5733  | 0.4664 | 1.1215  | 0.6712  |
| Ra-222+E  | 0.0540  | 0.0537 | 0.0653  | 0.0522  | 0.0514  | 0.0443 | 0.1072  | 0.0847  |
| Ra-223+E  | 2.4204  | 2.2564 | 2.8562  | 2.3976  | 2.2745  | 1.8648 | 3.7811  | 2.6065  |
| Ra-224+E  | 2.0869  | 2.0858 | 2.0952  | 2.2644  | 2.0666  | 2.0498 | 2.1586  | 1.9936  |
| Ra-226+E  | 5.3887  | 4.9680 | 6.3821  | 5.5689  | 5.2408  | 4.8158 | 7.8516  | 5.3006  |
| Ra-228+E  | 3.7680  | 3.5143 | 4.5325  | 3.7388  | 3.5976  | 3.3637 | 5.1005  | 3.6888  |
| Rb-81+E   | 2.2967  | 2.1207 | 3.0062  | 2.2218  | 2.0983  | 1.9343 | 3.7710  | 2.0301  |
| Rb-83+E   | 2.4008  | 2.1517 | 3.1950  | 2.5910  | 2.1744  | 2.0892 | 3.2979  | 2.6188  |
| Re-186m+E | 1.3570  | 1.0794 | 1.4391  | 1.6439  | 1.0216  | 0.8131 | 1.5907  | 1.8636  |
| Rn-219+E  | 0.3485  | 0.3423 | 0.4354  | 0.3229  | 0.3323  | 0.2875 | 0.5764  | 0.4360  |
| Rn-220+E  | 2.0059  | 2.0070 | 1.9947  | 2.1900  | 1.9892  | 1.9852 | 2.0225  | 1.8932  |
| Rn-222+E  | 0.0015  | 0.0014 | 0.0022  | 0.0018  | 0.0016  | 0.0015 | 0.0023  | 0.0016  |
| Ru-103+E  | 2.0603  | 1.8642 | 2.9381  | 2.3171  | 2.0583  | 1.9823 | 3.0772  | 2.1476  |
| Ru-106+E  | 0.6277  | 0.5681 | 0.9100  | 0.7069  | 0.6262  | 0.6041 | 0.9531  | 0.5749  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.3647  | 2.2247 | 2.4277  | 2.1181  | 2.0940  | 2.0059 | 2.5796  | 1.9780  |
| Sn-121m+E | 0.2342  | 0.1948 | 0.1732  | 0.2370  | 0.1924  | 0.1767 | 0.1984  | 0.2000  |
| Sn-126+E  | 6.5349  | 6.1244 | 8.5358  | 6.6139  | 6.3288  | 5.6885 | 9.7757  | 5.1465  |
| Sr-82+E   | 0.7370  | 0.6830 | 0.8336  | 0.5878  | 0.5846  | 0.5267 | 0.9812  | 0.7792  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0001  | 0.0000  | 0.0000  | 0.0000 | 0.0001  | 0.0001  |
| Te-118+E  | 1.1965  | 1.0164 | 0.8971  | 1.1486  | 1.0118  | 0.9654 | 0.9778  | 0.8550  |
| Te-129m+E | 0.6972  | 0.5968 | 0.6474  | 0.7125  | 0.6155  | 0.5688 | 0.7781  | 0.6170  |
| Th-229+E  | 3.8370  | 3.4204 | 4.1338  | 3.7752  | 3.3442  | 2.8396 | 4.8642  | 3.7197  |
| Th-232+E  | 10.4592 | 9.8501 | 12.0368 | 10.8569 | 10.1078 | 9.2798 | 14.2734 | 10.4560 |
| Th-234+E  | 0.2975  | 0.2635 | 0.3025  | 0.2717  | 0.2617  | 0.2220 | 0.3231  | 0.2728  |
| Ti-44+E   | 4.0022  | 3.3517 | 4.7111  | 4.1496  | 4.0063  | 3.3354 | 4.6972  | 2.6140  |
| U-228+E   | 0.3939  | 0.3595 | 0.4800  | 0.3692  | 0.3478  | 0.3011 | 0.6561  | 0.3836  |
| U-230+E   | 0.3726  | 0.3409 | 0.4025  | 0.3405  | 0.2999  | 0.2687 | 0.4847  | 0.4401  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.8665        | 2.7018        | 2.7771        | 2.6876        | 2.5554        | 2.4657        | 2.7506        | 2.8935        |
| U-238+E        | 1.5232        | 1.4839        | 1.4588        | 1.5045        | 1.4862        | 1.4510        | 1.5523        | 1.3563        |
| W-178+E        | 1.9034        | 1.5443        | 1.7484        | 1.8989        | 1.6850        | 1.3341        | 1.8981        | 1.9134        |
| Xe-122+E       | 1.7848        | 1.5340        | 1.6752        | 1.7957        | 1.6367        | 1.4983        | 2.2496        | 1.5672        |
| Zr-93+E        | 0.1088        | 0.1023        | 0.1034        | 0.0722        | 0.0822        | 0.0817        | 0.1061        | 0.1150        |

Table 27: Concrete 15cm Contamination Thickness for 400x400x40 ft

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2034        | 0.1609        | 0.3517        | 0.2804        |
| Ac-225+E       | 1.0970        | 0.8846        | 1.3951        | 1.0439        |
| Ac-227+E       | 3.2620        | 2.6021        | 4.0042        | 3.5925        |
| Ag-108m+E      | 4.8871        | 3.8161        | 4.8065        | 3.4185        |
| Ag-110m+E      | 4.8897        | 3.8946        | 5.2692        | 3.9881        |
| Am-242m+E      | 0.5385        | 0.4768        | 1.0508        | 0.8913        |
| Am-243+E       | 2.9203        | 2.2474        | 4.0517        | 2.7935        |
| Ar-42+E        | 0.2589        | 0.2031        | 0.4337        | 0.2977        |
| At-211+E       | 0.5856        | 0.3988        | 0.7058        | 0.5345        |
| Ba-128+E       | 1.7246        | 1.5197        | 1.7895        | 1.8410        |
| Bi-210m+E      | 1.5289        | 1.2752        | 1.2514        | 1.5351        |
| Bi-212+E       | 0.2213        | 0.1774        | 0.3183        | 0.2562        |
| Bi-213+E       | 0.5358        | 0.4325        | 0.5685        | 0.3872        |
| Bi-214+E       | 2.0201        | 1.5791        | 2.2339        | 1.7281        |
| Bi-215+E       | 1.0968        | 0.8739        | 0.9664        | 0.9893        |
| Bi-216+E       | 2.5735        | 2.0653        | 2.3854        | 1.6637        |
| Cd-118+E       | 0.1027        | 0.0814        | 0.0992        | 0.1225        |
| Ce-134+E       | 1.1086        | 1.0053        | 1.1420        | 1.2465        |
| Ce-144+E       | 0.3039        | 0.2292        | 0.2465        | 0.2075        |
| Cl-34m+E       | 1.6048        | 1.2455        | 1.6742        | 1.3215        |
| Cm-245+E       | 1.4140        | 1.0958        | 2.5129        | 1.5605        |
| Cm-247+E       | 1.7308        | 1.3474        | 2.1327        | 1.3595        |
| Cm-250+E       | 22.4436       | 18.1861       | 24.5654       | 19.0901       |
| Cs-137+E       | 3.4485        | 3.0680        | 3.3129        | 3.0860        |
| Es-254+E       | 2.1045        | 1.9152        | 3.1140        | 2.5946        |
| Fe-60+E        | 3.0671        | 2.4035        | 3.5667        | 3.9890        |
| Fr-220+E       | 0.1894        | 0.1389        | 0.2795        | 0.2345        |
| Fr-221+E       | 0.2302        | 0.1874        | 0.2512        | 0.1947        |
| Ge-68+E        | 0.2216        | 0.1422        | 0.7513        | 0.5053        |
| Hf-172+E       | 2.0326        | 1.5942        | 2.7775        | 1.9247        |
| Hf-182+E       | 4.7970        | 3.8730        | 5.1394        | 4.8137        |
| Hg-193+E       | 2.9333        | 2.2753        | 3.5398        | 2.4981        |
| Hg-194+E       | 3.1614        | 2.4518        | 3.5523        | 2.6312        |
| In-114m+E      | 0.6377        | 0.5174        | 0.7006        | 0.5663        |
| Ir-192m+E      | 3.8791        | 3.1010        | 3.2724        | 2.8931        |
| Kr-76+E        | 2.3913        | 2.0008        | 2.5343        | 2.6600        |
| Mg-28+E        | 4.0657        | 3.3995        | 5.2790        | 4.1711        |
| Nd-140+E       | 1.1316        | 1.0342        | 1.0803        | 1.1444        |
| Ni-66+E        | 0.1459        | 0.1313        | 0.1724        | 0.1419        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1906        | 0.1818        | 0.4770        | 0.4891        |
| Np-237+E       | 2.3287        | 1.9050        | 3.3832        | 2.8361        |
| Os-194+E       | 0.4597        | 0.3592        | 0.5909        | 0.4997        |
| Pa-231+E       | 3.8090        | 3.0857        | 5.0209        | 4.6404        |
| Pb-202+E       | 2.7288        | 2.1008        | 3.2887        | 2.1517        |
| Pb-210+E       | 0.1363        | 0.1193        | 0.3661        | 0.3786        |
| Pd-103+E       | 0.5132        | 0.4809        | 0.5639        | 0.5575        |
| Pt-202+E       | 0.3839        | 0.3163        | 0.4073        | 0.3312        |
| Pu-239+E       | 0.0301        | 0.0273        | 0.0793        | 0.0748        |
| Pu-244+E       | 1.2454        | 1.0530        | 1.6550        | 1.4559        |
| Pu-246+E       | 3.4304        | 2.8949        | 4.4125        | 3.5169        |
| Ra-219+E       | 1.0245        | 0.7849        | 0.8609        | 0.7578        |
| Ra-221+E       | 0.4790        | 0.3532        | 0.6821        | 0.5677        |
| Ra-222+E       | 0.0495        | 0.0387        | 0.0355        | 0.0332        |
| Ra-223+E       | 2.0905        | 1.5949        | 2.3510        | 1.9016        |
| Ra-224+E       | 2.0036        | 1.9534        | 2.0159        | 2.0418        |
| Ra-226+E       | 5.0521        | 4.3070        | 5.1828        | 4.6727        |
| Ra-228+E       | 3.3906        | 3.0736        | 3.9025        | 3.4995        |
| Rb-81+E        | 1.8720        | 1.5514        | 2.2315        | 1.7917        |
| Rb-83+E        | 1.9015        | 1.6323        | 2.1004        | 2.0782        |
| Re-186m+E      | 0.7759        | 0.5599        | 1.5125        | 0.9793        |
| Rn-219+E       | 0.3149        | 0.2615        | 0.3098        | 0.3101        |
| Rn-220+E       | 1.9317        | 1.8900        | 1.9454        | 1.9545        |
| Rn-222+E       | 0.0015        | 0.0012        | 0.0012        | 0.0010        |
| Ru-103+E       | 1.9333        | 1.6520        | 1.6215        | 1.2917        |
| Ru-106+E       | 0.5978        | 0.4848        | 0.5084        | 0.3824        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8804        | 1.5375        | 2.2596        | 1.8135        |
| Sn-121m+E      | 0.1593        | 0.1359        | 0.2063        | 0.2104        |
| Sn-126+E       | 6.0168        | 4.5581        | 6.3890        | 4.2381        |
| Sr-82+E        | 0.4382        | 0.4298        | 0.7844        | 1.0559        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.8592        | 0.7316        | 1.0200        | 1.1093        |
| Te-129m+E      | 0.5378        | 0.4563        | 0.6231        | 0.6042        |
| Th-229+E       | 2.8427        | 2.2948        | 4.2119        | 3.3144        |
| Th-232+E       | 9.5995        | 8.6558        | 10.4162       | 9.7630        |
| Th-234+E       | 0.2174        | 0.1770        | 0.3711        | 0.2603        |
| Ti-44+E        | 3.8844        | 2.8640        | 3.6927        | 2.9219        |
| U-228+E        | 0.2930        | 0.2347        | 0.4066        | 0.3213        |
| U-230+E        | 0.2322        | 0.1973        | 0.3922        | 0.3627        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.2538        | 2.1404        | 2.7736        | 2.9547        |
| U-238+E        | 1.4111        | 1.3597        | 1.5988        | 1.5007        |
| W-178+E        | 1.4728        | 1.1667        | 2.1251        | 1.3320        |
| Xe-122+E       | 1.4713        | 1.2426        | 1.5342        | 1.5068        |
| Zr-93+E        | 0.0534        | 0.0557        | 0.1042        | 0.0997        |

Table 28: Concrete Infinite Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10  | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|--------|---------|---------|---------|---------|
| Ac-223+E  | 0.2089  | 0.1855  | 0.3503  | 0.0554 | 0.2534  | 0.2085  | 0.2769  | 0.3586  |
| Ac-225+E  | 0.7476  | 0.7422  | 0.9939  | 0.2184 | 1.0599  | 0.9478  | 1.2583  | 1.5700  |
| Ac-227+E  | 2.5452  | 2.4330  | 3.4387  | 0.6982 | 3.4513  | 2.9523  | 4.0045  | 4.6430  |
| Ag-108m+E | 2.7682  | 2.7080  | 2.7567  | 0.7704 | 4.2691  | 3.9788  | 5.3924  | 5.9775  |
| Ag-110m+E | 2.8271  | 2.8154  | 2.7933  | 0.8997 | 4.6030  | 4.1792  | 5.8223  | 6.4183  |
| Am-242m+E | 0.6570  | 0.5986  | 0.9607  | 0.1395 | 0.8003  | 0.6766  | 0.7291  | 0.8793  |
| Am-243+E  | 2.2297  | 2.1811  | 2.8773  | 0.5797 | 3.0936  | 2.5529  | 3.2409  | 3.6555  |
| Ar-42+E   | 0.1639  | 0.1808  | 0.1777  | 0.0675 | 0.2747  | 0.2709  | 0.3691  | 0.3493  |
| At-211+E  | 0.5230  | 0.4828  | 0.7597  | 0.1454 | 0.6474  | 0.5066  | 0.6925  | 0.7837  |
| Ba-128+E  | 1.1529  | 1.0507  | 1.1931  | 0.2214 | 1.6344  | 1.4070  | 1.6568  | 2.0759  |
| Bi-210m+E | 0.9449  | 0.9219  | 1.0465  | 0.2620 | 1.3758  | 1.2506  | 1.8239  | 1.9289  |
| Bi-212+E  | 0.1819  | 0.1629  | 0.2746  | 0.0542 | 0.2445  | 0.2075  | 0.2830  | 0.3396  |
| Bi-213+E  | 0.2491  | 0.2781  | 0.3113  | 0.0886 | 0.4156  | 0.3938  | 0.5805  | 0.6867  |
| Bi-214+E  | 1.1844  | 1.2092  | 1.2198  | 0.3872 | 1.9089  | 1.8021  | 2.5754  | 2.6125  |
| Bi-215+E  | 0.6722  | 0.6670  | 0.7821  | 0.1964 | 1.0078  | 0.8889  | 1.3486  | 1.4198  |
| Bi-216+E  | 1.1978  | 1.2802  | 1.3264  | 0.3899 | 1.9942  | 1.9002  | 2.7758  | 3.2727  |
| Cd-118+E  | 0.0495  | 0.0547  | 0.0543  | 0.0185 | 0.0897  | 0.0827  | 0.1213  | 0.1209  |
| Ce-134+E  | 0.8119  | 0.7340  | 0.9086  | 0.1245 | 1.1875  | 0.9083  | 0.9768  | 1.2209  |
| Ce-144+E  | 0.1602  | 0.1666  | 0.1977  | 0.0487 | 0.2550  | 0.2130  | 0.2492  | 0.2868  |
| Cl-34m+E  | 0.9297  | 0.9783  | 1.0246  | 0.3313 | 1.4581  | 1.3590  | 1.8177  | 1.8294  |
| Cm-245+E  | 1.1318  | 1.1200  | 1.4735  | 0.2939 | 1.5823  | 1.3410  | 1.5655  | 1.8537  |
| Cm-247+E  | 0.9166  | 1.0055  | 1.1679  | 0.3112 | 1.4635  | 1.3703  | 1.9744  | 2.2172  |
| Cm-250+E  | 12.4247 | 12.9637 | 13.2375 | 4.0139 | 20.2539 | 18.7288 | 26.2203 | 28.4302 |
| Cs-137+E  | 1.7477  | 1.6701  | 1.7433  | 1.1810 | 2.5114  | 2.3823  | 2.8590  | 3.0305  |
| Es-254+E  | 1.7064  | 1.6787  | 2.4516  | 0.4695 | 2.5012  | 2.1659  | 2.8953  | 3.4710  |
| Fe-60+E   | 1.6574  | 1.7792  | 2.2077  | 0.6343 | 2.8777  | 2.6110  | 3.8581  | 3.8801  |
| Fr-220+E  | 0.1939  | 0.1744  | 0.2957  | 0.0523 | 0.2354  | 0.1857  | 0.2422  | 0.3014  |
| Fr-221+E  | 0.1597  | 0.1528  | 0.1828  | 0.0389 | 0.2195  | 0.1985  | 0.2353  | 0.3147  |
| Ge-68+E   | 0.3664  | 0.2572  | 1.1615  | 0.1188 | 0.3360  | 0.2207  | 0.3936  | 0.6095  |
| Hf-172+E  | 1.5339  | 1.4169  | 2.8020  | 0.3933 | 2.2115  | 1.4707  | 2.1973  | 2.6618  |
| Hf-182+E  | 2.8694  | 2.9128  | 3.5984  | 0.8844 | 4.5236  | 3.7747  | 5.3972  | 6.0835  |
| Hg-193+E  | 2.0335  | 1.9603  | 2.8673  | 0.6166 | 2.9276  | 2.3491  | 3.3879  | 4.0655  |
| Hg-194+E  | 2.0695  | 2.0145  | 2.9295  | 0.6356 | 3.1062  | 2.5278  | 4.1057  | 4.5043  |
| In-114m+E | 0.4964  | 0.3880  | 0.4253  | 0.0800 | 0.6054  | 0.5695  | 0.5846  | 0.7715  |
| Ir-192m+E | 2.0494  | 2.0711  | 2.6197  | 0.6206 | 3.3326  | 2.9332  | 5.0274  | 5.4043  |
| Kr-76+E   | 1.7035  | 1.6292  | 2.1770  | 0.4676 | 2.4365  | 2.1021  | 3.1344  | 3.5784  |
| Mg-28+E   | 2.4878  | 2.6028  | 2.5858  | 0.8202 | 3.9707  | 3.7606  | 5.1334  | 5.2603  |
| Nd-140+E  | 0.7477  | 0.7076  | 0.9155  | 0.1206 | 1.1986  | 0.8769  | 0.9604  | 1.0134  |
| Ni-66+E   | 0.0738  | 0.0854  | 0.0839  | 0.0279 | 0.1420  | 0.1268  | 0.1963  | 0.2261  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50   | ctr50   | mid50   | cnr50   |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Np-235+E  | 0.3539 | 0.3012 | 0.5708 | 0.0767 | 0.3856  | 0.3165  | 0.3505  | 0.4834  |
| Np-237+E  | 2.0507 | 1.9308 | 2.6437 | 0.4946 | 2.7626  | 2.3397  | 3.1458  | 3.5725  |
| Os-194+E  | 0.3509 | 0.3136 | 0.6702 | 0.1036 | 0.4817  | 0.3844  | 0.6478  | 0.7339  |
| Pa-231+E  | 3.2892 | 3.0579 | 4.5519 | 0.8612 | 4.2951  | 3.6570  | 4.8622  | 5.7669  |
| Pb-202+E  | 1.7017 | 1.6859 | 2.6618 | 0.5458 | 2.4521  | 2.0394  | 3.0552  | 3.7486  |
| Pb-210+E  | 0.2613 | 0.2066 | 0.5042 | 0.0639 | 0.2723  | 0.1974  | 0.2605  | 0.3851  |
| Pd-103+E  | 0.4501 | 0.4316 | 0.4854 | 0.0623 | 0.6059  | 0.5310  | 0.4666  | 0.3786  |
| Pt-202+E  | 0.1769 | 0.1993 | 0.2058 | 0.0654 | 0.3140  | 0.2948  | 0.4356  | 0.4948  |
| Pu-239+E  | 0.0547 | 0.0456 | 0.1025 | 0.0126 | 0.0584  | 0.0466  | 0.0543  | 0.0758  |
| Pu-244+E  | 1.0715 | 1.0045 | 1.3884 | 0.2656 | 1.4408  | 1.2749  | 1.5988  | 1.9087  |
| Pu-246+E  | 2.2832 | 2.3157 | 2.7414 | 0.6367 | 3.5197  | 3.0546  | 3.8731  | 4.4889  |
| Ra-219+E  | 0.5940 | 0.5984 | 0.6975 | 0.1702 | 0.9463  | 0.8060  | 1.3978  | 1.4034  |
| Ra-221+E  | 0.4422 | 0.4106 | 0.6547 | 0.1290 | 0.5697  | 0.4616  | 0.5711  | 0.7680  |
| Ra-222+E  | 0.0241 | 0.0254 | 0.0260 | 0.0073 | 0.0425  | 0.0374  | 0.0697  | 0.0687  |
| Ra-223+E  | 1.4036 | 1.3866 | 1.8356 | 0.4200 | 1.9992  | 1.7241  | 2.4393  | 2.7320  |
| Ra-224+E  | 0.9077 | 0.9086 | 0.9637 | 0.8990 | 1.2422  | 1.2646  | 1.2596  | 1.3395  |
| Ra-226+E  | 2.9654 | 2.9871 | 3.2780 | 1.5835 | 4.4715  | 4.2107  | 5.7031  | 5.8744  |
| Ra-228+E  | 2.1702 | 2.1843 | 2.4736 | 1.2812 | 3.2175  | 2.9816  | 3.7512  | 4.1531  |
| Rb-81+E   | 1.4079 | 1.3404 | 1.5929 | 0.3675 | 1.9568  | 1.7280  | 2.1594  | 3.1049  |
| Rb-83+E   | 1.4234 | 1.3284 | 1.7314 | 0.3852 | 1.9179  | 1.7046  | 2.3148  | 3.0577  |
| Re-186m+E | 0.7908 | 0.6479 | 1.9330 | 0.2388 | 0.9330  | 0.6114  | 0.9662  | 1.3637  |
| Rn-219+E  | 0.1808 | 0.1854 | 0.2073 | 0.0554 | 0.2696  | 0.2561  | 0.3591  | 0.3960  |
| Rn-220+E  | 0.8571 | 0.8604 | 0.9090 | 0.8861 | 1.1754  | 1.2008  | 1.1869  | 1.2518  |
| Rn-222+E  | 0.0006 | 0.0007 | 0.0007 | 0.0002 | 0.0011  | 0.0010  | 0.0014  | 0.0018  |
| Ru-103+E  | 0.8220 | 0.9079 | 0.9442 | 0.2673 | 1.4066  | 1.3348  | 1.9069  | 2.3639  |
| Ru-106+E  | 0.2832 | 0.2956 | 0.2943 | 0.0878 | 0.4721  | 0.4453  | 0.6463  | 0.7593  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 1.2772 | 1.0744 | 1.1368 | 0.2562 | 1.6398  | 1.6238  | 1.9260  | 2.2177  |
| Sn-121m+E | 0.1581 | 0.1073 | 0.1585 | 0.0187 | 0.1676  | 0.1501  | 0.1392  | 0.1815  |
| Sn-126+E  | 3.5094 | 3.3883 | 3.6020 | 1.0020 | 5.3535  | 4.8896  | 6.7752  | 7.5377  |
| Sr-82+E   | 0.7051 | 0.6043 | 0.6966 | 0.1564 | 0.8094  | 0.6786  | 0.7582  | 1.0725  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| Te-118+E  | 0.8239 | 0.5470 | 0.6010 | 0.0841 | 0.8627  | 0.8220  | 0.7297  | 0.9261  |
| Te-129m+E | 0.4333 | 0.3346 | 0.4250 | 0.0691 | 0.5217  | 0.4704  | 0.5050  | 0.6483  |
| Th-229+E  | 2.4889 | 2.3470 | 3.5019 | 0.6417 | 3.3084  | 2.7520  | 3.4372  | 4.2084  |
| Th-232+E  | 8.0032 | 7.8945 | 8.9373 | 5.7537 | 11.2927 | 10.7672 | 12.5815 | 13.2330 |
| Th-234+E  | 0.2069 | 0.1949 | 0.2765 | 0.0515 | 0.2771  | 0.2165  | 0.2786  | 0.3427  |
| Ti-44+E   | 2.2991 | 2.3825 | 2.7955 | 0.7381 | 3.6295  | 2.8633  | 4.3023  | 4.5932  |
| U-228+E   | 0.2505 | 0.2405 | 0.3298 | 0.0668 | 0.3412  | 0.2922  | 0.3480  | 0.4713  |
| U-230+E   | 0.2630 | 0.2407 | 0.3712 | 0.0628 | 0.3253  | 0.2754  | 0.3381  | 0.4230  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.9184       | 2.7721       | 3.3897       | 2.2933       | 3.7542       | 3.5633       | 3.9039       | 4.1764       |
| U-238+E        | 1.0089       | 0.9920       | 1.1342       | 0.8661       | 1.3873       | 1.3541       | 1.4163       | 1.5094       |
| W-178+E        | 1.0850       | 1.0395       | 1.9735       | 0.2921       | 1.6577       | 1.0425       | 1.6816       | 2.0420       |
| Xe-122+E       | 1.0836       | 0.8926       | 0.9797       | 0.1803       | 1.4121       | 1.2508       | 1.4097       | 1.7582       |
| Zr-93+E        | 0.0767       | 0.0770       | 0.0950       | 0.0136       | 0.0995       | 0.0913       | 0.0860       | 0.0975       |

Table 29: Concrete Infinite Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100 | ctr100 | mid100 | cnr100 | avg200  | ctr200  | mid200  | cnr200  |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Ac-223+E  | 0.0440 | 0.0361 | 0.0393 | 0.0554 | 0.2283  | 0.2003  | 0.1748  | 0.2606  |
| Ac-225+E  | 0.1929 | 0.1617 | 0.1391 | 0.2184 | 1.1157  | 0.8851  | 0.8542  | 1.1827  |
| Ac-227+E  | 0.6133 | 0.4991 | 0.4534 | 0.6982 | 3.4993  | 2.8749  | 2.5733  | 3.5558  |
| Ag-108m+E | 0.7680 | 0.6524 | 0.4977 | 0.7704 | 4.7122  | 3.6094  | 3.6905  | 6.9301  |
| Ag-110m+E | 0.7969 | 0.6855 | 0.5474 | 0.8997 | 5.0192  | 3.6767  | 4.5490  | 7.9273  |
| Am-242m+E | 0.1331 | 0.1190 | 0.1267 | 0.1395 | 0.6526  | 0.6247  | 0.5844  | 0.8315  |
| Am-243+E  | 0.5384 | 0.4671 | 0.3920 | 0.5797 | 3.0833  | 2.7145  | 2.1242  | 3.0643  |
| Ar-42+E   | 0.0497 | 0.0453 | 0.0457 | 0.0675 | 0.3149  | 0.2211  | 0.2918  | 0.4089  |
| At-211+E  | 0.1140 | 0.0924 | 0.0830 | 0.1454 | 0.6279  | 0.5434  | 0.3861  | 0.6824  |
| Ba-128+E  | 0.2751 | 0.2504 | 0.2199 | 0.2214 | 1.6612  | 1.5207  | 1.4854  | 1.3956  |
| Bi-210m+E | 0.2509 | 0.1961 | 0.1605 | 0.2620 | 1.5713  | 1.1775  | 1.0454  | 1.2366  |
| Bi-212+E  | 0.0420 | 0.0348 | 0.0365 | 0.0542 | 0.2385  | 0.1885  | 0.2082  | 0.3546  |
| Bi-213+E  | 0.0800 | 0.0656 | 0.0508 | 0.0886 | 0.4940  | 0.3682  | 0.3694  | 0.5161  |
| Bi-214+E  | 0.3383 | 0.2926 | 0.2670 | 0.3872 | 2.1273  | 1.5528  | 1.9784  | 3.0582  |
| Bi-215+E  | 0.1798 | 0.1442 | 0.1196 | 0.1964 | 1.1071  | 0.8533  | 0.7706  | 1.0492  |
| Bi-216+E  | 0.3707 | 0.3095 | 0.2283 | 0.3899 | 2.3337  | 1.7814  | 1.6298  | 2.9043  |
| Cd-118+E  | 0.0155 | 0.0136 | 0.0134 | 0.0185 | 0.0968  | 0.0706  | 0.1081  | 0.1196  |
| Ce-134+E  | 0.1820 | 0.1756 | 0.1656 | 0.1245 | 1.0799  | 1.1087  | 1.0755  | 0.8564  |
| Ce-144+E  | 0.0436 | 0.0376 | 0.0318 | 0.0487 | 0.2685  | 0.2396  | 0.2137  | 0.2668  |
| Cl-34m+E  | 0.2634 | 0.2188 | 0.2186 | 0.3313 | 1.6762  | 1.2838  | 1.7741  | 1.8743  |
| Cm-245+E  | 0.2742 | 0.2507 | 0.2097 | 0.2939 | 1.5373  | 1.4429  | 1.1547  | 1.7867  |
| Cm-247+E  | 0.2844 | 0.2328 | 0.1862 | 0.3112 | 1.7039  | 1.2675  | 1.3679  | 1.7820  |
| Cm-250+E  | 3.6114 | 3.0798 | 2.6096 | 4.0139 | 22.7412 | 16.9442 | 20.4220 | 26.7414 |
| Cs-137+E  | 1.5713 | 1.5270 | 1.4681 | 1.5553 | 2.7606  | 2.4088  | 2.5166  | 3.7763  |
| Es-254+E  | 0.4116 | 0.3614 | 0.3629 | 0.4695 | 2.3040  | 1.8518  | 2.4060  | 2.8637  |
| Fe-60+E   | 0.4926 | 0.4318 | 0.4593 | 0.6343 | 3.0192  | 2.2039  | 3.3924  | 3.7078  |
| Fr-220+E  | 0.0406 | 0.0330 | 0.0336 | 0.0523 | 0.2127  | 0.1903  | 0.1573  | 0.2568  |
| Fr-221+E  | 0.0395 | 0.0341 | 0.0241 | 0.0389 | 0.2371  | 0.1763  | 0.1608  | 0.1710  |
| Ge-68+E   | 0.0552 | 0.0389 | 0.0856 | 0.1188 | 0.2279  | 0.2310  | 0.1051  | 0.1915  |
| Hf-172+E  | 0.3542 | 0.2798 | 0.3246 | 0.3933 | 1.9305  | 1.8131  | 1.2742  | 1.4604  |
| Hf-182+E  | 0.7802 | 0.6452 | 0.5800 | 0.8844 | 4.7766  | 3.7673  | 3.9314  | 4.3910  |
| Hg-193+E  | 0.5060 | 0.4154 | 0.3899 | 0.6166 | 2.9728  | 2.3681  | 2.2987  | 3.0777  |
| Hg-194+E  | 0.5353 | 0.4317 | 0.4320 | 0.6356 | 3.1816  | 2.5338  | 2.3937  | 3.2046  |
| In-114m+E | 0.1035 | 0.0947 | 0.0771 | 0.0800 | 0.5945  | 0.5271  | 0.4750  | 0.6076  |
| Ir-192m+E | 0.5883 | 0.4664 | 0.4029 | 0.6206 | 3.6488  | 2.8402  | 2.3787  | 3.4429  |
| Kr-76+E   | 0.4292 | 0.3402 | 0.3270 | 0.4676 | 2.4701  | 1.9620  | 1.9670  | 2.6143  |
| Mg-28+E   | 0.7108 | 0.6348 | 0.6315 | 0.8202 | 4.4418  | 3.3099  | 4.5163  | 5.2623  |
| Nd-140+E  | 0.1798 | 0.1690 | 0.1681 | 0.1206 | 1.0584  | 1.0812  | 1.0498  | 0.7419  |
| Ni-66+E   | 0.0235 | 0.0208 | 0.0179 | 0.0279 | 0.1496  | 0.1047  | 0.1721  | 0.1891  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.0635        | 0.0532        | 0.0684        | 0.0767        | 0.2765        | 0.2671        | 0.2927        | 0.4241        |
| Np-237+E       | 0.4730        | 0.4048        | 0.3818        | 0.4946        | 2.5922        | 2.3046        | 2.0594        | 2.9345        |
| Os-194+E       | 0.0816        | 0.0632        | 0.0756        | 0.1036        | 0.4548        | 0.3795        | 0.3216        | 0.4457        |
| Pa-231+E       | 0.7547        | 0.6160        | 0.5936        | 0.8612        | 4.1798        | 3.5071        | 3.2206        | 4.4462        |
| Pb-202+E       | 0.4459        | 0.3577        | 0.3313        | 0.5458        | 2.5932        | 2.0776        | 1.8048        | 2.5923        |
| Pb-210+E       | 0.0443        | 0.0339        | 0.0528        | 0.0639        | 0.1850        | 0.1808        | 0.1910        | 0.2898        |
| Pd-103+E       | 0.0968        | 0.0962        | 0.0870        | 0.0623        | 0.5014        | 0.4721        | 0.4140        | 0.5297        |
| Pt-202+E       | 0.0575        | 0.0487        | 0.0407        | 0.0654        | 0.3608        | 0.2626        | 0.3268        | 0.4153        |
| Pu-239+E       | 0.0096        | 0.0079        | 0.0109        | 0.0126        | 0.0413        | 0.0405        | 0.0397        | 0.0582        |
| Pu-244+E       | 0.2468        | 0.2115        | 0.2034        | 0.2656        | 1.3532        | 1.1409        | 1.1522        | 1.8916        |
| Pu-246+E       | 0.5987        | 0.5294        | 0.4528        | 0.6367        | 3.5463        | 2.8824        | 3.1815        | 4.0484        |
| Ra-219+E       | 0.1645        | 0.1317        | 0.1092        | 0.1702        | 1.0081        | 0.8121        | 0.6370        | 0.9437        |
| Ra-221+E       | 0.0979        | 0.0800        | 0.0777        | 0.1290        | 0.5247        | 0.4799        | 0.4145        | 0.6792        |
| Ra-222+E       | 0.0074        | 0.0059        | 0.0048        | 0.0073        | 0.0471        | 0.0362        | 0.0310        | 0.0433        |
| Ra-223+E       | 0.3619        | 0.2943        | 0.2457        | 0.4200        | 2.1464        | 1.7378        | 1.4837        | 2.1589        |
| Ra-224+E       | 1.2822        | 1.2780        | 1.2591        | 1.2509        | 1.4022        | 1.3458        | 1.3988        | 1.3537        |
| Ra-226+E       | 1.9193        | 1.7917        | 1.7150        | 1.9921        | 4.9785        | 4.0234        | 4.3166        | 5.7625        |
| Ra-228+E       | 1.6241        | 1.5507        | 1.5186        | 1.6519        | 3.4275        | 2.8811        | 3.2176        | 3.9633        |
| Rb-81+E        | 0.3428        | 0.2930        | 0.2396        | 0.3675        | 1.9269        | 1.5043        | 1.6514        | 2.2507        |
| Rb-83+E        | 0.3369        | 0.2786        | 0.2611        | 0.3852        | 1.8833        | 1.5530        | 1.5243        | 2.7220        |
| Re-186m+E      | 0.1513        | 0.1146        | 0.1730        | 0.2388        | 0.7502        | 0.7277        | 0.4544        | 0.6364        |
| Rn-219+E       | 0.0517        | 0.0408        | 0.0328        | 0.0554        | 0.3204        | 0.2320        | 0.2367        | 0.2722        |
| Rn-220+E       | 1.2696        | 1.2678        | 1.2514        | 1.2380        | 1.3242        | 1.2894        | 1.3448        | 1.3017        |
| Rn-222+E       | 0.0002        | 0.0002        | 0.0001        | 0.0002        | 0.0012        | 0.0010        | 0.0007        | 0.0013        |
| Ru-103+E       | 0.2563        | 0.2193        | 0.1589        | 0.2673        | 1.6437        | 1.3124        | 1.0002        | 1.6930        |
| Ru-106+E       | 0.0846        | 0.0719        | 0.0526        | 0.0878        | 0.5398        | 0.4200        | 0.3702        | 0.7147        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 0.3056        | 0.2636        | 0.2327        | 0.2562        | 1.7624        | 1.4642        | 1.5696        | 1.8514        |
| Sn-121m+E      | 0.0274        | 0.0254        | 0.0270        | 0.0187        | 0.1474        | 0.1566        | 0.1366        | 0.1354        |
| Sn-126+E       | 0.9656        | 0.8131        | 0.6229        | 1.0020        | 5.9332        | 4.5654        | 4.6924        | 8.6673        |
| Sr-82+E        | 0.1359        | 0.1121        | 0.1225        | 0.1564        | 0.6393        | 0.5410        | 0.8182        | 1.3102        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0001        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.1438        | 0.1356        | 0.1329        | 0.0841        | 0.7899        | 0.8204        | 0.7626        | 0.7890        |
| Te-129m+E      | 0.0879        | 0.0802        | 0.0752        | 0.0691        | 0.5054        | 0.4833        | 0.4456        | 0.5189        |
| Th-229+E       | 0.5703        | 0.4854        | 0.4637        | 0.6417        | 3.0964        | 2.7131        | 2.5056        | 3.5050        |
| Th-232+E       | 7.7554        | 7.5153        | 7.6149        | 7.7027        | 12.4153       | 11.0275       | 11.5375       | 12.5360       |
| Th-234+E       | 0.0463        | 0.0399        | 0.0388        | 0.0515        | 0.2483        | 0.2250        | 0.2078        | 0.2970        |
| Ti-44+E        | 0.6197        | 0.5160        | 0.4408        | 0.7381        | 3.7694        | 2.9947        | 3.0018        | 3.7511        |
| U-228+E        | 0.0587        | 0.0499        | 0.0436        | 0.0668        | 0.3230        | 0.2798        | 0.2622        | 0.3726        |
| U-230+E        | 0.0554        | 0.0466        | 0.0492        | 0.0628        | 0.2809        | 0.2521        | 0.2503        | 0.3584        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.1578        | 3.1323        | 2.9071        | 3.2747        | 3.8885        | 3.7676        | 3.6978        | 3.8193        |
| U-238+E        | 1.2346        | 1.2229        | 1.1621        | 1.2241        | 1.4858        | 1.4401        | 1.4771        | 1.4962        |
| W-178+E        | 0.2614        | 0.2064        | 0.2366        | 0.2921        | 1.4438        | 1.3356        | 0.9813        | 1.0922        |
| Xe-122+E       | 0.2359        | 0.2163        | 0.1908        | 0.1803        | 1.3956        | 1.3188        | 1.2316        | 1.4342        |
| Zr-93+E        | 0.0164        | 0.0150        | 0.0147        | 0.0136        | 0.0787        | 0.0755        | 0.0791        | 0.0949        |

Table 30: Concrete Infinite Contamination Thickness for 400x400x40 ft

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1887        | 0.1370        | 0.1592        | 0.3406        |
| Ac-225+E       | 1.0257        | 0.7671        | 0.7446        | 1.1403        |
| Ac-227+E       | 3.1725        | 2.3091        | 2.2750        | 3.1939        |
| Ag-108m+E      | 4.6180        | 3.1850        | 2.8664        | 3.6614        |
| Ag-110m+E      | 5.0444        | 2.9285        | 2.7783        | 3.3762        |
| Am-242m+E      | 0.4833        | 0.3621        | 0.7768        | 1.2290        |
| Am-243+E       | 2.8150        | 2.0989        | 2.2386        | 2.7221        |
| Ar-42+E        | 0.3153        | 0.1843        | 0.2506        | 0.4052        |
| At-211+E       | 0.5594        | 0.4537        | 0.4160        | 0.5822        |
| Ba-128+E       | 1.5618        | 1.3033        | 1.2153        | 1.2367        |
| Bi-210m+E      | 1.5165        | 1.0574        | 0.7797        | 0.6243        |
| Bi-212+E       | 0.2180        | 0.1337        | 0.1279        | 0.2846        |
| Bi-213+E       | 0.4824        | 0.3869        | 0.3332        | 0.4535        |
| Bi-214+E       | 2.1177        | 1.2759        | 1.5415        | 1.8084        |
| Bi-215+E       | 1.0690        | 0.7635        | 0.6309        | 0.6085        |
| Bi-216+E       | 2.2990        | 1.7281        | 1.5763        | 1.8590        |
| Cd-118+E       | 0.0966        | 0.0576        | 0.0715        | 0.0708        |
| Ce-134+E       | 0.9994        | 0.8797        | 0.9027        | 0.7762        |
| Ce-144+E       | 0.2556        | 0.1767        | 0.1549        | 0.1363        |
| Cl-34m+E       | 1.6274        | 0.9900        | 1.4479        | 1.3335        |
| Cm-245+E       | 1.3840        | 0.9586        | 1.1036        | 1.7202        |
| Cm-247+E       | 1.6540        | 1.3181        | 1.1334        | 1.6877        |
| Cm-250+E       | 22.4436       | 14.6475       | 15.9031       | 16.8634       |
| Cs-137+E       | 2.7599        | 2.1173        | 2.2193        | 1.9341        |
| Es-254+E       | 2.0335        | 1.2818        | 2.0809        | 2.8145        |
| Fe-60+E        | 2.9803        | 1.7130        | 2.1492        | 2.7101        |
| Fr-220+E       | 0.1791        | 0.1355        | 0.1395        | 0.2632        |
| Fr-221+E       | 0.2233        | 0.1576        | 0.1100        | 0.1197        |
| Ge-68+E        | 0.1343        | 0.0750        | 0.0378        | 0.8327        |
| Hf-172+E       | 1.7229        | 1.3270        | 1.3288        | 1.9503        |
| Hf-182+E       | 4.6255        | 3.1004        | 2.7810        | 2.6751        |
| Hg-193+E       | 2.7935        | 2.0020        | 1.8250        | 2.4432        |
| Hg-194+E       | 3.0176        | 2.1864        | 2.1047        | 2.7488        |
| In-114m+E      | 0.5429        | 0.4234        | 0.3546        | 0.4964        |
| Ir-192m+E      | 3.5486        | 2.6525        | 2.1625        | 2.4364        |
| Kr-76+E        | 2.2686        | 1.6422        | 1.2827        | 2.1157        |
| Mg-28+E        | 4.3659        | 2.8591        | 3.6497        | 4.6984        |
| Nd-140+E       | 0.9785        | 0.8943        | 0.9431        | 0.7616        |
| Ni-66+E        | 0.1513        | 0.0856        | 0.0905        | 0.0884        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1695        | 0.1202        | 0.3625        | 0.7002        |
| Np-237+E       | 2.2605        | 1.6830        | 2.1537        | 3.0669        |
| Os-194+E       | 0.4081        | 0.2951        | 0.2403        | 0.5479        |
| Pa-231+E       | 3.6728        | 2.6741        | 2.9485        | 4.4635        |
| Pb-202+E       | 2.4167        | 1.9560        | 1.6879        | 2.6483        |
| Pb-210+E       | 0.1149        | 0.0782        | 0.0941        | 0.4726        |
| Pd-103+E       | 0.3835        | 0.3668        | 0.5087        | 0.7207        |
| Pt-202+E       | 0.3579        | 0.2523        | 0.2433        | 0.2981        |
| Pu-239+E       | 0.0248        | 0.0176        | 0.0513        | 0.1124        |
| Pu-244+E       | 1.1626        | 0.8009        | 1.2521        | 1.7737        |
| Pu-246+E       | 3.3306        | 2.1760        | 2.4388        | 2.9594        |
| Ra-219+E       | 0.9802        | 0.7435        | 0.6213        | 0.6027        |
| Ra-221+E       | 0.4493        | 0.3076        | 0.3195        | 0.6192        |
| Ra-222+E       | 0.0469        | 0.0352        | 0.0282        | 0.0254        |
| Ra-223+E       | 2.0287        | 1.5066        | 1.2496        | 1.6318        |
| Ra-224+E       | 1.3872        | 1.2394        | 1.4539        | 1.2004        |
| Ra-226+E       | 4.9057        | 3.6485        | 3.8510        | 4.0038        |
| Ra-228+E       | 3.3083        | 2.4962        | 3.1081        | 3.1252        |
| Rb-81+E        | 1.7358        | 1.2372        | 0.9160        | 1.7748        |
| Rb-83+E        | 1.6549        | 1.2245        | 1.1851        | 2.1671        |
| Re-186m+E      | 0.5926        | 0.4249        | 0.3482        | 1.3561        |
| Rn-219+E       | 0.3105        | 0.2257        | 0.1668        | 0.1930        |
| Rn-220+E       | 1.3135        | 1.1907        | 1.4203        | 1.1726        |
| Rn-222+E       | 0.0012        | 0.0010        | 0.0010        | 0.0009        |
| Ru-103+E       | 1.5855        | 1.2757        | 1.2731        | 1.3096        |
| Ru-106+E       | 0.5330        | 0.3796        | 0.3715        | 0.3771        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.6466        | 1.3893        | 1.1811        | 1.9123        |
| Sn-121m+E      | 0.1259        | 0.1147        | 0.1093        | 0.1759        |
| Sn-126+E       | 5.8899        | 3.9987        | 3.3628        | 4.3519        |
| Sr-82+E        | 0.4725        | 0.2872        | 0.4058        | 1.0423        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.6918        | 0.6169        | 0.5959        | 0.8300        |
| Te-129m+E      | 0.4596        | 0.3816        | 0.3552        | 0.4854        |
| Th-229+E       | 2.6838        | 2.0242        | 2.4113        | 3.7728        |
| Th-232+E       | 12.0896       | 10.0201       | 11.2990       | 9.9935        |
| Th-234+E       | 0.2135        | 0.1571        | 0.2159        | 0.3051        |
| Ti-44+E        | 3.6771        | 2.7021        | 2.6970        | 1.9966        |
| U-228+E        | 0.2806        | 0.1964        | 0.2525        | 0.3653        |
| U-230+E        | 0.2205        | 0.1539        | 0.2864        | 0.4446        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.6579        | 3.4285        | 4.0216        | 5.6171        |
| U-238+E        | 1.4465        | 1.3764        | 1.6050        | 1.2913        |
| W-178+E        | 1.3150        | 1.0206        | 1.0485        | 1.3668        |
| Xe-122+E       | 1.3014        | 1.0661        | 1.0049        | 1.1201        |
| Zr-93+E        | 0.0516        | 0.0386        | 0.1996        | 0.1820        |

## Appendix C

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 31: Drywall Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5750  | 0.3307  | 0.4995  | 0.5851  | 0.4707  | 0.3285  | 0.5430  | 0.6146  |
| Ac-225+E  | 1.4636  | 0.9361  | 1.3039  | 1.4843  | 1.3881  | 1.1086  | 1.5407  | 1.6510  |
| Ac-227+E  | 5.1673  | 3.2616  | 4.5869  | 5.2439  | 4.7877  | 3.7595  | 5.3422  | 5.7704  |
| Ag-108m+E | 3.5590  | 2.5349  | 3.2640  | 3.5869  | 4.0901  | 3.6903  | 4.3500  | 4.3468  |
| Ag-110m+E | 2.9433  | 2.1159  | 2.7121  | 2.9645  | 3.5385  | 3.2354  | 3.7467  | 3.6865  |
| Am-242m+E | 1.9717  | 1.1827  | 1.7291  | 1.9973  | 1.7021  | 1.2658  | 1.9253  | 2.1196  |
| Am-243+E  | 4.4662  | 2.9324  | 3.9993  | 4.5229  | 4.3482  | 3.5705  | 4.7832  | 5.0662  |
| Ar-42+E   | 0.1673  | 0.1185  | 0.1538  | 0.1682  | 0.2030  | 0.1856  | 0.2149  | 0.2103  |
| At-211+E  | 1.0693  | 0.6662  | 0.9448  | 1.0852  | 0.9674  | 0.7448  | 1.0859  | 1.1823  |
| Ba-128+E  | 1.8689  | 1.2640  | 1.6894  | 1.8814  | 2.0177  | 1.7694  | 2.1585  | 2.1947  |
| Bi-210m+E | 1.1977  | 0.8472  | 1.0955  | 1.2152  | 1.3099  | 1.1535  | 1.4123  | 1.4475  |
| Bi-212+E  | 0.3965  | 0.2283  | 0.3450  | 0.4033  | 0.3379  | 0.2421  | 0.3868  | 0.4320  |
| Bi-213+E  | 0.3597  | 0.2537  | 0.3288  | 0.3640  | 0.4000  | 0.3541  | 0.4294  | 0.4364  |
| Bi-214+E  | 1.2506  | 0.8919  | 1.1494  | 1.2592  | 1.4935  | 1.3606  | 1.5834  | 1.5618  |
| Bi-215+E  | 0.9584  | 0.6617  | 0.8708  | 0.9710  | 1.0191  | 0.8806  | 1.1045  | 1.1396  |
| Bi-216+E  | 1.4572  | 1.0521  | 1.3418  | 1.4720  | 1.6987  | 1.5402  | 1.8079  | 1.8070  |
| Cd-118+E  | 0.0617  | 0.0440  | 0.0567  | 0.0620  | 0.0746  | 0.0685  | 0.0789  | 0.0774  |
| Ce-134+E  | 1.5468  | 1.0115  | 1.3854  | 1.5567  | 1.6116  | 1.3833  | 1.7355  | 1.7804  |
| Ce-144+E  | 0.2949  | 0.2081  | 0.2694  | 0.2976  | 0.3256  | 0.2908  | 0.3481  | 0.3540  |
| Cl-34m+E  | 1.0890  | 0.7942  | 1.0060  | 1.0980  | 1.2998  | 1.1919  | 1.3770  | 1.3620  |
| Cm-245+E  | 2.5886  | 1.6812  | 2.3121  | 2.6209  | 2.4627  | 1.9927  | 2.7217  | 2.9045  |
| Cm-247+E  | 1.4888  | 1.0384  | 1.3557  | 1.5065  | 1.6067  | 1.4056  | 1.7326  | 1.7743  |
| Cm-250+E  | 14.6153 | 10.5571 | 13.4656 | 14.7408 | 17.2596 | 15.7347 | 18.3056 | 18.1604 |
| Cs-137+E  | 1.9748  | 1.4221  | 1.8194  | 1.9921  | 2.3519  | 2.1499  | 2.4880  | 2.4558  |
| Es-254+E  | 4.1641  | 2.5202  | 3.6639  | 4.2180  | 3.7768  | 2.8990  | 4.2335  | 4.5883  |
| Fe-60+E   | 2.6855  | 1.7146  | 2.3980  | 2.7174  | 2.7961  | 2.3423  | 3.0573  | 3.1706  |
| Fr-220+E  | 0.4765  | 0.2847  | 0.4173  | 0.4840  | 0.4064  | 0.2966  | 0.4629  | 0.5149  |
| Fr-221+E  | 0.2368  | 0.1643  | 0.2152  | 0.2402  | 0.2479  | 0.2132  | 0.2693  | 0.2797  |
| Ge-68+E   | 1.7147  | 0.8250  | 1.4356  | 1.7595  | 1.1483  | 0.5952  | 1.4198  | 1.7486  |
| Hf-172+E  | 4.2971  | 2.4994  | 3.7427  | 4.3829  | 3.7126  | 2.7110  | 4.2174  | 4.7089  |
| Hf-182+E  | 4.4517  | 2.9966  | 4.0195  | 4.5166  | 4.6766  | 3.9960  | 5.0817  | 5.2719  |
| Hg-193+E  | 3.7640  | 2.3567  | 3.3365  | 3.8251  | 3.5602  | 2.8148  | 3.9641  | 4.2674  |
| Hg-194+E  | 3.9195  | 2.4387  | 3.4712  | 3.9847  | 3.6949  | 2.9087  | 4.1208  | 4.4486  |
| In-114m+E | 0.7981  | 0.5471  | 0.7242  | 0.8037  | 0.8573  | 0.7507  | 0.9164  | 0.9393  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Ir-192m+E | 3.4364 | 2.2605 | 3.0876 | 3.4917 | 3.4766 | 2.8893 | 3.8197 | 4.0322 |
| Kr-76+E   | 3.4119 | 2.1516 | 3.0308 | 3.4628 | 3.1634 | 2.4743 | 3.5274 | 3.8177 |
| Mg-28+E   | 2.8947 | 2.0599 | 2.6580 | 2.9076 | 3.4555 | 3.1635 | 3.6456 | 3.5815 |
| Nd-140+E  | 1.5841 | 1.0314 | 1.4164 | 1.5956 | 1.6359 | 1.3964 | 1.7652 | 1.8203 |
| Ni-66+E   | 0.0902 | 0.0644 | 0.0830 | 0.0908 | 0.1090 | 0.0996 | 0.1152 | 0.1131 |
| Np-235+E  | 1.1710 | 0.6681 | 1.0155 | 1.1884 | 0.9356 | 0.6416 | 1.0813 | 1.2257 |
| Np-237+E  | 4.7437 | 2.9786 | 4.2053 | 4.8036 | 4.3379 | 3.3877 | 4.8400 | 5.2315 |
| Os-194+E  | 0.9927 | 0.5508 | 0.8562 | 1.0136 | 0.8022 | 0.5443 | 0.9335 | 1.0692 |
| Pa-231+E  | 7.3110 | 4.5018 | 6.4523 | 7.4194 | 6.5452 | 4.9952 | 7.3599 | 8.0412 |
| Pb-202+E  | 3.5334 | 2.1616 | 3.1141 | 3.5950 | 3.2281 | 2.4813 | 3.6278 | 3.9601 |
| Pb-210+E  | 0.9158 | 0.4942 | 0.7847 | 0.9333 | 0.6829 | 0.4254 | 0.8075 | 0.9463 |
| Pd-103+E  | 1.2767 | 0.8426 | 1.1446 | 1.2852 | 1.2900 | 1.0919 | 1.3973 | 1.4466 |
| Pt-202+E  | 0.2267 | 0.1628 | 0.2086 | 0.2288 | 0.2674 | 0.2433 | 0.2840 | 0.2822 |
| Pu-239+E  | 0.1956 | 0.1082 | 0.1685 | 0.1990 | 0.1516 | 0.0998 | 0.1772 | 0.2039 |
| Pu-244+E  | 2.4709 | 1.5178 | 2.1806 | 2.5016 | 2.2303 | 1.7146 | 2.4989 | 2.7095 |
| Pu-246+E  | 4.2347 | 2.8127 | 3.8093 | 4.2808 | 4.3089 | 3.6267 | 4.6948 | 4.8892 |
| Ra-219+E  | 0.9572 | 0.6599 | 0.8692 | 0.9699 | 1.0057 | 0.8644 | 1.0920 | 1.1325 |
| Ra-221+E  | 1.0988 | 0.6699 | 0.9673 | 1.1158 | 0.9595 | 0.7168 | 1.0863 | 1.1981 |
| Ra-222+E  | 0.0344 | 0.0250 | 0.0318 | 0.0349 | 0.0392 | 0.0353 | 0.0419 | 0.0424 |
| Ra-223+E  | 2.4450 | 1.6135 | 2.1938 | 2.4802 | 2.4165 | 1.9924 | 2.6595 | 2.8128 |
| Ra-224+E  | 1.1783 | 0.8571 | 1.0878 | 1.1877 | 1.4038 | 1.2885 | 1.4842 | 1.4738 |
| Ra-226+E  | 3.6552 | 2.5560 | 3.3385 | 3.6916 | 4.1345 | 3.6737 | 4.4234 | 4.4622 |
| Ra-228+E  | 3.3016 | 2.2280 | 2.9877 | 3.3355 | 3.5182 | 3.0243 | 3.7994 | 3.9028 |
| Rb-81+E   | 2.6953 | 1.7606 | 2.4145 | 2.7296 | 2.5662 | 2.0584 | 2.8370 | 3.0314 |
| Rb-83+E   | 2.9038 | 1.7864 | 2.5645 | 2.9415 | 2.5851 | 1.9514 | 2.9060 | 3.1774 |
| Re-186m+E | 2.9075 | 1.5196 | 2.4748 | 2.9758 | 2.1638 | 1.3292 | 2.5791 | 3.0496 |
| Rn-219+E  | 0.2329 | 0.1666 | 0.2137 | 0.2361 | 0.2589 | 0.2303 | 0.2781 | 0.2830 |
| Rn-220+E  | 1.1176 | 0.8139 | 1.0322 | 1.1261 | 1.3377 | 1.2303 | 1.4130 | 1.4008 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0007 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.0981 | 0.7803 | 1.0066 | 1.1091 | 1.2559 | 1.1275 | 1.3403 | 1.3479 |
| Ru-106+E  | 0.3140 | 0.2285 | 0.2900 | 0.3168 | 0.3752 | 0.3437 | 0.3975 | 0.3936 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.0347 | 1.4090 | 1.8517 | 2.0464 | 2.2315 | 1.9786 | 2.3731 | 2.4132 |
| Sn-121m+E | 0.3130 | 0.1948 | 0.2773 | 0.3157 | 0.3020 | 0.2451 | 0.3304 | 0.3517 |
| Sn-126+E  | 4.2336 | 3.0175 | 3.8829 | 4.2723 | 4.8673 | 4.3864 | 5.1831 | 5.1916 |
| Sr-82+E   | 1.6231 | 1.0021 | 1.4339 | 1.6383 | 1.3884 | 1.0237 | 1.5642 | 1.7184 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| Te-118+E  | 1.3319 | 0.8905 | 1.2013 | 1.3358 | 1.4137 | 1.2317 | 1.5050 | 1.5436 |
| Te-129m+E | 0.7499 | 0.4845 | 0.6705 | 0.7558 | 0.7620 | 0.6410 | 0.8250 | 0.8608 |
| Th-229+E  | 5.8789 | 3.6203 | 5.1864 | 5.9607 | 5.2526 | 4.0100 | 5.9022 | 6.4435 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-232+E       | 8.2696       | 5.6382       | 7.4989       | 8.3598       | 8.9332       | 7.7464       | 9.6294       | 9.8592       |
| Th-234+E       | 0.4834       | 0.3002       | 0.4272       | 0.4898       | 0.4355       | 0.3355       | 0.4874       | 0.5295       |
| Ti-44+E        | 3.1378       | 2.2362       | 2.8710       | 3.1691       | 3.5541       | 3.1902       | 3.7921       | 3.8111       |
| U-228+E        | 0.5744       | 0.3633       | 0.5102       | 0.5822       | 0.5274       | 0.4131       | 0.5889       | 0.6356       |
| U-230+E        | 0.7155       | 0.4305       | 0.6281       | 0.7253       | 0.6123       | 0.4513       | 0.6946       | 0.7681       |
| U-235+E        | 3.8369       | 2.4798       | 3.4268       | 3.8912       | 3.6405       | 2.9278       | 4.0337       | 4.2997       |
| U-238+E        | 1.4278       | 0.9929       | 1.2986       | 1.4425       | 1.5612       | 1.3727       | 1.6721       | 1.6986       |
| W-178+E        | 2.9082       | 1.6958       | 2.5340       | 2.9678       | 2.5218       | 1.8448       | 2.8633       | 3.1918       |
| Xe-122+E       | 1.6952       | 1.1512       | 1.5347       | 1.7039       | 1.8381       | 1.6173       | 1.9597       | 1.9919       |
| Zr-93+E        | 0.2383       | 0.1494       | 0.2112       | 0.2401       | 0.2159       | 0.1700       | 0.2401       | 0.2564       |

Table 32: Drywall Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4703  | 0.3633  | 0.5736  | 0.6411  | 0.3334  | 0.3131  | 0.5544  | 0.6400  |
| Ac-225+E  | 1.4731  | 1.2904  | 1.6707  | 1.7369  | 1.2124  | 1.2199  | 1.6843  | 1.7898  |
| Ac-227+E  | 5.0275  | 4.3339  | 5.7572  | 6.0607  | 4.0520  | 4.0497  | 5.7550  | 6.1960  |
| Ag-108m+E | 4.6447  | 4.5174  | 4.8663  | 4.6241  | 4.3099  | 4.5584  | 5.1126  | 4.9273  |
| Ag-110m+E | 4.1325  | 4.0882  | 4.2837  | 4.0065  | 4.0234  | 4.3334  | 4.6251  | 4.3441  |
| Am-242m+E | 1.7087  | 1.3779  | 2.0043  | 2.1912  | 1.2001  | 1.1308  | 1.9208  | 2.1733  |
| Am-243+E  | 4.6296  | 4.1302  | 5.1570  | 5.3182  | 3.8574  | 3.9055  | 5.1835  | 5.5051  |
| Ar-42+E   | 0.2390  | 0.2372  | 0.2461  | 0.2289  | 0.2342  | 0.2515  | 0.2687  | 0.2501  |
| At-211+E  | 1.0076  | 0.8528  | 1.1625  | 1.2414  | 0.8042  | 0.8031  | 1.1573  | 1.2655  |
| Ba-128+E  | 2.2398  | 2.1154  | 2.3971  | 2.3503  | 1.9983  | 2.1027  | 2.4511  | 2.4456  |
| Bi-210m+E | 1.4691  | 1.4089  | 1.5855  | 1.5432  | 1.3654  | 1.4337  | 1.6577  | 1.6416  |
| Bi-212+E  | 0.3485  | 0.2798  | 0.4164  | 0.4547  | 0.2655  | 0.2590  | 0.4123  | 0.4602  |
| Bi-213+E  | 0.4521  | 0.4345  | 0.4841  | 0.4670  | 0.4225  | 0.4456  | 0.5093  | 0.4996  |
| Bi-214+E  | 1.7427  | 1.7194  | 1.8085  | 1.6962  | 1.6928  | 1.8165  | 1.9575  | 1.8399  |
| Bi-215+E  | 1.1323  | 1.0670  | 1.2287  | 1.2122  | 1.0303  | 1.0788  | 1.2781  | 1.2821  |
| Bi-216+E  | 1.9540  | 1.9152  | 2.0558  | 1.9446  | 1.8740  | 1.9936  | 2.1955  | 2.1134  |
| Cd-118+E  | 0.0875  | 0.0867  | 0.0903  | 0.0846  | 0.0855  | 0.0918  | 0.0982  | 0.0919  |
| Ce-134+E  | 1.7707  | 1.6386  | 1.9120  | 1.9112  | 1.5472  | 1.6274  | 1.9397  | 1.9717  |
| Ce-144+E  | 0.3652  | 0.3508  | 0.3870  | 0.3775  | 0.3391  | 0.3592  | 0.4059  | 0.4001  |
| Cl-34m+E  | 1.5094  | 1.4962  | 1.5683  | 1.4717  | 1.4709  | 1.5766  | 1.7085  | 1.5905  |
| Cm-245+E  | 2.5896  | 2.2713  | 2.9126  | 3.0295  | 2.0908  | 2.0846  | 2.8990  | 3.1345  |
| Cm-247+E  | 1.7869  | 1.6935  | 1.9283  | 1.8861  | 1.6222  | 1.6964  | 1.9960  | 1.9845  |
| Cm-250+E  | 19.9529 | 19.6687 | 20.8176 | 19.6065 | 19.2346 | 20.5669 | 22.3566 | 21.2068 |
| Cs-137+E  | 2.7326  | 2.7255  | 2.8527  | 2.6778  | 2.6450  | 2.8361  | 3.0703  | 2.8957  |
| Es-254+E  | 3.9257  | 3.3061  | 4.5143  | 4.8142  | 3.0079  | 2.9604  | 4.4451  | 4.8298  |
| Fe-60+E   | 3.1452  | 2.9071  | 3.4314  | 3.4316  | 2.8585  | 2.9889  | 3.6186  | 3.6141  |
| Fr-220+E  | 0.4122  | 0.3312  | 0.4899  | 0.5371  | 0.3054  | 0.2946  | 0.4792  | 0.5403  |
| Fr-221+E  | 0.2726  | 0.2557  | 0.2981  | 0.2961  | 0.2448  | 0.2535  | 0.3094  | 0.3124  |
| Ge-68+E   | 1.0644  | 0.6266  | 1.4864  | 1.8317  | 0.5996  | 0.4761  | 1.3765  | 1.7700  |
| Hf-172+E  | 3.8473  | 3.1486  | 4.5535  | 4.9873  | 3.0246  | 2.9881  | 4.5290  | 5.0148  |
| Hf-182+E  | 5.2085  | 4.8747  | 5.6735  | 5.6560  | 4.7595  | 4.9732  | 5.9270  | 5.9605  |
| Hg-193+E  | 3.8181  | 3.3455  | 4.3377  | 4.5342  | 3.2345  | 3.2911  | 4.4131  | 4.6703  |
| Hg-194+E  | 3.9646  | 3.4665  | 4.5156  | 4.7217  | 3.3546  | 3.4099  | 4.5910  | 4.8679  |
| In-114m+E | 0.9405  | 0.8864  | 1.0033  | 0.9805  | 0.8161  | 0.8456  | 1.0188  | 1.0143  |
| Ir-192m+E | 3.8220  | 3.5033  | 4.2478  | 4.2810  | 3.3984  | 3.5181  | 4.3871  | 4.4992  |
| Kr-76+E   | 3.3332  | 2.8754  | 3.8189  | 3.9961  | 2.6959  | 2.7004  | 3.8376  | 4.1097  |
| Mg-28+E   | 4.0085  | 3.9560  | 4.1485  | 3.8853  | 3.8450  | 4.1247  | 4.4391  | 4.1732  |
| Nd-140+E  | 1.7954  | 1.6538  | 1.9378  | 1.9431  | 1.5700  | 1.6571  | 1.9705  | 2.0132  |
| Ni-66+E   | 0.1278  | 0.1266  | 0.1323  | 0.1238  | 0.1248  | 0.1348  | 0.1430  | 0.1336  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.9092  | 0.6768 | 1.1147  | 1.2659  | 0.5807 | 0.5203 | 1.0506  | 1.2367  |
| Np-237+E  | 4.4918  | 3.8176 | 5.1445  | 5.4527  | 3.4666 | 3.4123 | 5.0629  | 5.5364  |
| Os-194+E  | 0.8109  | 0.6221 | 1.0017  | 1.1239  | 0.5949 | 0.5669 | 0.9779  | 1.1251  |
| Pa-231+E  | 6.7653  | 5.6685 | 7.8624  | 8.4162  | 5.2288 | 5.1386 | 7.7640  | 8.5186  |
| Pb-202+E  | 3.4168  | 2.9194 | 3.9546  | 4.1940  | 2.8154 | 2.8273 | 3.9797  | 4.2987  |
| Pb-210+E  | 0.6524  | 0.4493 | 0.8383  | 0.9798  | 0.4012 | 0.3488 | 0.7899  | 0.9593  |
| Pd-103+E  | 1.3570  | 1.2314 | 1.4587  | 1.4675  | 1.0480 | 1.0363 | 1.4216  | 1.4799  |
| Pt-202+E  | 0.3097  | 0.3049 | 0.3243  | 0.3056  | 0.2991 | 0.3197 | 0.3478  | 0.3306  |
| Pu-239+E  | 0.1462  | 0.1053 | 0.1831  | 0.2112  | 0.0916 | 0.0807 | 0.1720  | 0.2057  |
| Pu-244+E  | 2.2999  | 1.9284 | 2.6468  | 2.8260  | 1.7351 | 1.6927 | 2.6001  | 2.8452  |
| Pu-246+E  | 4.6825  | 4.2839 | 5.1220  | 5.1633  | 4.0193 | 4.1333 | 5.2294  | 5.3743  |
| Ra-219+E  | 1.1099  | 1.0395 | 1.2079  | 1.1977  | 0.9985 | 1.0428 | 1.2496  | 1.2657  |
| Ra-221+E  | 0.9808  | 0.8051 | 1.1540  | 1.2505  | 0.7418 | 0.7209 | 1.1374  | 1.2612  |
| Ra-222+E  | 0.0445  | 0.0434 | 0.0472  | 0.0451  | 0.0422 | 0.0448 | 0.0498  | 0.0483  |
| Ra-223+E  | 2.6100  | 2.3563 | 2.9124  | 2.9727  | 2.2525 | 2.3107 | 2.9699  | 3.0951  |
| Ra-224+E  | 1.6250  | 1.6488 | 1.6919  | 1.5851  | 1.5742 | 1.6908 | 1.8143  | 1.7384  |
| Ra-226+E  | 4.7245  | 4.5670 | 5.0064  | 4.7812  | 4.4620 | 4.7397 | 5.3216  | 5.1219  |
| Ra-228+E  | 3.9220  | 3.7125 | 4.2479  | 4.1629  | 3.5217 | 3.6832 | 4.4003  | 4.3912  |
| Rb-81+E   | 2.7105  | 2.3809 | 3.0617  | 3.1604  | 2.2047 | 2.2099 | 3.1029  | 3.2660  |
| Rb-83+E   | 2.6686  | 2.2153 | 3.1003  | 3.3043  | 2.0307 | 1.9827 | 3.0811  | 3.3882  |
| Re-186m+E | 2.1087  | 1.4701 | 2.7321  | 3.2046  | 1.4094 | 1.2683 | 2.6099  | 3.1536  |
| Rn-219+E  | 0.2916  | 0.2816 | 0.3134  | 0.3021  | 0.2727 | 0.2870 | 0.3282  | 0.3216  |
| Rn-220+E  | 1.5514  | 1.5782 | 1.6122  | 1.5074  | 1.5064 | 1.6201 | 1.7312  | 1.6558  |
| Rn-222+E  | 0.0010  | 0.0010 | 0.0010  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4319  | 1.3912 | 1.5109  | 1.4411  | 1.3466 | 1.4215 | 1.6043  | 1.5723  |
| Ru-106+E  | 0.4357  | 0.4308 | 0.4536  | 0.4253  | 0.4229 | 0.4521 | 0.4889  | 0.4667  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.4664  | 2.3460 | 2.6143  | 2.5233  | 2.1630 | 2.2535 | 2.6490  | 2.6102  |
| Sn-121m+E | 0.3209  | 0.2827 | 0.3575  | 0.3680  | 0.2586 | 0.2622 | 0.3515  | 0.3712  |
| Sn-126+E  | 5.5636  | 5.4172 | 5.8547  | 5.5744  | 5.2701 | 5.6107 | 6.1909  | 5.9678  |
| Sr-82+E   | 1.3792  | 1.0963 | 1.6166  | 1.7578  | 0.9361 | 0.8769 | 1.5601  | 1.7588  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0002  | 0.0002  | 0.0001 | 0.0001 | 0.0001  | 0.0002  |
| Te-118+E  | 1.5409  | 1.4360 | 1.6416  | 1.6118  | 1.3039 | 1.3517 | 1.6345  | 1.6440  |
| Te-129m+E | 0.8267  | 0.7531 | 0.9036  | 0.9083  | 0.6992 | 0.7209 | 0.9052  | 0.9298  |
| Th-229+E  | 5.4169  | 4.5246 | 6.2813  | 6.7324  | 4.1601 | 4.0857 | 6.1931  | 6.8281  |
| Th-232+E  | 10.0193 | 9.5737 | 10.7690 | 10.5231 | 9.1530 | 9.6158 | 11.3349 | 11.1759 |
| Th-234+E  | 0.4490  | 0.3770 | 0.5166  | 0.5531  | 0.3440 | 0.3370 | 0.5080  | 0.5604  |
| Ti-44+E   | 4.0435  | 3.9222 | 4.2458  | 4.1212  | 3.8540 | 4.1146 | 4.5037  | 4.3798  |
| U-228+E   | 0.5470  | 0.4671 | 0.6274  | 0.6645  | 0.4261 | 0.4203 | 0.6230  | 0.6724  |
| U-230+E   | 0.6147  | 0.4925 | 0.7268  | 0.7976  | 0.4362 | 0.4130 | 0.7015  | 0.7938  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.8328        | 3.3629        | 4.3312        | 4.5241        | 3.1001        | 3.0993        | 4.3021        | 4.5679        |
| U-238+E        | 1.7508        | 1.6685        | 1.8338        | 1.8034        | 1.6068        | 1.6876        | 1.9529        | 1.8480        |
| W-178+E        | 2.6244        | 2.1560        | 3.1001        | 3.3945        | 2.0916        | 2.0760        | 3.0990        | 3.4248        |
| Xe-122+E       | 2.0352        | 1.9234        | 2.1662        | 2.1156        | 1.7976        | 1.8865        | 2.2052        | 2.1932        |
| Zr-93+E        | 0.2169        | 0.1809        | 0.2464        | 0.2667        | 0.1503        | 0.1426        | 0.2342        | 0.2586        |

Table 33: Drywall Surface Contamination for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2406        | 0.3095        | 0.5579        | 0.6729        |
| Ac-225+E       | 1.0143        | 1.2293        | 1.7209        | 1.9377        |
| Ac-227+E       | 3.3366        | 4.0580        | 5.8740        | 6.6850        |
| Ag-108m+E      | 3.8842        | 4.6089        | 5.2723        | 5.4843        |
| Ag-110m+E      | 3.8248        | 4.5516        | 4.8480        | 4.9636        |
| Am-242m+E      | 0.8019        | 1.0514        | 1.9075        | 2.2491        |
| Am-243+E       | 3.2532        | 3.9017        | 5.2833        | 5.9812        |
| Ar-42+E        | 0.2248        | 0.2663        | 0.2839        | 0.2867        |
| At-211+E       | 0.6800        | 0.8192        | 1.1954        | 1.3895        |
| Ba-128+E       | 1.7184        | 2.0154        | 2.4856        | 2.6857        |
| Bi-210m+E      | 1.2596        | 1.4657        | 1.7181        | 1.8390        |
| Bi-212+E       | 0.2088        | 0.2665        | 0.4193        | 0.4914        |
| Bi-213+E       | 0.3921        | 0.4572        | 0.5301        | 0.5595        |
| Bi-214+E       | 1.6119        | 1.9050        | 2.0570        | 2.0984        |
| Bi-215+E       | 0.9430        | 1.1059        | 1.3288        | 1.4380        |
| Bi-216+E       | 1.7610        | 2.0528        | 2.2811        | 2.3719        |
| Cd-118+E       | 0.0817        | 0.0967        | 0.1037        | 0.1051        |
| Ce-134+E       | 1.3080        | 1.5516        | 1.9605        | 2.1441        |
| Ce-144+E       | 0.3162        | 0.3722        | 0.4235        | 0.4570        |
| Cl-34m+E       | 1.4275        | 1.6740        | 1.8312        | 1.8205        |
| Cm-245+E       | 1.6916        | 2.0569        | 2.9306        | 3.3594        |
| Cm-247+E       | 1.4675        | 1.7178        | 2.0709        | 2.2101        |
| Cm-250+E       | 18.1848       | 21.3793       | 23.4148       | 24.0701       |
| Cs-137+E       | 2.4982        | 2.9379        | 3.2343        | 3.3625        |
| Es-254+E       | 2.2755        | 2.8755        | 4.4859        | 5.1273        |
| Fe-60+E        | 2.6184        | 3.1485        | 3.7849        | 4.0420        |
| Fr-220+E       | 0.2352        | 0.2949        | 0.4875        | 0.5760        |
| Fr-221+E       | 0.2205        | 0.2593        | 0.3181        | 0.3486        |
| Ge-68+E        | 0.3319        | 0.4896        | 1.3714        | 1.8277        |
| Hf-172+E       | 2.4590        | 3.0203        | 4.5415        | 5.3041        |
| Hf-182+E       | 4.3694        | 5.1423        | 6.1358        | 6.5751        |
| Hg-193+E       | 2.8308        | 3.4025        | 4.5464        | 5.0906        |
| Hg-194+E       | 2.9175        | 3.5078        | 4.7190        | 5.2857        |
| In-114m+E      | 0.6757        | 0.8087        | 1.0266        | 1.1138        |
| Ir-192m+E      | 3.0362        | 3.5905        | 4.5199        | 4.9510        |
| Kr-76+E        | 2.2088        | 2.7136        | 3.9023        | 4.4063        |
| Mg-28+E        | 3.5814        | 4.2167        | 4.6351        | 4.7357        |
| Nd-140+E       | 1.3363        | 1.6167        | 1.9967        | 2.1871        |
| Ni-66+E        | 0.1191        | 0.1405        | 0.1507        | 0.1540        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3428        | 0.4799        | 1.0396        | 1.2640        |
| Np-237+E       | 2.6615        | 3.3055        | 5.1018        | 5.8711        |
| Os-194+E       | 0.4541        | 0.5767        | 0.9891        | 1.1923        |
| Pa-231+E       | 4.1047        | 5.0843        | 7.8731        | 9.0908        |
| Pb-202+E       | 2.4113        | 2.9018        | 4.0856        | 4.6583        |
| Pb-210+E       | 0.2377        | 0.3392        | 0.7838        | 0.9833        |
| Pd-103+E       | 0.7331        | 0.9267        | 1.4046        | 1.5290        |
| Pt-202+E       | 0.2830        | 0.3320        | 0.3642        | 0.3745        |
| Pu-239+E       | 0.0534        | 0.0753        | 0.1703        | 0.2105        |
| Pu-244+E       | 1.2870        | 1.6363        | 2.6123        | 2.9915        |
| Pu-246+E       | 3.4284        | 4.1529        | 5.3395        | 5.8666        |
| Ra-219+E       | 0.9031        | 1.0586        | 1.2949        | 1.4103        |
| Ra-221+E       | 0.5798        | 0.7221        | 1.1627        | 1.3388        |
| Ra-222+E       | 0.0392        | 0.0454        | 0.0519        | 0.0544        |
| Ra-223+E       | 1.9922        | 2.3577        | 3.0750        | 3.4176        |
| Ra-224+E       | 1.4886        | 1.7292        | 1.8831        | 2.0514        |
| Ra-226+E       | 4.1757        | 4.9197        | 5.7233        | 5.8090        |
| Ra-228+E       | 3.1473        | 3.7759        | 4.6384        | 4.8605        |
| Rb-81+E        | 1.8070        | 2.2236        | 3.1610        | 3.4968        |
| Rb-83+E        | 1.5569        | 1.9759        | 3.1092        | 3.5700        |
| Re-186m+E      | 0.9885        | 1.3024        | 2.6175        | 3.2878        |
| Rn-219+E       | 0.2523        | 0.2932        | 0.3410        | 0.3614        |
| Rn-220+E       | 1.4267        | 1.6570        | 1.7975        | 1.9590        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.2372        | 1.4496        | 1.6519        | 1.7404        |
| Ru-106+E       | 0.4001        | 0.4674        | 0.5077        | 0.5253        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8002        | 2.1411        | 2.6749        | 2.8750        |
| Sn-121m+E      | 0.1985        | 0.2423        | 0.3495        | 0.4012        |
| Sn-126+E       | 4.8980        | 5.7574        | 6.4297        | 6.7313        |
| Sr-82+E        | 0.6042        | 0.8348        | 1.5550        | 1.8060        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.0293        | 1.2350        | 1.6241        | 1.8022        |
| Te-129m+E      | 0.5678        | 0.6802        | 0.9082        | 1.0144        |
| Th-229+E       | 3.2392        | 4.0469        | 6.2705        | 7.2667        |
| Th-232+E       | 8.3331        | 9.9043        | 11.9030       | 12.6321       |
| Th-234+E       | 0.2645        | 0.3303        | 0.5113        | 0.5893        |
| Ti-44+E        | 3.7169        | 4.3032        | 4.7540        | 5.0067        |
| U-228+E        | 0.3339        | 0.4132        | 0.6337        | 0.7117        |
| U-230+E        | 0.3039        | 0.3950        | 0.7020        | 0.8286        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4953        | 3.0554        | 4.3256        | 5.0272        |
| U-238+E        | 1.4617        | 1.7266        | 2.1974        | 4.2522        |
| W-178+E        | 1.7302        | 2.1149        | 3.1104        | 3.5929        |
| Xe-122+E       | 1.5186        | 1.7910        | 2.2270        | 2.4123        |
| Zr-93+E        | 0.0936        | 0.1248        | 0.2310        | 0.2642        |

Table 34: Drywall 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3065  | 0.2483  | 0.2957  | 0.3228  | 0.2633  | 0.2273  | 0.2872  | 0.3111  |
| Ac-225+E  | 1.1187  | 0.9327  | 1.0922  | 1.1647  | 1.1131  | 1.0448  | 1.1949  | 1.2195  |
| Ac-227+E  | 3.6933  | 3.1054  | 3.6073  | 3.8452  | 3.5812  | 3.3403  | 3.8303  | 3.9556  |
| Ag-108m+E | 3.7988  | 3.1543  | 3.7239  | 3.9327  | 4.1838  | 4.1104  | 4.4554  | 4.4024  |
| Ag-110m+E | 3.8875  | 3.1013  | 3.7901  | 4.0403  | 4.4388  | 4.3500  | 4.7621  | 4.6606  |
| Am-242m+E | 0.8950  | 0.7638  | 0.8685  | 0.9330  | 0.7373  | 0.6432  | 0.7875  | 0.8708  |
| Am-243+E  | 3.3360  | 2.8907  | 3.2769  | 3.4518  | 3.2757  | 3.1264  | 3.4754  | 3.5221  |
| Ar-42+E   | 0.2113  | 0.1639  | 0.2046  | 0.2196  | 0.2448  | 0.2382  | 0.2660  | 0.2626  |
| At-211+E  | 0.7201  | 0.6136  | 0.7042  | 0.7492  | 0.6786  | 0.6317  | 0.7279  | 0.7418  |
| Ba-128+E  | 1.3410  | 1.1899  | 1.3203  | 1.3763  | 1.3533  | 1.3041  | 1.4080  | 1.4410  |
| Bi-210m+E | 1.3428  | 1.1302  | 1.3197  | 1.3920  | 1.4453  | 1.4105  | 1.5315  | 1.5493  |
| Bi-212+E  | 0.2524  | 0.1970  | 0.2428  | 0.2662  | 0.2374  | 0.2119  | 0.2594  | 0.2726  |
| Bi-213+E  | 0.4012  | 0.3326  | 0.3934  | 0.4163  | 0.4375  | 0.4266  | 0.4688  | 0.4624  |
| Bi-214+E  | 1.5934  | 1.2632  | 1.5503  | 1.6557  | 1.8198  | 1.7753  | 1.9642  | 1.9347  |
| Bi-215+E  | 0.9896  | 0.8293  | 0.9708  | 1.0264  | 1.0543  | 1.0245  | 1.1220  | 1.1297  |
| Bi-216+E  | 1.8120  | 1.4848  | 1.7752  | 1.8808  | 2.0221  | 1.9744  | 2.1641  | 2.1391  |
| Cd-118+E  | 0.0795  | 0.0624  | 0.0772  | 0.0827  | 0.0915  | 0.0899  | 0.0989  | 0.0971  |
| Ce-134+E  | 0.9239  | 0.8464  | 0.9101  | 0.9440  | 0.8736  | 0.8321  | 0.8959  | 0.9318  |
| Ce-144+E  | 0.2831  | 0.2483  | 0.2791  | 0.2912  | 0.2961  | 0.2895  | 0.3130  | 0.3102  |
| Cl-34m+E  | 1.3601  | 1.1021  | 1.3257  | 1.4084  | 1.5385  | 1.5003  | 1.6629  | 1.6234  |
| Cm-245+E  | 1.8039  | 1.5595  | 1.7692  | 1.8684  | 1.7407  | 1.6416  | 1.8489  | 1.8889  |
| Cm-247+E  | 1.4829  | 1.2527  | 1.4569  | 1.5358  | 1.5784  | 1.5413  | 1.6877  | 1.6646  |
| Cm-250+E  | 17.9532 | 14.6135 | 17.5394 | 18.6112 | 20.1845 | 19.7537 | 21.6567 | 21.3178 |
| Cs-137+E  | 2.4382  | 1.9724  | 2.3820  | 2.5365  | 2.7550  | 2.7029  | 2.9416  | 2.8788  |
| Es-254+E  | 2.4408  | 1.9862  | 2.3614  | 2.5517  | 2.2839  | 2.0788  | 2.4641  | 2.6036  |
| Fe-60+E   | 2.6870  | 2.0723  | 2.5949  | 2.8113  | 2.9342  | 2.8142  | 3.2018  | 3.1984  |
| Fr-220+E  | 0.2716  | 0.2271  | 0.2639  | 0.2841  | 0.2415  | 0.2151  | 0.2604  | 0.2756  |
| Fr-221+E  | 0.2394  | 0.2039  | 0.2353  | 0.2479  | 0.2513  | 0.2442  | 0.2678  | 0.2663  |
| Ge-68+E   | 0.6611  | 0.4580  | 0.6158  | 0.7227  | 0.4289  | 0.2816  | 0.5099  | 0.6143  |
| Hf-172+E  | 2.5539  | 2.1304  | 2.4788  | 2.6754  | 2.2567  | 2.0325  | 2.4405  | 2.5669  |
| Hf-182+E  | 4.4491  | 3.7021  | 4.3547  | 4.6195  | 4.7038  | 4.5566  | 5.0242  | 5.0252  |
| Hg-193+E  | 3.0036  | 2.4784  | 2.9272  | 3.1330  | 2.9959  | 2.8249  | 3.2246  | 3.2665  |
| Hg-194+E  | 3.1526  | 2.5769  | 3.0675  | 3.2930  | 3.1546  | 2.9657  | 3.3994  | 3.4906  |
| In-114m+E | 0.5588  | 0.4945  | 0.5507  | 0.5742  | 0.5661  | 0.5492  | 0.5933  | 0.6020  |
| Ir-192m+E | 3.3778  | 2.7694  | 3.2991  | 3.5216  | 3.5455  | 3.3983  | 3.7961  | 3.8887  |
| Kr-76+E   | 2.4863  | 2.0649  | 2.4243  | 2.5926  | 2.4445  | 2.2692  | 2.6151  | 2.7382  |
| Mg-28+E   | 3.1540  | 2.5564  | 3.0725  | 3.2623  | 3.5577  | 3.4747  | 3.8232  | 3.7749  |
| Nd-140+E  | 0.9470  | 0.8750  | 0.9340  | 0.9666  | 0.8820  | 0.8455  | 0.9027  | 0.9347  |
| Ni-66+E   | 0.1164  | 0.0917  | 0.1132  | 0.1211  | 0.1337  | 0.1307  | 0.1442  | 0.1419  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Np-235+E  | 0.4525 | 0.3720 | 0.4344 | 0.4768 | 0.3335 | 0.2606 | 0.3631 | 0.4267 |
| Np-237+E  | 2.9041 | 2.4761 | 2.8359 | 3.0176 | 2.7087 | 2.4915 | 2.8813 | 3.0420 |
| Os-194+E  | 0.5823 | 0.4553 | 0.5591 | 0.6169 | 0.5137 | 0.4476 | 0.5649 | 0.6119 |
| Pa-231+E  | 4.6358 | 3.8820 | 4.5156 | 4.8360 | 4.3347 | 3.9612 | 4.6458 | 4.8826 |
| Pb-202+E  | 2.6404 | 2.1671 | 2.5698 | 2.7620 | 2.5727 | 2.3955 | 2.7819 | 2.8395 |
| Pb-210+E  | 0.3542 | 0.2761 | 0.3367 | 0.3781 | 0.2507 | 0.1827 | 0.2806 | 0.3340 |
| Pd-103+E  | 0.5598 | 0.5274 | 0.5531 | 0.5695 | 0.4912 | 0.4906 | 0.5012 | 0.5358 |
| Pt-202+E  | 0.2836 | 0.2291 | 0.2770 | 0.2946 | 0.3197 | 0.3133 | 0.3438 | 0.3377 |
| Pu-239+E  | 0.0751 | 0.0599 | 0.0716 | 0.0797 | 0.0537 | 0.0408 | 0.0594 | 0.0702 |
| Pu-244+E  | 1.4324 | 1.1893 | 1.3912 | 1.4936 | 1.3290 | 1.2048 | 1.4240 | 1.5142 |
| Pu-246+E  | 3.4563 | 2.9116 | 3.3818 | 3.5811 | 3.5483 | 3.4062 | 3.7798 | 3.8094 |
| Ra-219+E  | 0.9610 | 0.8118 | 0.9437 | 0.9963 | 1.0136 | 0.9848 | 1.0769 | 1.0935 |
| Ra-221+E  | 0.6718 | 0.5633 | 0.6540 | 0.7017 | 0.6155 | 0.5553 | 0.6616 | 0.6936 |
| Ra-222+E  | 0.0418 | 0.0350 | 0.0411 | 0.0433 | 0.0458 | 0.0450 | 0.0488 | 0.0493 |
| Ra-223+E  | 2.1169 | 1.7881 | 2.0749 | 2.1983 | 2.1561 | 2.0643 | 2.3016 | 2.3182 |
| Ra-224+E  | 1.3924 | 1.1348 | 1.3653 | 1.4418 | 1.5633 | 1.5503 | 1.6704 | 1.6275 |
| Ra-226+E  | 4.1845 | 3.3821 | 4.0839 | 4.3500 | 4.6545 | 4.5346 | 4.9918 | 4.9339 |
| Ra-228+E  | 3.1644 | 2.5627 | 3.0850 | 3.2933 | 3.4214 | 3.2969 | 3.6632 | 3.6547 |
| Rb-81+E   | 2.0487 | 1.7231 | 2.0038 | 2.1293 | 2.0550 | 1.9229 | 2.1974 | 2.2519 |
| Rb-83+E   | 1.8276 | 1.4892 | 1.7733 | 1.9113 | 1.7518 | 1.5718 | 1.8839 | 2.0035 |
| Re-186m+E | 1.3797 | 1.0573 | 1.3135 | 1.4759 | 1.0637 | 0.8504 | 1.1957 | 1.3376 |
| Rn-219+E  | 0.2653 | 0.2228 | 0.2607 | 0.2749 | 0.2878 | 0.2814 | 0.3061 | 0.3058 |
| Rn-220+E  | 1.3257 | 1.0782 | 1.2997 | 1.3727 | 1.4918 | 1.4806 | 1.5947 | 1.5516 |
| Rn-222+E  | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0011 |
| Ru-103+E  | 1.2538 | 1.0308 | 1.2280 | 1.3010 | 1.3847 | 1.3487 | 1.4771 | 1.4734 |
| Ru-106+E  | 0.4103 | 0.3331 | 0.4014 | 0.4260 | 0.4634 | 0.4524 | 0.4956 | 0.4911 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 1.4326 | 1.2626 | 1.4122 | 1.4713 | 1.4727 | 1.4352 | 1.5465 | 1.5671 |
| Sn-121m+E | 0.1415 | 0.1268 | 0.1384 | 0.1458 | 0.1221 | 0.1102 | 0.1268 | 0.1385 |
| Sn-126+E  | 4.8505 | 4.0149 | 4.7545 | 5.0268 | 5.3549 | 5.2471 | 5.7151 | 5.6140 |
| Sr-82+E   | 0.7303 | 0.6210 | 0.7093 | 0.7593 | 0.6297 | 0.5306 | 0.6671 | 0.7488 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0001 | 0.0001 |
| Te-118+E  | 0.6420 | 0.5996 | 0.6344 | 0.6528 | 0.5999 | 0.5680 | 0.6113 | 0.6509 |
| Te-129m+E | 0.4367 | 0.3835 | 0.4280 | 0.4500 | 0.4182 | 0.3924 | 0.4373 | 0.4576 |
| Th-229+E  | 3.5675 | 3.0170 | 3.4768 | 3.7158 | 3.2851 | 2.9917 | 3.5165 | 3.6857 |
| Th-232+E  | 8.3575 | 6.7881 | 8.1530 | 8.6906 | 9.0874 | 8.8019 | 9.7213 | 9.6554 |
| Th-234+E  | 0.2857 | 0.2442 | 0.2789 | 0.2969 | 0.2617 | 0.2391 | 0.2786 | 0.2926 |
| Ti-44+E   | 3.4282 | 2.9201 | 3.3723 | 3.5382 | 3.7031 | 3.6627 | 3.9446 | 3.8400 |
| U-228+E   | 0.3767 | 0.3200 | 0.3681 | 0.3915 | 0.3576 | 0.3302 | 0.3815 | 0.3956 |
| U-230+E   | 0.3641 | 0.3063 | 0.3535 | 0.3803 | 0.3143 | 0.2744 | 0.3374 | 0.3686 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.6143       | 2.2368       | 2.5631       | 2.7202       | 2.5331       | 2.3805       | 2.7050       | 2.7751       |
| U-238+E        | 1.2507       | 1.0450       | 1.2249       | 1.2965       | 1.3441       | 1.3132       | 1.4292       | 1.3930       |
| W-178+E        | 1.8114       | 1.5104       | 1.7594       | 1.8963       | 1.6233       | 1.4728       | 1.7517       | 1.8296       |
| Xe-122+E       | 1.1404       | 1.0179       | 1.1237       | 1.1688       | 1.1474       | 1.1042       | 1.1915       | 1.2237       |
| Zr-93+E        | 0.0992       | 0.0892       | 0.0970       | 0.1020       | 0.0801       | 0.0705       | 0.0834       | 0.0936       |

Table 35: Drywall 1cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2631  | 0.2386  | 0.3032  | 0.3300  | 0.2172  | 0.2179  | 0.2481  | 0.2893  |
| Ac-225+E  | 1.1606  | 1.1430  | 1.2568  | 1.2764  | 1.0650  | 1.0926  | 1.1906  | 1.2049  |
| Ac-227+E  | 3.6904  | 3.5934  | 4.0287  | 4.1138  | 3.3453  | 3.4081  | 3.7616  | 3.8546  |
| Ag-108m+E | 4.5150  | 4.6327  | 4.7183  | 4.5316  | 4.3529  | 4.4986  | 5.0832  | 4.6766  |
| Ag-110m+E | 4.8850  | 5.0944  | 5.1271  | 4.7422  | 4.7862  | 4.9544  | 5.8274  | 5.0500  |
| Am-242m+E | 0.7130  | 0.6297  | 0.8234  | 0.9127  | 0.5545  | 0.5329  | 0.6538  | 0.7834  |
| Am-243+E  | 3.3597  | 3.2972  | 3.6129  | 3.6610  | 3.0966  | 3.1330  | 3.3986  | 3.4108  |
| Ar-42+E   | 0.2734  | 0.2891  | 0.2903  | 0.2632  | 0.2689  | 0.2817  | 0.3231  | 0.2706  |
| At-211+E  | 0.6883  | 0.6608  | 0.7517  | 0.7819  | 0.6210  | 0.6328  | 0.6709  | 0.7050  |
| Ba-128+E  | 1.3992  | 1.3893  | 1.4789  | 1.4862  | 1.3163  | 1.3284  | 1.4533  | 1.4359  |
| Bi-210m+E | 1.5385  | 1.5698  | 1.6296  | 1.5754  | 1.4813  | 1.5293  | 1.6831  | 1.5933  |
| Bi-212+E  | 0.2483  | 0.2379  | 0.2788  | 0.2855  | 0.2188  | 0.2234  | 0.2648  | 0.2731  |
| Bi-213+E  | 0.4701  | 0.4807  | 0.4932  | 0.4865  | 0.4534  | 0.4748  | 0.4992  | 0.4867  |
| Bi-214+E  | 2.0103  | 2.0963  | 2.1154  | 1.9620  | 1.9693  | 2.0527  | 2.3659  | 2.0521  |
| Bi-215+E  | 1.1207  | 1.1395  | 1.1896  | 1.1550  | 1.0736  | 1.1094  | 1.2256  | 1.1451  |
| Bi-216+E  | 2.1944  | 2.2585  | 2.2868  | 2.2316  | 2.1340  | 2.2372  | 2.4188  | 2.2839  |
| Cd-118+E  | 0.1015  | 0.1063  | 0.1069  | 0.0985  | 0.0998  | 0.1040  | 0.1213  | 0.1033  |
| Ce-134+E  | 0.8775  | 0.8452  | 0.9352  | 0.9615  | 0.8079  | 0.7962  | 0.8785  | 0.8945  |
| Ce-144+E  | 0.3099  | 0.3132  | 0.3255  | 0.3181  | 0.2990  | 0.3043  | 0.3291  | 0.3026  |
| Cl-34m+E  | 1.6869  | 1.7530  | 1.7861  | 1.6707  | 1.6571  | 1.7338  | 1.9400  | 1.6532  |
| Cm-245+E  | 1.7755  | 1.7273  | 1.9258  | 1.9658  | 1.6097  | 1.6179  | 1.7929  | 1.8093  |
| Cm-247+E  | 1.6766  | 1.7010  | 1.7688  | 1.7453  | 1.6012  | 1.6611  | 1.7434  | 1.7185  |
| Cm-250+E  | 22.0314 | 22.8529 | 23.1958 | 21.8612 | 21.5283 | 22.3975 | 25.1859 | 22.3688 |
| Cs-137+E  | 3.0197  | 3.1250  | 3.1692  | 2.9497  | 2.9488  | 3.0610  | 3.3846  | 3.0521  |
| Es-254+E  | 2.3607  | 2.2646  | 2.6348  | 2.6962  | 2.0593  | 2.0603  | 2.5029  | 2.5465  |
| Fe-60+E   | 3.2297  | 3.3190  | 3.4695  | 3.2641  | 3.1023  | 3.2216  | 3.7825  | 3.3302  |
| Fr-220+E  | 0.2413  | 0.2239  | 0.2716  | 0.2904  | 0.2064  | 0.2078  | 0.2294  | 0.2556  |
| Fr-221+E  | 0.2646  | 0.2673  | 0.2814  | 0.2754  | 0.2523  | 0.2581  | 0.2798  | 0.2620  |
| Ge-68+E   | 0.4063  | 0.2840  | 0.5553  | 0.6935  | 0.2463  | 0.2434  | 0.3031  | 0.5440  |
| Hf-172+E  | 2.2667  | 2.0974  | 2.5344  | 2.7203  | 1.9835  | 2.0003  | 2.0945  | 2.3998  |
| Hf-182+E  | 5.0084  | 5.0794  | 5.3288  | 5.1658  | 4.8067  | 4.9391  | 5.4480  | 5.1054  |
| Hg-193+E  | 3.1384  | 3.1007  | 3.4013  | 3.4080  | 2.9193  | 2.9898  | 3.2649  | 3.2274  |
| Hg-194+E  | 3.3200  | 3.2842  | 3.6095  | 3.6083  | 3.0832  | 3.1728  | 3.4879  | 3.4188  |
| In-114m+E | 0.5850  | 0.5824  | 0.6182  | 0.6179  | 0.5448  | 0.5431  | 0.6147  | 0.5754  |
| Ir-192m+E | 3.7781  | 3.8086  | 4.0471  | 3.9912  | 3.5772  | 3.7168  | 4.1024  | 3.8861  |
| Kr-76+E   | 2.5415  | 2.4900  | 2.7747  | 2.8146  | 2.3083  | 2.3661  | 2.6346  | 2.6842  |
| Mg-28+E   | 3.9043  | 4.0736  | 4.1193  | 3.8260  | 3.8171  | 3.9648  | 4.5037  | 3.9230  |
| Nd-140+E  | 0.8804  | 0.8433  | 0.9357  | 0.9708  | 0.8100  | 0.7943  | 0.8593  | 0.9074  |
| Ni-66+E   | 0.1479  | 0.1553  | 0.1563  | 0.1434  | 0.1455  | 0.1504  | 0.1771  | 0.1522  |

| Element   | avg100 | ctr100  | mid100  | cnr100 | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|---------|---------|--------|--------|--------|---------|---------|
| Np-235+E  | 0.3110 | 0.2496  | 0.3834  | 0.4510 | 0.2083 | 0.1935 | 0.2590  | 0.3665  |
| Np-237+E  | 2.7441 | 2.6207  | 3.0283  | 3.1451 | 2.4055 | 2.4139 | 2.7504  | 2.8692  |
| Os-194+E  | 0.5261 | 0.4853  | 0.6047  | 0.6464 | 0.4479 | 0.4578 | 0.5196  | 0.5824  |
| Pa-231+E  | 4.4183 | 4.2207  | 4.8915  | 5.0859 | 3.8944 | 3.9389 | 4.4180  | 4.6807  |
| Pb-202+E  | 2.6779 | 2.6072  | 2.9162  | 3.0147 | 2.4518 | 2.5313 | 2.6621  | 2.8229  |
| Pb-210+E  | 0.2343 | 0.1804  | 0.2983  | 0.3586 | 0.1534 | 0.1471 | 0.1829  | 0.2890  |
| Pd-103+E  | 0.4734 | 0.4392  | 0.5117  | 0.5471 | 0.3861 | 0.3647 | 0.4481  | 0.4886  |
| Pt-202+E  | 0.3497 | 0.3629  | 0.3669  | 0.3496 | 0.3414 | 0.3567 | 0.3948  | 0.3607  |
| Pu-239+E  | 0.0500 | 0.0390  | 0.0630  | 0.0753 | 0.0326 | 0.0305 | 0.0405  | 0.0605  |
| Pu-244+E  | 1.3584 | 1.2906  | 1.5069  | 1.5722 | 1.1720 | 1.1772 | 1.3953  | 1.4665  |
| Pu-246+E  | 3.7339 | 3.7451  | 3.9992  | 3.9205 | 3.4962 | 3.5516 | 4.0606  | 3.8302  |
| Ra-219+E  | 1.0718 | 1.0856  | 1.1401  | 1.1131 | 1.0217 | 1.0565 | 1.1630  | 1.0707  |
| Ra-221+E  | 0.6215 | 0.5869  | 0.6931  | 0.7283 | 0.5416 | 0.5457 | 0.6122  | 0.6418  |
| Ra-222+E  | 0.0492 | 0.0506  | 0.0520  | 0.0499 | 0.0476 | 0.0495 | 0.0548  | 0.0490  |
| Ra-223+E  | 2.2540 | 2.2469  | 2.4159  | 2.4110 | 2.1157 | 2.1753 | 2.3520  | 2.3052  |
| Ra-224+E  | 1.7105 | 1.7809  | 1.7865  | 1.6824 | 1.6695 | 1.7422 | 1.8157  | 1.7032  |
| Ra-226+E  | 5.0766 | 5.2330  | 5.3453  | 5.0524 | 4.9284 | 5.1508 | 5.6894  | 5.1615  |
| Ra-228+E  | 3.7003 | 3.7802  | 3.9519  | 3.7821 | 3.5322 | 3.6618 | 4.0994  | 3.7980  |
| Rb-81+E   | 2.1387 | 2.1152  | 2.3148  | 2.3303 | 1.9578 | 1.9978 | 2.2172  | 2.1507  |
| Rb-83+E   | 1.8139 | 1.7477  | 1.9935  | 2.0866 | 1.5977 | 1.6430 | 1.8596  | 1.9833  |
| Re-186m+E | 1.0424 | 0.8720  | 1.2689  | 1.4597 | 0.8013 | 0.8007 | 0.8883  | 1.2131  |
| Rn-219+E  | 0.3074 | 0.3144  | 0.3245  | 0.3148 | 0.2964 | 0.3072 | 0.3309  | 0.3199  |
| Rn-220+E  | 1.6348 | 1.7038  | 1.7063  | 1.6046 | 1.5967 | 1.6676 | 1.7339  | 1.6240  |
| Rn-222+E  | 0.0011 | 0.0012  | 0.0012  | 0.0012 | 0.0011 | 0.0012 | 0.0012  | 0.0012  |
| Ru-103+E  | 1.4962 | 1.5348  | 1.5583  | 1.5507 | 1.4481 | 1.5234 | 1.6361  | 1.5713  |
| Ru-106+E  | 0.5058 | 0.5228  | 0.5260  | 0.5087 | 0.4941 | 0.5177 | 0.5733  | 0.5271  |
| Si-32+E   | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.5337 | 1.5355  | 1.6115  | 1.6177 | 1.4326 | 1.4452 | 1.5728  | 1.5741  |
| Sn-121m+E | 0.1189 | 0.1083  | 0.1312  | 0.1437 | 0.1005 | 0.0952 | 0.1109  | 0.1267  |
| Sn-126+E  | 5.7834 | 5.9415  | 6.0506  | 5.7855 | 5.6131 | 5.8031 | 6.4961  | 5.9550  |
| Sr-82+E   | 0.6164 | 0.5623  | 0.7062  | 0.7556 | 0.4826 | 0.4680 | 0.6034  | 0.6843  |
| Sr-90+E   | 0.0000 | 0.0000  | 0.0001  | 0.0001 | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Te-118+E  | 0.5942 | 0.5693  | 0.6287  | 0.6588 | 0.5300 | 0.5032 | 0.5899  | 0.6048  |
| Te-129m+E | 0.4260 | 0.4121  | 0.4575  | 0.4731 | 0.3861 | 0.3827 | 0.4350  | 0.4454  |
| Th-229+E  | 3.3226 | 3.1484  | 3.6801  | 3.8646 | 2.9053 | 2.9204 | 3.2538  | 3.5000  |
| Th-232+E  | 9.8385 | 10.0753 | 10.4441 | 9.9979 | 9.4455 | 9.8296 | 10.7638 | 10.0532 |
| Th-234+E  | 0.2631 | 0.2489  | 0.2910  | 0.3048 | 0.2294 | 0.2283 | 0.2560  | 0.2756  |
| Ti-44+E   | 3.9421 | 4.0405  | 4.1237  | 3.9561 | 3.8562 | 3.9710 | 4.2698  | 3.8756  |
| U-228+E   | 0.3646 | 0.3511  | 0.4006  | 0.4131 | 0.3234 | 0.3255 | 0.3688  | 0.3700  |
| U-230+E   | 0.3108 | 0.2832  | 0.3549  | 0.3836 | 0.2533 | 0.2493 | 0.2967  | 0.3361  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5974        | 2.5251        | 2.8044        | 2.9095        | 2.3483        | 2.3636        | 2.5546        | 2.6840        |
| U-238+E        | 1.4379        | 1.4610        | 1.4686        | 1.4851        | 1.3805        | 1.4370        | 1.5300        | 1.4605        |
| W-178+E        | 1.6388        | 1.5300        | 1.8228        | 1.9387        | 1.4530        | 1.4690        | 1.5217        | 1.7248        |
| Xe-122+E       | 1.1829        | 1.1726        | 1.2466        | 1.2529        | 1.1070        | 1.1074        | 1.2414        | 1.1993        |
| Zr-93+E        | 0.0756        | 0.0658        | 0.0868        | 0.0970        | 0.0554        | 0.0501        | 0.0705        | 0.0809        |

Table 36: Drywall 1cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1823        | 0.1949        | 0.3098        | 0.3435        |
| Ac-225+E       | 0.9746        | 1.0346        | 1.2940        | 1.3374        |
| Ac-227+E       | 3.0337        | 3.2126        | 4.0459        | 4.2893        |
| Ag-108m+E      | 4.1045        | 4.3058        | 4.9908        | 5.1899        |
| Ag-110m+E      | 4.5904        | 4.8628        | 5.4851        | 5.9315        |
| Am-242m+E      | 0.4183        | 0.4391        | 0.7853        | 0.9230        |
| Am-243+E       | 2.8393        | 3.0248        | 3.5294        | 3.8404        |
| Ar-42+E        | 0.2597        | 0.2834        | 0.3110        | 0.3262        |
| At-211+E       | 0.5662        | 0.5952        | 0.7378        | 0.8269        |
| Ba-128+E       | 1.2100        | 1.2311        | 1.4448        | 1.5301        |
| Bi-210m+E      | 1.4070        | 1.4941        | 1.6455        | 1.6607        |
| Bi-212+E       | 0.1950        | 0.2056        | 0.2968        | 0.3308        |
| Bi-213+E       | 0.4314        | 0.4565        | 0.5206        | 0.5130        |
| Bi-214+E       | 1.8912        | 2.0463        | 2.2783        | 2.4202        |
| Bi-215+E       | 1.0165        | 1.0805        | 1.2005        | 1.2497        |
| Bi-216+E       | 2.0374        | 2.1883        | 2.4719        | 2.4767        |
| Cd-118+E       | 0.0960        | 0.1086        | 0.1125        | 0.1300        |
| Ce-134+E       | 0.7276        | 0.7145        | 0.8813        | 0.9781        |
| Ce-144+E       | 0.2836        | 0.2885        | 0.3322        | 0.3276        |
| Cl-34m+E       | 1.5975        | 1.6910        | 1.9445        | 1.7845        |
| Cm-245+E       | 1.4489        | 1.5776        | 1.9005        | 2.0571        |
| Cm-247+E       | 1.5107        | 1.5728        | 1.8170        | 1.7926        |
| Cm-250+E       | 20.6364       | 22.0289       | 24.6172       | 25.0648       |
| Cs-137+E       | 2.8213        | 2.9905        | 3.2156        | 3.5112        |
| Es-254+E       | 1.7763        | 1.8673        | 2.6751        | 3.0846        |
| Fe-60+E        | 2.9457        | 3.3250        | 3.6726        | 4.2530        |
| Fr-220+E       | 0.1791        | 0.1891        | 0.2708        | 0.3051        |
| Fr-221+E       | 0.2379        | 0.2519        | 0.2879        | 0.2799        |
| Ge-68+E        | 0.1515        | 0.1639        | 0.6367        | 0.7075        |
| Hf-172+E       | 1.7850        | 1.8110        | 2.5428        | 2.8289        |
| Hf-182+E       | 4.5736        | 4.8961        | 5.4273        | 5.8143        |
| Hg-193+E       | 2.7257        | 2.8335        | 3.4649        | 3.7318        |
| Hg-194+E       | 2.8743        | 3.0072        | 3.6644        | 3.9362        |
| In-114m+E      | 0.4939        | 0.5053        | 0.6070        | 0.6545        |
| Ir-192m+E      | 3.3624        | 3.5618        | 4.1583        | 4.2104        |
| Kr-76+E        | 2.0973        | 2.2229        | 2.8178        | 3.0240        |
| Mg-28+E        | 3.6504        | 3.8989        | 4.2968        | 4.5418        |
| Nd-140+E       | 0.7339        | 0.7239        | 0.8776        | 1.0247        |
| Ni-66+E        | 0.1397        | 0.1506        | 0.1653        | 0.1884        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1286        | 0.1329        | 0.3707        | 0.4622        |
| Np-237+E       | 2.0983        | 2.2405        | 2.9426        | 3.2902        |
| Os-194+E       | 0.3912        | 0.4126        | 0.6348        | 0.6836        |
| Pa-231+E       | 3.4423        | 3.6396        | 4.8888        | 5.3051        |
| Pb-202+E       | 2.2647        | 2.3603        | 3.0164        | 3.1669        |
| Pb-210+E       | 0.0989        | 0.1055        | 0.3086        | 0.3881        |
| Pd-103+E       | 0.2857        | 0.2727        | 0.4451        | 0.5144        |
| Pt-202+E       | 0.3271        | 0.3528        | 0.3893        | 0.4079        |
| Pu-239+E       | 0.0197        | 0.0203        | 0.0630        | 0.0760        |
| Pu-244+E       | 1.0011        | 1.0642        | 1.5324        | 1.7142        |
| Pu-246+E       | 3.2273        | 3.4367        | 4.0548        | 4.4119        |
| Ra-219+E       | 0.9639        | 1.0209        | 1.1283        | 1.1668        |
| Ra-221+E       | 0.4751        | 0.4980        | 0.7082        | 0.7341        |
| Ra-222+E       | 0.0453        | 0.0477        | 0.0520        | 0.0520        |
| Ra-223+E       | 1.9768        | 2.0899        | 2.4409        | 2.5158        |
| Ra-224+E       | 1.5979        | 1.6980        | 1.7239        | 1.9277        |
| Ra-226+E       | 4.7105        | 5.0572        | 5.5665        | 5.7815        |
| Ra-228+E       | 3.3247        | 3.5368        | 3.9977        | 4.3967        |
| Rb-81+E        | 1.7816        | 1.8816        | 2.4016        | 2.4427        |
| Rb-83+E        | 1.4074        | 1.5432        | 2.1023        | 2.3869        |
| Re-186m+E      | 0.6501        | 0.6646        | 1.3552        | 1.4950        |
| Rn-219+E       | 0.2818        | 0.2973        | 0.3329        | 0.3274        |
| Rn-220+E       | 1.5290        | 1.6241        | 1.6418        | 1.8468        |
| Rn-222+E       | 0.0011        | 0.0012        | 0.0013        | 0.0013        |
| Ru-103+E       | 1.3733        | 1.5049        | 1.6844        | 1.6913        |
| Ru-106+E       | 0.4726        | 0.5142        | 0.5735        | 0.5898        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.3023        | 1.3161        | 1.5681        | 1.7233        |
| Sn-121m+E      | 0.0827        | 0.0802        | 0.1188        | 0.1571        |
| Sn-126+E       | 5.3507        | 5.6137        | 6.3778        | 6.6746        |
| Sr-82+E        | 0.3698        | 0.3916        | 0.6724        | 0.9162        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0001        |
| Te-118+E       | 0.4515        | 0.4433        | 0.5432        | 0.7569        |
| Te-129m+E      | 0.3423        | 0.3461        | 0.4412        | 0.5167        |
| Th-229+E       | 2.5487        | 2.7088        | 3.6735        | 4.0717        |
| Th-232+E       | 8.9495        | 9.5585        | 10.6934       | 11.4054       |
| Th-234+E       | 0.2005        | 0.2120        | 0.2803        | 0.3300        |
| Ti-44+E        | 3.7273        | 3.9349        | 4.0814        | 4.5907        |
| U-228+E        | 0.2855        | 0.2996        | 0.4066        | 0.4078        |
| U-230+E        | 0.2053        | 0.2169        | 0.3460        | 0.3969        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.1064        | 2.2085        | 2.7259        | 3.0411        |
| U-238+E        | 1.3091        | 1.3894        | 1.5686        | 1.6611        |
| W-178+E        | 1.3281        | 1.3539        | 1.8151        | 2.0500        |
| Xe-122+E       | 1.0081        | 1.0214        | 1.2053        | 1.3429        |
| Zr-93+E        | 0.0360        | 0.0351        | 0.0747        | 0.0856        |

Table 37: Drywall 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2943  | 0.2464  | 0.2943  | 0.2679  | 0.2690  | 0.1945  | 0.2411  | 0.2947  |
| Ac-225+E  | 1.1922  | 1.0587  | 1.1311  | 1.0768  | 1.1890  | 0.9588  | 1.0584  | 1.3729  |
| Ac-227+E  | 3.7204  | 3.2384  | 3.5590  | 3.2999  | 3.6508  | 2.8256  | 3.1511  | 3.9595  |
| Ag-108m+E | 4.6957  | 4.2467  | 4.2352  | 4.2521  | 4.9260  | 4.4230  | 4.7992  | 6.8216  |
| Ag-110m+E | 4.7503  | 4.2273  | 4.1798  | 4.3611  | 5.1390  | 4.8406  | 5.2108  | 8.3397  |
| Am-242m+E | 0.8552  | 0.7494  | 0.8826  | 0.8187  | 0.8040  | 0.5532  | 0.7037  | 0.6853  |
| Am-243+E  | 3.0221  | 2.7720  | 2.9419  | 2.7735  | 3.0875  | 2.2591  | 2.6523  | 3.2154  |
| Ar-42+E   | 0.2512  | 0.2150  | 0.2269  | 0.2289  | 0.2800  | 0.2530  | 0.2725  | 0.4753  |
| At-211+E  | 0.5791  | 0.5135  | 0.5352  | 0.4993  | 0.5633  | 0.3874  | 0.4948  | 0.6564  |
| Ba-128+E  | 1.4656  | 1.3338  | 1.3988  | 1.3486  | 1.4332  | 1.2087  | 1.6176  | 1.6023  |
| Bi-210m+E | 1.5690  | 1.3439  | 1.4638  | 1.3271  | 1.5897  | 1.3402  | 1.3341  | 1.7293  |
| Bi-212+E  | 0.2714  | 0.2269  | 0.2576  | 0.2474  | 0.2614  | 0.2222  | 0.2627  | 0.3884  |
| Bi-213+E  | 0.4982  | 0.4460  | 0.4422  | 0.4330  | 0.5069  | 0.4377  | 0.4677  | 0.6361  |
| Bi-214+E  | 1.9292  | 1.6894  | 1.7082  | 1.7517  | 2.0865  | 1.9212  | 2.0475  | 3.3723  |
| Bi-215+E  | 1.0998  | 0.9511  | 0.9982  | 0.9384  | 1.1207  | 0.9322  | 0.9688  | 1.3362  |
| Bi-216+E  | 2.3485  | 2.1013  | 2.0898  | 2.0711  | 2.4284  | 2.1559  | 2.3240  | 3.2657  |
| Cd-118+E  | 0.0951  | 0.0828  | 0.0811  | 0.0851  | 0.1039  | 0.0953  | 0.0985  | 0.1700  |
| Ce-134+E  | 0.8501  | 0.7902  | 0.8484  | 0.8226  | 0.8165  | 0.6440  | 1.0386  | 0.8473  |
| Ce-144+E  | 0.2597  | 0.2512  | 0.2497  | 0.2436  | 0.2769  | 0.2163  | 0.2756  | 0.2941  |
| Cl-34m+E  | 1.4929  | 1.3009  | 1.3223  | 1.3457  | 1.6122  | 1.4083  | 1.4704  | 2.4135  |
| Cm-245+E  | 1.6545  | 1.5443  | 1.6733  | 1.6001  | 1.7022  | 1.2133  | 1.4863  | 1.7531  |
| Cm-247+E  | 1.7185  | 1.5545  | 1.5546  | 1.5049  | 1.7522  | 1.4606  | 1.5550  | 2.0434  |
| Cm-250+E  | 21.3178 | 18.8393 | 19.0836 | 19.2319 | 22.7235 | 20.3368 | 21.4767 | 32.9728 |
| Cs-137+E  | 2.6278  | 2.3906  | 2.5006  | 2.5412  | 2.8074  | 2.7067  | 2.8936  | 3.5682  |
| Es-254+E  | 2.6206  | 2.2532  | 2.4660  | 2.4546  | 2.5866  | 2.1570  | 2.5155  | 3.2775  |
| Fe-60+E   | 3.0776  | 2.6196  | 2.6905  | 2.7658  | 3.2832  | 2.9466  | 3.1469  | 5.3997  |
| Fr-220+E  | 0.2332  | 0.2010  | 0.2268  | 0.2086  | 0.2170  | 0.1510  | 0.1933  | 0.2383  |
| Fr-221+E  | 0.2428  | 0.2222  | 0.2401  | 0.2266  | 0.2552  | 0.2084  | 0.2051  | 0.2686  |
| Ge-68+E   | 0.6175  | 0.4271  | 0.6555  | 0.5497  | 0.4532  | 0.2813  | 0.4810  | 0.6132  |
| Hf-172+E  | 2.0965  | 1.7968  | 2.0984  | 1.8927  | 1.8679  | 1.3424  | 1.7885  | 1.9877  |
| Hf-182+E  | 4.5957  | 4.0118  | 4.2186  | 4.0284  | 4.7215  | 3.9833  | 4.1778  | 5.9397  |
| Hg-193+E  | 2.8932  | 2.5073  | 2.6581  | 2.5275  | 2.8602  | 2.3483  | 2.6193  | 3.7005  |
| Hg-194+E  | 3.2533  | 2.7391  | 2.9635  | 2.7679  | 3.1678  | 2.6016  | 2.8432  | 4.0242  |
| In-114m+E | 0.6021  | 0.5621  | 0.5891  | 0.5791  | 0.6104  | 0.5108  | 0.5775  | 0.6470  |
| Ir-192m+E | 4.0872  | 3.4546  | 3.6979  | 3.4534  | 4.0346  | 3.3841  | 3.5024  | 4.7393  |
| Kr-76+E   | 2.7345  | 2.3340  | 2.5867  | 2.3934  | 2.6265  | 2.1530  | 2.3251  | 2.9743  |
| Mg-28+E   | 3.7207  | 3.2643  | 3.3260  | 3.3997  | 3.9709  | 3.6279  | 4.0386  | 6.2740  |
| Nd-140+E  | 0.8145  | 0.7620  | 0.8253  | 0.7962  | 0.8039  | 0.5907  | 0.8847  | 0.7187  |
| Ni-66+E   | 0.1384  | 0.1216  | 0.1166  | 0.1283  | 0.1496  | 0.1438  | 0.1548  | 0.2479  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|--------|---------|
| Np-235+E  | 0.4279 | 0.3530 | 0.4474 | 0.4031 | 0.3692 | 0.2480 | 0.3300 | 0.3158  |
| Np-237+E  | 2.9048 | 2.5462 | 2.8309 | 2.6446 | 2.8273 | 2.1036 | 2.4524 | 2.8734  |
| Os-194+E  | 0.6135 | 0.4896 | 0.5923 | 0.5333 | 0.5525 | 0.4249 | 0.5052 | 0.6641  |
| Pa-231+E  | 4.6460 | 4.0070 | 4.5010 | 4.1520 | 4.4678 | 3.4115 | 3.9032 | 4.7427  |
| Pb-202+E  | 2.7112 | 2.3457 | 2.4825 | 2.3276 | 2.5970 | 2.0824 | 2.4046 | 3.1726  |
| Pb-210+E  | 0.3088 | 0.2384 | 0.3270 | 0.2853 | 0.2376 | 0.1567 | 0.2381 | 0.2686  |
| Pd-103+E  | 0.5595 | 0.5276 | 0.5676 | 0.5491 | 0.5552 | 0.4011 | 0.4856 | 0.3579  |
| Pt-202+E  | 0.3570 | 0.3166 | 0.3111 | 0.3164 | 0.3744 | 0.3386 | 0.3572 | 0.5375  |
| Pu-239+E  | 0.0709 | 0.0567 | 0.0746 | 0.0661 | 0.0595 | 0.0390 | 0.0544 | 0.0539  |
| Pu-244+E  | 1.5568 | 1.3566 | 1.5046 | 1.4392 | 1.5270 | 1.2250 | 1.4164 | 1.7633  |
| Pu-246+E  | 3.5905 | 3.2571 | 3.4052 | 3.3876 | 3.7564 | 3.1205 | 3.4769 | 4.6890  |
| Ra-219+E  | 1.0653 | 0.9131 | 0.9552 | 0.8941 | 1.0701 | 0.8572 | 0.8826 | 1.2010  |
| Ra-221+E  | 0.6107 | 0.5316 | 0.5931 | 0.5542 | 0.5829 | 0.4189 | 0.5051 | 0.6053  |
| Ra-222+E  | 0.0520 | 0.0440 | 0.0458 | 0.0429 | 0.0522 | 0.0439 | 0.0431 | 0.0589  |
| Ra-223+E  | 2.1481 | 1.8936 | 1.9904 | 1.8710 | 2.1614 | 1.6968 | 1.8686 | 2.4687  |
| Ra-224+E  | 1.4324 | 1.3203 | 1.4285 | 1.4505 | 1.5182 | 1.5113 | 1.5498 | 1.5230  |
| Ra-226+E  | 4.6590 | 4.0963 | 4.3042 | 4.2705 | 4.9100 | 4.4834 | 4.6882 | 6.4207  |
| Ra-228+E  | 3.3821 | 3.0053 | 3.1932 | 3.2281 | 3.5428 | 3.2619 | 3.4701 | 4.3633  |
| Rb-81+E   | 2.1382 | 1.9255 | 2.0609 | 1.9965 | 2.1354 | 1.7780 | 1.8350 | 2.4280  |
| Rb-83+E   | 2.0758 | 1.7957 | 1.9445 | 1.8669 | 1.9730 | 1.6739 | 1.9454 | 2.5937  |
| Re-186m+E | 1.1990 | 0.9257 | 1.2349 | 1.0638 | 0.9729 | 0.6477 | 0.9626 | 1.1347  |
| Rn-219+E  | 0.3203 | 0.2804 | 0.2970 | 0.2749 | 0.3259 | 0.2782 | 0.2806 | 0.3631  |
| Rn-220+E  | 1.3571 | 1.2538 | 1.3541 | 1.3833 | 1.4401 | 1.4453 | 1.4851 | 1.4424  |
| Rn-222+E  | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0011 | 0.0012 | 0.0017  |
| Ru-103+E  | 1.6646 | 1.4797 | 1.4809 | 1.4638 | 1.7031 | 1.4919 | 1.6327 | 2.2165  |
| Ru-106+E  | 0.5345 | 0.4764 | 0.4744 | 0.4763 | 0.5596 | 0.5045 | 0.5486 | 0.7951  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 1.7511 | 1.6102 | 1.6357 | 1.5930 | 1.7273 | 1.4848 | 1.7018 | 1.8807  |
| Sn-121m+E | 0.1425 | 0.1290 | 0.1456 | 0.1378 | 0.1271 | 0.0999 | 0.1550 | 0.1265  |
| Sn-126+E  | 5.7378 | 5.1915 | 5.1607 | 5.1769 | 6.0343 | 5.3919 | 5.8979 | 8.5801  |
| Sr-82+E   | 0.7001 | 0.6153 | 0.6868 | 0.6629 | 0.6379 | 0.5312 | 0.6249 | 0.7925  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000  |
| Te-118+E  | 0.6894 | 0.6523 | 0.6864 | 0.6726 | 0.6453 | 0.5430 | 0.7927 | 0.6625  |
| Te-129m+E | 0.4782 | 0.4338 | 0.4639 | 0.4495 | 0.4547 | 0.3835 | 0.5267 | 0.5313  |
| Th-229+E  | 3.3687 | 2.9795 | 3.3165 | 3.1147 | 3.2783 | 2.4167 | 2.8637 | 3.4609  |
| Th-232+E  | 8.7600 | 7.7875 | 8.3661 | 8.3457 | 9.2056 | 8.4623 | 8.9164 | 10.9995 |
| Th-234+E  | 0.2538 | 0.2252 | 0.2480 | 0.2329 | 0.2454 | 0.1802 | 0.2163 | 0.2611  |
| Ti-44+E   | 3.0561 | 2.7658 | 2.5711 | 2.5831 | 3.2566 | 2.6922 | 2.9406 | 4.4933  |
| U-228+E   | 0.3724 | 0.3300 | 0.3638 | 0.3451 | 0.3703 | 0.2795 | 0.3016 | 0.3613  |
| U-230+E   | 0.3556 | 0.3078 | 0.3572 | 0.3293 | 0.3354 | 0.2426 | 0.2911 | 0.3151  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.4103       | 2.2044       | 2.4378       | 2.3603       | 2.3458       | 2.0672       | 2.2953       | 2.2570       |
| U-238+E        | 1.2784       | 1.1756       | 1.2793       | 1.2761       | 1.3435       | 1.2719       | 1.3224       | 1.3460       |
| W-178+E        | 1.4486       | 1.2231       | 1.4207       | 1.2756       | 1.2888       | 0.9404       | 1.1845       | 1.4325       |
| Xe-122+E       | 1.2468       | 1.1474       | 1.1889       | 1.1642       | 1.2215       | 1.0391       | 1.3952       | 1.4144       |
| Zr-93+E        | 0.1059       | 0.0956       | 0.1085       | 0.1027       | 0.1082       | 0.0730       | 0.0800       | 0.0550       |

Table 38: Drywall 5cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2416  | 0.2050  | 0.2677  | 0.2446  | 0.2010  | 0.1752  | 0.3640  | 0.2673  |
| Ac-225+E  | 1.1468  | 0.9342  | 1.2793  | 1.3465  | 1.0682  | 0.7944  | 2.5776  | 1.5901  |
| Ac-227+E  | 3.4188  | 3.0035  | 4.0566  | 3.6098  | 3.1343  | 2.7290  | 5.9008  | 3.6537  |
| Ag-108m+E | 5.0342  | 3.7100  | 5.8266  | 6.9285  | 4.9196  | 3.1171  | 15.5046 | 9.5113  |
| Ag-110m+E | 5.3216  | 4.1116  | 6.4661  | 7.3874  | 5.2955  | 3.4411  | 17.8990 | 10.4642 |
| Am-242m+E | 0.6882  | 0.6010  | 0.6678  | 0.5919  | 0.5242  | 0.5095  | 0.6544  | 0.6272  |
| Am-243+E  | 2.8532  | 2.6138  | 3.2262  | 2.7597  | 2.6030  | 2.3749  | 3.8024  | 2.2595  |
| Ar-42+E   | 0.2911  | 0.2273  | 0.2879  | 0.3474  | 0.2900  | 0.1965  | 0.8672  | 0.4388  |
| At-211+E  | 0.5280  | 0.4221  | 0.6287  | 0.5115  | 0.4600  | 0.3662  | 0.7447  | 0.4422  |
| Ba-128+E  | 1.4593  | 1.1496  | 1.4352  | 1.7297  | 1.3769  | 1.1149  | 2.8405  | 2.0823  |
| Bi-210m+E | 1.5330  | 1.4242  | 1.9960  | 1.7032  | 1.5183  | 1.4151  | 2.8308  | 1.6108  |
| Bi-212+E  | 0.2551  | 0.1982  | 0.2958  | 0.3249  | 0.2312  | 0.1628  | 0.6999  | 0.4468  |
| Bi-213+E  | 0.5191  | 0.3674  | 0.5994  | 0.7005  | 0.5088  | 0.3105  | 1.5680  | 0.9419  |
| Bi-214+E  | 2.1714  | 1.6656  | 2.4463  | 2.8784  | 2.1636  | 1.4011  | 6.9006  | 3.8764  |
| Bi-215+E  | 1.0855  | 0.9348  | 1.4245  | 1.2424  | 1.0660  | 0.9289  | 2.2005  | 1.2345  |
| Bi-216+E  | 2.5023  | 1.7616  | 2.7967  | 3.4803  | 2.4804  | 1.4705  | 7.9165  | 4.8724  |
| Cd-118+E  | 0.1104  | 0.0847  | 0.1267  | 0.1540  | 0.1105  | 0.0712  | 0.3549  | 0.2046  |
| Ce-134+E  | 0.8231  | 0.6520  | 0.6798  | 0.8878  | 0.7405  | 0.6580  | 1.0814  | 1.0152  |
| Ce-144+E  | 0.2676  | 0.2369  | 0.2776  | 0.2859  | 0.2585  | 0.2222  | 0.4363  | 0.2455  |
| Cl-34m+E  | 1.6395  | 1.4379  | 1.7337  | 1.8803  | 1.6385  | 1.2277  | 4.1980  | 2.0673  |
| Cm-245+E  | 1.5303  | 1.4835  | 1.5985  | 1.4101  | 1.3774  | 1.3377  | 1.8314  | 1.0412  |
| Cm-247+E  | 1.7565  | 1.3117  | 2.1051  | 2.2299  | 1.6949  | 1.1339  | 4.7881  | 2.7817  |
| Cm-250+E  | 23.1772 | 18.6634 | 26.6754 | 29.5601 | 23.0331 | 16.3284 | 66.0542 | 37.2406 |
| Cs-137+E  | 2.8994  | 2.5681  | 3.2076  | 3.4981  | 2.8715  | 2.3466  | 6.2409  | 4.3270  |
| Es-254+E  | 2.4818  | 1.9835  | 2.7444  | 2.7871  | 2.1813  | 1.6497  | 5.8602  | 3.8839  |
| Fe-60+E   | 3.4472  | 2.6608  | 3.8930  | 4.6472  | 3.3782  | 2.2292  | 10.6372 | 6.1596  |
| Fr-220+E  | 0.1974  | 0.1669  | 0.2204  | 0.1861  | 0.1654  | 0.1414  | 0.2593  | 0.1786  |
| Fr-221+E  | 0.2411  | 0.2337  | 0.2716  | 0.2694  | 0.2320  | 0.2036  | 0.4084  | 0.2335  |
| Ge-68+E   | 0.3854  | 0.2772  | 0.3928  | 0.4113  | 0.2403  | 0.2010  | 0.5206  | 0.5920  |
| Hf-172+E  | 1.7891  | 1.5160  | 1.8538  | 1.8641  | 1.5341  | 1.2517  | 2.1184  | 2.0659  |
| Hf-182+E  | 4.7299  | 4.1844  | 5.6049  | 5.4961  | 4.6163  | 3.6978  | 10.3744 | 6.2335  |
| Hg-193+E  | 2.8376  | 2.3127  | 3.3991  | 3.2855  | 2.6620  | 1.9637  | 6.3286  | 3.9337  |
| Hg-194+E  | 3.0992  | 2.4927  | 3.9952  | 3.5222  | 2.9587  | 2.3959  | 6.3940  | 3.8667  |
| In-114m+E | 0.5908  | 0.5046  | 0.5672  | 0.7069  | 0.5558  | 0.4435  | 0.9547  | 0.6934  |
| Ir-192m+E | 3.8831  | 3.1312  | 5.2843  | 4.6564  | 3.8414  | 3.3059  | 8.1743  | 4.8232  |
| Kr-76+E   | 2.5085  | 2.1282  | 3.1322  | 2.8588  | 2.3695  | 2.0586  | 4.8860  | 3.0152  |
| Mg-28+E   | 4.1623  | 3.2371  | 4.4010  | 5.2221  | 4.1109  | 2.8176  | 12.2275 | 6.7058  |
| Nd-140+E  | 0.7740  | 0.6192  | 0.6135  | 0.8297  | 0.6912  | 0.5856  | 0.8612  | 0.8334  |
| Ni-66+E   | 0.1589  | 0.1244  | 0.1913  | 0.2070  | 0.1580  | 0.1049  | 0.5297  | 0.2995  |

| Element   | avg100 | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.3045 | 0.2534 | 0.2975  | 0.2470  | 0.2051 | 0.1984 | 0.2761  | 0.3340  |
| Np-237+E  | 2.5460 | 2.2478 | 3.0335  | 2.4664  | 2.2618 | 2.1721 | 3.3833  | 2.2252  |
| Os-194+E  | 0.5111 | 0.4078 | 0.6485  | 0.5811  | 0.4539 | 0.3982 | 0.9079  | 0.6301  |
| Pa-231+E  | 4.1261 | 3.5982 | 4.8156  | 4.2589  | 3.6802 | 3.2482 | 6.7037  | 4.4186  |
| Pb-202+E  | 2.5896 | 1.8776 | 3.0136  | 3.1867  | 2.3994 | 1.5570 | 6.3933  | 4.1336  |
| Pb-210+E  | 0.2040 | 0.1619 | 0.1971  | 0.1893  | 0.1333 | 0.1192 | 0.2128  | 0.2555  |
| Pd-103+E  | 0.5138 | 0.4107 | 0.4068  | 0.4918  | 0.3925 | 0.3700 | 0.3789  | 0.4161  |
| Pt-202+E  | 0.3906 | 0.2861 | 0.4537  | 0.5376  | 0.3877 | 0.2403 | 1.2566  | 0.7410  |
| Pu-239+E  | 0.0490 | 0.0397 | 0.0478  | 0.0414  | 0.0321 | 0.0308 | 0.0447  | 0.0566  |
| Pu-244+E  | 1.4327 | 1.1353 | 1.5280  | 1.6327  | 1.2592 | 0.9455 | 3.1542  | 2.1805  |
| Pu-246+E  | 3.6331 | 3.1735 | 4.0512  | 4.1946  | 3.4197 | 2.7486 | 8.0793  | 4.8404  |
| Ra-219+E  | 1.0013 | 0.8501 | 1.4538  | 1.0891  | 0.9935 | 0.9548 | 1.6197  | 0.8424  |
| Ra-221+E  | 0.5300 | 0.4803 | 0.5648  | 0.4964  | 0.4617 | 0.4024 | 0.7404  | 0.4832  |
| Ra-222+E  | 0.0495 | 0.0409 | 0.0746  | 0.0572  | 0.0504 | 0.0478 | 0.0920  | 0.0485  |
| Ra-223+E  | 2.0706 | 1.7742 | 2.5367  | 2.2743  | 1.9657 | 1.6419 | 3.9760  | 2.2628  |
| Ra-224+E  | 1.5656 | 1.5968 | 1.5777  | 1.5675  | 1.5401 | 1.5542 | 1.6413  | 1.5863  |
| Ra-226+E  | 5.0029 | 4.2870 | 5.8194  | 5.9848  | 4.9485 | 3.9969 | 11.2523 | 6.8930  |
| Ra-228+E  | 3.5606 | 3.1839 | 4.0403  | 4.0267  | 3.4424 | 2.9412 | 7.1992  | 4.9068  |
| Rb-81+E   | 2.0505 | 1.7753 | 2.2406  | 2.4233  | 1.9291 | 1.4765 | 4.3751  | 2.6888  |
| Rb-83+E   | 1.9590 | 1.4165 | 2.0574  | 2.5144  | 1.8023 | 1.1485 | 5.3309  | 3.5615  |
| Re-186m+E | 0.8746 | 0.7020 | 0.9254  | 0.8846  | 0.6618 | 0.5547 | 1.0481  | 1.0880  |
| Rn-219+E  | 0.3221 | 0.2790 | 0.3971  | 0.3852  | 0.3168 | 0.2578 | 0.7485  | 0.4307  |
| Rn-220+E  | 1.4902 | 1.5202 | 1.4935  | 1.4848  | 1.4669 | 1.4872 | 1.5032  | 1.5053  |
| Rn-222+E  | 0.0013 | 0.0009 | 0.0014  | 0.0018  | 0.0013 | 0.0008 | 0.0041  | 0.0026  |
| Ru-103+E  | 1.7479 | 1.2144 | 1.8184  | 2.4244  | 1.7227 | 1.0197 | 5.3141  | 3.3969  |
| Ru-106+E  | 0.5782 | 0.4121 | 0.6334  | 0.8072  | 0.5761 | 0.3442 | 1.8453  | 1.1450  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.7458 | 1.2788 | 1.8393  | 2.2508  | 1.6570 | 1.1457 | 4.0095  | 2.6857  |
| Sn-121m+E | 0.1234 | 0.0943 | 0.0919  | 0.1388  | 0.1052 | 0.0899 | 0.1014  | 0.1396  |
| Sn-126+E  | 6.1682 | 4.6457 | 7.3569  | 8.3912  | 6.0766 | 3.9306 | 18.8276 | 11.3204 |
| Sr-82+E   | 0.5919 | 0.4929 | 0.6699  | 0.6274  | 0.4846 | 0.3883 | 1.2805  | 0.8910  |
| Sr-90+E   | 0.0001 | 0.0000 | 0.0001  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0001  |
| Te-118+E  | 0.6481 | 0.4969 | 0.4864  | 0.7632  | 0.5841 | 0.4811 | 0.6596  | 0.7598  |
| Te-129m+E | 0.4574 | 0.3472 | 0.4212  | 0.5605  | 0.4193 | 0.3239 | 0.8298  | 0.6726  |
| Th-229+E  | 2.9976 | 2.5691 | 3.2110  | 3.0698  | 2.6176 | 2.1754 | 4.8222  | 3.2251  |
| Th-232+E  | 9.3017 | 8.5371 | 10.1690 | 10.2848 | 9.0304 | 7.8809 | 17.1569 | 11.7214 |
| Th-234+E  | 0.2255 | 0.1984 | 0.2529  | 0.2111  | 0.1944 | 0.1682 | 0.3215  | 0.2309  |
| Ti-44+E   | 3.3730 | 2.6281 | 4.1757  | 3.9609  | 3.2930 | 2.2638 | 7.9940  | 4.6044  |
| U-228+E   | 0.3356 | 0.3086 | 0.3582  | 0.3338  | 0.2998 | 0.2576 | 0.5251  | 0.3438  |
| U-230+E   | 0.2917 | 0.2578 | 0.3261  | 0.2643  | 0.2396 | 0.2292 | 0.3590  | 0.2790  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.2426        | 2.1180        | 2.2513        | 2.1195        | 2.0181        | 1.9719        | 2.2457        | 2.2505        |
| U-238+E        | 1.3529        | 1.3369        | 1.3377        | 1.3354        | 1.3140        | 1.2998        | 1.4812        | 1.3076        |
| W-178+E        | 1.2587        | 1.0668        | 1.3814        | 1.3062        | 1.0980        | 0.8535        | 1.6867        | 1.5803        |
| Xe-122+E       | 1.2384        | 0.9587        | 1.1907        | 1.4910        | 1.1687        | 0.9265        | 2.2992        | 1.7475        |
| Zr-93+E        | 0.0842        | 0.0752        | 0.0835        | 0.0574        | 0.0605        | 0.0615        | 0.0641        | 0.0819        |

Table 39: Drywall 5cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1703        | 0.1383        | 0.2947        | 0.2663        |
| Ac-225+E       | 0.9982        | 0.6397        | 1.5262        | 1.1469        |
| Ac-227+E       | 2.8754        | 2.0973        | 4.3037        | 3.1717        |
| Ag-108m+E      | 4.7220        | 2.5188        | 7.8812        | 6.8281        |
| Ag-110m+E      | 5.1533        | 2.7848        | 9.1064        | 8.2422        |
| Am-242m+E      | 0.3955        | 0.3778        | 0.7184        | 0.7286        |
| Am-243+E       | 2.3966        | 1.8485        | 2.8242        | 2.3891        |
| Ar-42+E        | 0.2866        | 0.1661        | 0.5648        | 0.3256        |
| At-211+E       | 0.4195        | 0.3245        | 0.4529        | 0.5026        |
| Ba-128+E       | 1.2850        | 0.9127        | 1.7817        | 1.7771        |
| Bi-210m+E      | 1.4500        | 1.0533        | 2.2429        | 1.2830        |
| Bi-212+E       | 0.2108        | 0.1337        | 0.4083        | 0.3794        |
| Bi-213+E       | 0.4945        | 0.2526        | 0.8201        | 0.6089        |
| Bi-214+E       | 2.1161        | 1.1507        | 3.8169        | 3.0760        |
| Bi-215+E       | 1.0176        | 0.6627        | 1.6756        | 1.0734        |
| Bi-216+E       | 2.4116        | 1.2050        | 4.2131        | 3.2459        |
| Cd-118+E       | 0.1077        | 0.0576        | 0.2123        | 0.1873        |
| Ce-134+E       | 0.6757        | 0.5555        | 0.7341        | 1.0586        |
| Ce-144+E       | 0.2496        | 0.1428        | 0.3172        | 0.1794        |
| Cl-34m+E       | 1.6204        | 0.8724        | 2.7430        | 1.6143        |
| Cm-245+E       | 1.2538        | 0.9740        | 1.5945        | 1.2961        |
| Cm-247+E       | 1.6372        | 0.9084        | 2.4279        | 1.8302        |
| Cm-250+E       | 22.4608       | 12.6898       | 38.3534       | 28.5612       |
| Cs-137+E       | 2.7780        | 2.1497        | 3.7938        | 3.8876        |
| Es-254+E       | 1.9172        | 1.3019        | 3.6908        | 3.6633        |
| Fe-60+E        | 3.2564        | 1.8275        | 6.5764        | 5.8135        |
| Fr-220+E       | 0.1432        | 0.1156        | 0.2009        | 0.1930        |
| Fr-221+E       | 0.2226        | 0.1695        | 0.2347        | 0.1447        |
| Ge-68+E        | 0.1508        | 0.1853        | 0.5606        | 0.7560        |
| Hf-172+E       | 1.3473        | 0.9788        | 1.4710        | 1.7630        |
| Hf-182+E       | 4.4206        | 2.9717        | 6.5797        | 5.2828        |
| Hg-193+E       | 2.5007        | 1.6302        | 3.5730        | 3.1574        |
| Hg-194+E       | 2.7676        | 1.6820        | 4.7720        | 3.3447        |
| In-114m+E      | 0.5064        | 0.3581        | 0.6589        | 0.5245        |
| Ir-192m+E      | 3.6378        | 2.0201        | 7.0117        | 3.9527        |
| Kr-76+E        | 2.1877        | 1.4204        | 3.8977        | 2.4477        |
| Mg-28+E        | 4.0194        | 2.3268        | 7.1055        | 5.4087        |
| Nd-140+E       | 0.6317        | 0.5296        | 0.6439        | 0.8035        |
| Ni-66+E        | 0.1540        | 0.0849        | 0.2835        | 0.2681        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1283        | 0.1512        | 0.3397        | 0.3678        |
| Np-237+E       | 1.9848        | 1.4883        | 3.3564        | 2.4554        |
| Os-194+E       | 0.4014        | 0.2650        | 0.8440        | 0.6215        |
| Pa-231+E       | 3.2856        | 2.4828        | 5.1885        | 3.9865        |
| Pb-202+E       | 2.2461        | 1.3234        | 3.4513        | 2.9938        |
| Pb-210+E       | 0.0839        | 0.1009        | 0.2382        | 0.2926        |
| Pd-103+E       | 0.2965        | 0.2621        | 0.4586        | 0.4990        |
| Pt-202+E       | 0.3780        | 0.1944        | 0.6788        | 0.5498        |
| Pu-239+E       | 0.0197        | 0.0240        | 0.0564        | 0.0647        |
| Pu-244+E       | 1.1011        | 0.7410        | 2.0661        | 1.8002        |
| Pu-246+E       | 3.2049        | 2.1307        | 4.9341        | 4.2472        |
| Ra-219+E       | 0.9413        | 0.5497        | 1.7289        | 0.8715        |
| Ra-221+E       | 0.4098        | 0.2912        | 0.6296        | 0.4399        |
| Ra-222+E       | 0.0482        | 0.0251        | 0.0960        | 0.0438        |
| Ra-223+E       | 1.8629        | 1.2508        | 2.7062        | 1.9225        |
| Ra-224+E       | 1.4860        | 1.5048        | 1.5634        | 1.7305        |
| Ra-226+E       | 4.7910        | 3.3410        | 7.4339        | 5.9342        |
| Ra-228+E       | 3.2751        | 2.5157        | 4.8360        | 4.3914        |
| Rb-81+E        | 1.8035        | 1.1230        | 2.6508        | 1.6725        |
| Rb-83+E        | 1.6389        | 0.9395        | 3.2699        | 2.6394        |
| Re-186m+E      | 0.5195        | 0.4518        | 0.9699        | 1.1552        |
| Rn-219+E       | 0.3056        | 0.2061        | 0.4544        | 0.2930        |
| Rn-220+E       | 1.4158        | 1.4441        | 1.4829        | 1.6768        |
| Rn-222+E       | 0.0013        | 0.0006        | 0.0024        | 0.0017        |
| Ru-103+E       | 1.6607        | 0.8292        | 3.1366        | 2.2925        |
| Ru-106+E       | 0.5595        | 0.2823        | 1.0181        | 0.8060        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.5284        | 0.9442        | 2.3078        | 1.9096        |
| Sn-121m+E      | 0.0855        | 0.0824        | 0.1129        | 0.1593        |
| Sn-126+E       | 5.8852        | 3.2288        | 9.2887        | 8.3087        |
| Sr-82+E        | 0.3846        | 0.2991        | 0.8146        | 0.7631        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0000        |
| Te-118+E       | 0.4910        | 0.4364        | 0.6341        | 0.8230        |
| Te-129m+E      | 0.3742        | 0.2780        | 0.5534        | 0.6135        |
| Th-229+E       | 2.3232        | 1.7649        | 3.3939        | 2.8788        |
| Th-232+E       | 8.6462        | 7.0554        | 11.7406       | 10.6799       |
| Th-234+E       | 0.1681        | 0.1363        | 0.2247        | 0.2359        |
| Ti-44+E        | 3.1983        | 1.9467        | 4.2056        | 4.1316        |
| U-228+E        | 0.2692        | 0.1912        | 0.3985        | 0.2578        |
| U-230+E        | 0.1950        | 0.1607        | 0.3564        | 0.2814        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 1.8089        | 1.8195        | 2.2005        | 2.5213        |
| U-238+E        | 1.2542        | 1.2441        | 1.4035        | 1.5976        |
| W-178+E        | 0.9773        | 0.7145        | 0.9950        | 1.3092        |
| Xe-122+E       | 1.0727        | 0.7448        | 1.5386        | 1.5475        |
| Zr-93+E        | 0.0401        | 0.0422        | 0.0841        | 0.0720        |

## Appendix D

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 40: Glass Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5834  | 0.3364  | 0.5063  | 0.5927  | 0.4789  | 0.3346  | 0.5507  | 0.6232  |
| Ac-225+E  | 1.4914  | 0.9585  | 1.3289  | 1.5117  | 1.4162  | 1.1323  | 1.5688  | 1.6816  |
| Ac-227+E  | 5.2800  | 3.3524  | 4.6878  | 5.3546  | 4.9024  | 3.8565  | 5.4549  | 5.8987  |
| Ag-108m+E | 3.5973  | 2.5702  | 3.3019  | 3.6266  | 4.1311  | 3.7260  | 4.3934  | 4.3977  |
| Ag-110m+E | 2.9629  | 2.1355  | 2.7327  | 2.9848  | 3.5596  | 3.2525  | 3.7685  | 3.7145  |
| Am-242m+E | 1.9944  | 1.1968  | 1.7465  | 2.0173  | 1.7236  | 1.2803  | 1.9457  | 2.1433  |
| Am-243+E  | 4.6087  | 3.0538  | 4.1318  | 4.6662  | 4.4964  | 3.6999  | 4.9356  | 5.2354  |
| Ar-42+E   | 0.1680  | 0.1192  | 0.1545  | 0.1689  | 0.2037  | 0.1860  | 0.2154  | 0.2111  |
| At-211+E  | 1.1055  | 0.6965  | 0.9782  | 1.1216  | 1.0046  | 0.7786  | 1.1225  | 1.2233  |
| Ba-128+E  | 1.9060  | 1.2944  | 1.7239  | 1.9185  | 2.0563  | 1.8031  | 2.1993  | 2.2413  |
| Bi-210m+E | 1.2272  | 0.8740  | 1.1236  | 1.2456  | 1.3410  | 1.1806  | 1.4431  | 1.4848  |
| Bi-212+E  | 0.4001  | 0.2302  | 0.3476  | 0.4063  | 0.3411  | 0.2440  | 0.3897  | 0.4354  |
| Bi-213+E  | 0.3666  | 0.2601  | 0.3356  | 0.3712  | 0.4072  | 0.3608  | 0.4371  | 0.4448  |
| Bi-214+E  | 1.2595  | 0.9005  | 1.1583  | 1.2686  | 1.5031  | 1.3677  | 1.5921  | 1.5734  |
| Bi-215+E  | 0.9829  | 0.6835  | 0.8939  | 0.9959  | 1.0448  | 0.9036  | 1.1298  | 1.1693  |
| Bi-216+E  | 1.4758  | 1.0700  | 1.3604  | 1.4914  | 1.7185  | 1.5583  | 1.8279  | 1.8296  |
| Cd-118+E  | 0.0620  | 0.0443  | 0.0570  | 0.0624  | 0.0749  | 0.0685  | 0.0791  | 0.0778  |
| Ce-134+E  | 1.5840  | 1.0412  | 1.4193  | 1.5936  | 1.6501  | 1.4172  | 1.7754  | 1.8267  |
| Ce-144+E  | 0.3065  | 0.2186  | 0.2805  | 0.3097  | 0.3381  | 0.3016  | 0.3627  | 0.3676  |
| Cl-34m+E  | 1.1129  | 0.8162  | 1.0290  | 1.1233  | 1.3257  | 1.2145  | 1.4069  | 1.3885  |
| Cm-245+E  | 2.6593  | 1.7399  | 2.3769  | 2.6910  | 2.5359  | 2.0527  | 2.7982  | 2.9864  |
| Cm-247+E  | 1.5247  | 1.0704  | 1.3900  | 1.5435  | 1.6445  | 1.4400  | 1.7723  | 1.8189  |
| Cm-250+E  | 14.8374 | 10.7648 | 13.6832 | 14.9727 | 17.4970 | 15.9422 | 18.5540 | 18.4363 |
| Cs-137+E  | 1.9958  | 1.4412  | 1.8438  | 2.0076  | 2.3725  | 2.1686  | 2.5255  | 2.4717  |
| Es-254+E  | 4.1971  | 2.5375  | 3.6871  | 4.2454  | 3.8060  | 2.9162  | 4.2594  | 4.6212  |
| Fe-60+E   | 2.7020  | 1.7250  | 2.4108  | 2.7323  | 2.8110  | 2.3434  | 3.0672  | 3.1898  |
| Fr-220+E  | 0.4873  | 0.2931  | 0.4267  | 0.4944  | 0.4172  | 0.3057  | 0.4733  | 0.5265  |
| Fr-221+E  | 0.2436  | 0.1704  | 0.2218  | 0.2474  | 0.2551  | 0.2198  | 0.2764  | 0.2874  |
| Ge-68+E   | 1.7289  | 0.8279  | 1.4428  | 1.7685  | 1.1582  | 0.5977  | 1.4273  | 1.7576  |
| Hf-172+E  | 4.4234  | 2.5986  | 3.8538  | 4.5045  | 3.8406  | 2.8201  | 4.3514  | 4.8607  |
| Hf-182+E  | 4.5850  | 3.1118  | 4.1442  | 4.6513  | 4.8155  | 4.1153  | 5.2240  | 5.4392  |
| Hg-193+E  | 3.8677  | 2.4418  | 3.4311  | 3.9275  | 3.6657  | 2.9084  | 4.0720  | 4.3905  |
| Hg-194+E  | 4.0111  | 2.5124  | 3.5524  | 4.0731  | 3.7873  | 2.9887  | 4.2145  | 4.5585  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| In-114m+E | 0.8118 | 0.5585 | 0.7368 | 0.8174 | 0.8715 | 0.7632 | 0.9315 | 0.9547 |
| Ir-192m+E | 3.4913 | 2.3061 | 3.1358 | 3.5436 | 3.5320 | 2.9361 | 3.8739 | 4.0978 |
| Kr-76+E   | 3.4628 | 2.1903 | 3.0735 | 3.5107 | 3.2140 | 2.5142 | 3.5762 | 3.8748 |
| Mg-28+E   | 2.9241 | 2.0860 | 2.6865 | 2.9384 | 3.4868 | 3.1895 | 3.6782 | 3.6204 |
| Nd-140+E  | 1.6291 | 1.0682 | 1.4570 | 1.6402 | 1.6826 | 1.4383 | 1.8129 | 1.8762 |
| Ni-66+E   | 0.0907 | 0.0648 | 0.0835 | 0.0913 | 0.1095 | 0.1000 | 0.1156 | 0.1138 |
| Np-235+E  | 1.1797 | 0.6715 | 1.0208 | 1.1950 | 0.9430 | 0.6450 | 1.0871 | 1.2329 |
| Np-237+E  | 4.8278 | 3.0431 | 4.2781 | 4.8836 | 4.4224 | 3.4554 | 4.9224 | 5.3266 |
| Os-194+E  | 1.0052 | 0.5581 | 0.8654 | 1.0240 | 0.8134 | 0.5519 | 0.9439 | 1.0816 |
| Pa-231+E  | 7.4440 | 4.6030 | 6.5672 | 7.5468 | 6.6781 | 5.1030 | 7.4883 | 8.1881 |
| Pb-202+E  | 3.6194 | 2.2306 | 3.1913 | 3.6789 | 3.3146 | 2.5571 | 3.7159 | 4.0600 |
| Pb-210+E  | 0.9247 | 0.4981 | 0.7903 | 0.9402 | 0.6904 | 0.4295 | 0.8138 | 0.9538 |
| Pd-103+E  | 1.2875 | 0.8497 | 1.1533 | 1.2956 | 1.3006 | 1.0996 | 1.4086 | 1.4609 |
| Pt-202+E  | 0.2292 | 0.1652 | 0.2111 | 0.2314 | 0.2700 | 0.2454 | 0.2866 | 0.2854 |
| Pu-239+E  | 0.1971 | 0.1087 | 0.1694 | 0.2001 | 0.1528 | 0.1003 | 0.1782 | 0.2050 |
| Pu-244+E  | 2.4932 | 1.5313 | 2.1975 | 2.5210 | 2.2510 | 1.7280 | 2.5174 | 2.7319 |
| Pu-246+E  | 4.3178 | 2.8817 | 3.8852 | 4.3635 | 4.3947 | 3.6973 | 4.7837 | 4.9873 |
| Ra-219+E  | 0.9828 | 0.6826 | 0.8930 | 0.9954 | 1.0325 | 0.8887 | 1.1184 | 1.1635 |
| Ra-221+E  | 1.1221 | 0.6878 | 0.9877 | 1.1383 | 0.9830 | 0.7361 | 1.1098 | 1.2228 |
| Ra-222+E  | 0.0351 | 0.0257 | 0.0323 | 0.0355 | 0.0399 | 0.0359 | 0.0426 | 0.0432 |
| Ra-223+E  | 2.5163 | 1.6748 | 2.2604 | 2.5523 | 2.4906 | 2.0583 | 2.7341 | 2.8964 |
| Ra-224+E  | 1.1949 | 0.8708 | 1.1071 | 1.2004 | 1.4167 | 1.2989 | 1.5060 | 1.4832 |
| Ra-226+E  | 3.7109 | 2.6049 | 3.3902 | 3.7412 | 4.1896 | 3.7264 | 4.4775 | 4.5097 |
| Ra-228+E  | 3.3391 | 2.2575 | 3.0218 | 3.3667 | 3.5520 | 3.0517 | 3.8466 | 3.9264 |
| Rb-81+E   | 2.7357 | 1.7921 | 2.4502 | 2.7691 | 2.6069 | 2.0930 | 2.8762 | 3.0724 |
| Rb-83+E   | 2.9260 | 1.7993 | 2.5806 | 2.9602 | 2.6054 | 1.9642 | 2.9224 | 3.1962 |
| Re-186m+E | 2.9577 | 1.5508 | 2.5136 | 3.0195 | 2.2101 | 1.3625 | 2.6252 | 3.1011 |
| Rn-219+E  | 0.2380 | 0.1713 | 0.2187 | 0.2415 | 0.2644 | 0.2351 | 0.2836 | 0.2896 |
| Rn-220+E  | 1.1327 | 0.8262 | 1.0501 | 1.1372 | 1.3490 | 1.2393 | 1.4332 | 1.4084 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.1095 | 0.7913 | 1.0179 | 1.1207 | 1.2678 | 1.1382 | 1.3519 | 1.3605 |
| Ru-106+E  | 0.3169 | 0.2315 | 0.2930 | 0.3198 | 0.3783 | 0.3465 | 0.4004 | 0.3970 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.0618 | 1.4319 | 1.8765 | 2.0739 | 2.2601 | 2.0029 | 2.4054 | 2.4473 |
| Sn-121m+E | 0.3177 | 0.1983 | 0.2813 | 0.3202 | 0.3067 | 0.2489 | 0.3353 | 0.3570 |
| Sn-126+E  | 4.3141 | 3.0915 | 3.9623 | 4.3555 | 4.9533 | 4.4639 | 5.2731 | 5.2948 |
| Sr-82+E   | 1.6332 | 1.0067 | 1.4402 | 1.6463 | 1.3975 | 1.0285 | 1.5711 | 1.7265 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| Te-118+E  | 1.3518 | 0.9063 | 1.2190 | 1.3555 | 1.4345 | 1.2487 | 1.5277 | 1.5671 |
| Te-129m+E | 0.7612 | 0.4930 | 0.6804 | 0.7667 | 0.7734 | 0.6503 | 0.8371 | 0.8739 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-229+E       | 5.9965       | 3.7108       | 5.2891       | 6.0740       | 5.3707       | 4.1074       | 6.0174       | 6.5728       |
| Th-232+E       | 8.3934       | 5.7387       | 7.6211       | 8.4719       | 9.0478       | 7.8422       | 9.7669       | 9.9486       |
| Th-234+E       | 0.4947       | 0.3091       | 0.4372       | 0.5006       | 0.4469       | 0.3451       | 0.4989       | 0.5428       |
| Ti-44+E        | 3.2927       | 2.3766       | 3.0210       | 3.3304       | 3.7185       | 3.3443       | 3.9603       | 4.0050       |
| U-228+E        | 0.5848       | 0.3713       | 0.5193       | 0.5922       | 0.5379       | 0.4219       | 0.5989       | 0.6467       |
| U-230+E        | 0.7247       | 0.4366       | 0.6353       | 0.7335       | 0.6211       | 0.4575       | 0.7030       | 0.7773       |
| U-235+E        | 3.9227       | 2.5450       | 3.4988       | 3.9633       | 3.7237       | 2.9975       | 4.1022       | 4.3717       |
| U-238+E        | 1.4763       | 1.0324       | 1.3451       | 1.4909       | 1.6032       | 1.4058       | 1.7303       | 1.7363       |
| W-178+E        | 3.0039       | 1.7721       | 2.6192       | 3.0603       | 2.6192       | 1.9296       | 2.9640       | 3.3102       |
| Xe-122+E       | 1.7262       | 1.1765       | 1.5632       | 1.7349       | 1.8705       | 1.6453       | 1.9945       | 2.0298       |
| Zr-93+E        | 0.2398       | 0.1502       | 0.2123       | 0.2414       | 0.2173       | 0.1709       | 0.2414       | 0.2581       |

Table 41: Glass Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4786  | 0.3700  | 0.5819  | 0.6497  | 0.3404  | 0.3185  | 0.5615  | 0.6522  |
| Ac-225+E  | 1.5023  | 1.3171  | 1.7007  | 1.7666  | 1.2392  | 1.2421  | 1.7087  | 1.8302  |
| Ac-227+E  | 5.1472  | 4.4410  | 5.8796  | 6.1826  | 4.1608  | 4.1387  | 5.8520  | 6.3949  |
| Ag-108m+E | 4.6883  | 4.5594  | 4.9085  | 4.6755  | 4.3508  | 4.5880  | 5.1566  | 4.9793  |
| Ag-110m+E | 4.1555  | 4.1082  | 4.3060  | 4.0347  | 4.0462  | 4.3476  | 4.6546  | 4.3792  |
| Am-242m+E | 1.7303  | 1.3946  | 2.0255  | 2.2164  | 1.2173  | 1.1448  | 1.9414  | 2.2012  |
| Am-243+E  | 4.7848  | 4.2814  | 5.3261  | 5.4770  | 4.0014  | 4.0336  | 5.3368  | 5.7465  |
| Ar-42+E   | 0.2398  | 0.2378  | 0.2469  | 0.2301  | 0.2349  | 0.2528  | 0.2704  | 0.2501  |
| At-211+E  | 1.0465  | 0.8900  | 1.2044  | 1.2766  | 0.8395  | 0.8272  | 1.1887  | 1.3503  |
| Ba-128+E  | 2.2804  | 2.1541  | 2.4355  | 2.3930  | 2.0351  | 2.1354  | 2.4854  | 2.4870  |
| Bi-210m+E | 1.5023  | 1.4407  | 1.6194  | 1.5776  | 1.3977  | 1.4622  | 1.6828  | 1.6952  |
| Bi-212+E  | 0.3516  | 0.2819  | 0.4192  | 0.4583  | 0.2680  | 0.2607  | 0.4152  | 0.4641  |
| Bi-213+E  | 0.4598  | 0.4421  | 0.4914  | 0.4747  | 0.4299  | 0.4514  | 0.5158  | 0.5080  |
| Bi-214+E  | 1.7530  | 1.7293  | 1.8192  | 1.7070  | 1.7028  | 1.8254  | 1.9706  | 1.8541  |
| Bi-215+E  | 1.1596  | 1.0924  | 1.2565  | 1.2397  | 1.0561  | 1.0985  | 1.2987  | 1.3314  |
| Bi-216+E  | 1.9752  | 1.9370  | 2.0767  | 1.9665  | 1.8948  | 2.0112  | 2.2132  | 2.1107  |
| Cd-118+E  | 0.0878  | 0.0871  | 0.0907  | 0.0848  | 0.0858  | 0.0921  | 0.0987  | 0.0920  |
| Ce-134+E  | 1.8107  | 1.6767  | 1.9518  | 1.9535  | 1.5834  | 1.6608  | 1.9751  | 2.0217  |
| Ce-144+E  | 0.3781  | 0.3633  | 0.4015  | 0.3902  | 0.3514  | 0.3712  | 0.4178  | 0.4160  |
| Cl-34m+E  | 1.5360  | 1.5229  | 1.5980  | 1.4966  | 1.4970  | 1.6058  | 1.7260  | 1.6232  |
| Cm-245+E  | 2.6654  | 2.3397  | 2.9953  | 3.1142  | 2.1617  | 2.1556  | 2.9837  | 3.2214  |
| Cm-247+E  | 1.8268  | 1.7310  | 1.9665  | 1.9271  | 1.6598  | 1.7270  | 2.0344  | 2.0557  |
| Cm-250+E  | 20.2044 | 19.9114 | 21.0764 | 19.8754 | 19.4799 | 20.7996 | 22.5765 | 21.4804 |
| Cs-137+E  | 2.7532  | 2.7222  | 2.8947  | 2.6718  | 2.6671  | 2.8451  | 3.0695  | 2.8938  |
| Es-254+E  | 3.9553  | 3.3262  | 4.5405  | 4.8460  | 3.0295  | 2.9712  | 4.4691  | 4.8788  |
| Fe-60+E   | 3.1602  | 2.9193  | 3.4483  | 3.4427  | 2.8718  | 2.9997  | 3.6388  | 3.6303  |
| Fr-220+E  | 0.4233  | 0.3412  | 0.5017  | 0.5477  | 0.3153  | 0.3019  | 0.4883  | 0.5611  |
| Fr-221+E  | 0.2801  | 0.2629  | 0.3065  | 0.3038  | 0.2521  | 0.2596  | 0.3146  | 0.3253  |
| Ge-68+E   | 1.0735  | 0.6292  | 1.4942  | 1.8421  | 0.6046  | 0.4779  | 1.3835  | 1.7802  |
| Hf-172+E  | 3.9806  | 3.2889  | 4.6942  | 5.1270  | 3.1446  | 3.1060  | 4.6459  | 5.1579  |
| Hf-182+E  | 5.3544  | 5.0364  | 5.8343  | 5.7982  | 4.8980  | 5.1076  | 6.0648  | 6.1578  |
| Hg-193+E  | 3.9283  | 3.4674  | 4.4574  | 4.6368  | 3.3351  | 3.3764  | 4.5133  | 4.8525  |
| Hg-194+E  | 4.0608  | 3.5733  | 4.6162  | 4.8166  | 3.4422  | 3.4873  | 4.6824  | 5.0067  |
| In-114m+E | 0.9553  | 0.9011  | 1.0188  | 0.9968  | 0.8293  | 0.8562  | 1.0295  | 1.0322  |
| Ir-192m+E | 3.8800  | 3.5578  | 4.3009  | 4.3498  | 3.4531  | 3.5645  | 4.4295  | 4.5468  |
| Kr-76+E   | 3.3858  | 2.9189  | 3.8667  | 4.0548  | 2.7433  | 2.7425  | 3.8770  | 4.1665  |
| Mg-28+E   | 4.0416  | 3.9880  | 4.1776  | 3.9211  | 3.8755  | 4.1545  | 4.4749  | 4.2123  |
| Nd-140+E  | 1.8437  | 1.6996  | 1.9883  | 1.9952  | 1.6143  | 1.6997  | 2.0153  | 2.0822  |
| Ni-66+E   | 0.1283  | 0.1270  | 0.1328  | 0.1241  | 0.1253  | 0.1349  | 0.1436  | 0.1351  |

| Element   | avg100  | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|---------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.9163  | 0.6806 | 1.1204  | 1.2738  | 0.5852 | 0.5228 | 1.0558  | 1.2460  |
| Np-237+E  | 4.5793  | 3.8928 | 5.2315  | 5.5496  | 3.5443 | 3.4797 | 5.1462  | 5.6565  |
| Os-194+E  | 0.8221  | 0.6303 | 1.0119  | 1.1371  | 0.6042 | 0.5743 | 0.9867  | 1.1387  |
| Pa-231+E  | 6.9031  | 5.7877 | 8.0001  | 8.5576  | 5.3508 | 5.2370 | 7.8752  | 8.7404  |
| Pb-202+E  | 3.5070  | 3.0149 | 4.0488  | 4.2780  | 2.8968 | 2.8930 | 4.0612  | 4.4368  |
| Pb-210+E  | 0.6597  | 0.4537 | 0.8445  | 0.9877  | 0.4065 | 0.3526 | 0.7951  | 0.9674  |
| Pd-103+E  | 1.3680  | 1.2411 | 1.4701  | 1.4837  | 1.0560 | 1.0390 | 1.4282  | 1.4986  |
| Pt-202+E  | 0.3125  | 0.3076 | 0.3268  | 0.3083  | 0.3018 | 0.3219 | 0.3504  | 0.3319  |
| Pu-239+E  | 0.1473  | 0.1059 | 0.1841  | 0.2125  | 0.0923 | 0.0811 | 0.1728  | 0.2071  |
| Pu-244+E  | 2.3212  | 1.9443 | 2.6667  | 2.8498  | 1.7517 | 1.7050 | 2.6174  | 2.8660  |
| Pu-246+E  | 4.7721  | 4.3640 | 5.2171  | 5.2621  | 4.1023 | 4.2099 | 5.3150  | 5.4868  |
| Ra-219+E  | 1.1381  | 1.0656 | 1.2357  | 1.2287  | 1.0252 | 1.0635 | 1.2718  | 1.3117  |
| Ra-221+E  | 1.0049  | 0.8267 | 1.1794  | 1.2740  | 0.7634 | 0.7391 | 1.1558  | 1.2983  |
| Ra-222+E  | 0.0452  | 0.0441 | 0.0478  | 0.0460  | 0.0429 | 0.0454 | 0.0503  | 0.0492  |
| Ra-223+E  | 2.6879  | 2.4291 | 2.9939  | 3.0497  | 2.3250 | 2.3687 | 3.0353  | 3.2352  |
| Ra-224+E  | 1.6412  | 1.6310 | 1.7094  | 1.5899  | 1.5913 | 1.6853 | 1.8211  | 1.7045  |
| Ra-226+E  | 4.7864  | 4.6208 | 5.0770  | 4.8383  | 4.5201 | 4.7778 | 5.3722  | 5.2130  |
| Ra-228+E  | 3.9610  | 3.7169 | 4.2877  | 4.1766  | 3.5597 | 3.6991 | 4.4326  | 4.4069  |
| Rb-81+E   | 2.7523  | 2.4195 | 3.1043  | 3.2038  | 2.2429 | 2.2431 | 3.1244  | 3.3094  |
| Rb-83+E   | 2.6891  | 2.2308 | 3.1177  | 3.3239  | 2.0466 | 1.9940 | 3.0933  | 3.3745  |
| Re-186m+E | 2.1553  | 1.5145 | 2.7810  | 3.2522  | 1.4485 | 1.3045 | 2.6539  | 3.2057  |
| Rn-219+E  | 0.2975  | 0.2870 | 0.3190  | 0.3081  | 0.2784 | 0.2920 | 0.3329  | 0.3314  |
| Rn-220+E  | 1.5658  | 1.5588 | 1.6278  | 1.5105  | 1.5218 | 1.6130 | 1.7368  | 1.6190  |
| Rn-222+E  | 0.0010  | 0.0010 | 0.0011  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4447  | 1.4052 | 1.5246  | 1.4549  | 1.3591 | 1.4317 | 1.6095  | 1.5409  |
| Ru-106+E  | 0.4390  | 0.4344 | 0.4573  | 0.4288  | 0.4263 | 0.4549 | 0.4914  | 0.4616  |
| Si-32+E   | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.4964  | 2.3747 | 2.6396  | 2.5568  | 2.1888 | 2.2738 | 2.6803  | 2.6488  |
| Sn-121m+E | 0.3257  | 0.2871 | 0.3621  | 0.3732  | 0.2626 | 0.2654 | 0.3561  | 0.3768  |
| Sn-126+E  | 5.6547  | 5.5076 | 5.9472  | 5.6711  | 5.3567 | 5.6816 | 6.2893  | 6.1146  |
| Sr-82+E   | 1.3881  | 1.1014 | 1.6220  | 1.7662  | 0.9419 | 0.8799 | 1.5662  | 1.7678  |
| Sr-90+E   | 0.0001  | 0.0001 | 0.0002  | 0.0002  | 0.0001 | 0.0001 | 0.0001  | 0.0002  |
| Te-118+E  | 1.5625  | 1.4572 | 1.6617  | 1.6343  | 1.3216 | 1.3654 | 1.6560  | 1.6672  |
| Te-129m+E | 0.8386  | 0.7643 | 0.9147  | 0.9209  | 0.7092 | 0.7290 | 0.9161  | 0.9411  |
| Th-229+E  | 5.5388  | 4.6324 | 6.4082  | 6.8578  | 4.2689 | 4.1778 | 6.3025  | 7.0178  |
| Th-232+E  | 10.1511 | 9.6002 | 10.9449 | 10.5979 | 9.2776 | 9.6821 | 11.4249 | 11.2638 |
| Th-234+E  | 0.4608  | 0.3894 | 0.5292  | 0.5650  | 0.3546 | 0.3469 | 0.5205  | 0.5769  |
| Ti-44+E   | 4.2172  | 4.1196 | 4.4407  | 4.2704  | 4.0166 | 4.2409 | 4.6602  | 4.7280  |
| U-228+E   | 0.5577  | 0.4768 | 0.6385  | 0.6756  | 0.4356 | 0.4287 | 0.6302  | 0.6878  |
| U-230+E   | 0.6237  | 0.4996 | 0.7354  | 0.8071  | 0.4436 | 0.4193 | 0.7095  | 0.8055  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.9238        | 3.4510        | 4.4134        | 4.5645        | 3.1826        | 3.1631        | 4.3737        | 4.6773        |
| U-238+E        | 1.7938        | 1.7119        | 1.8856        | 1.8447        | 1.6559        | 1.7292        | 1.9984        | 1.9790        |
| W-178+E        | 2.7259        | 2.2709        | 3.2090        | 3.4992        | 2.1838        | 2.1692        | 3.1935        | 3.5360        |
| Xe-122+E       | 2.0692        | 1.9565        | 2.1986        | 2.1513        | 1.8276        | 1.9122        | 2.2351        | 2.2270        |
| Zr-93+E        | 0.2184        | 0.1818        | 0.2477        | 0.2685        | 0.1513        | 0.1433        | 0.2352        | 0.2611        |

Table 42: Glass Surface Contamination for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2438        | 0.3128        | 0.5620        | 0.6765        |
| Ac-225+E       | 1.0280        | 1.2451        | 1.7409        | 1.9528        |
| Ac-227+E       | 3.3863        | 4.1135        | 5.9204        | 6.7603        |
| Ag-108m+E      | 3.9132        | 4.6371        | 5.2930        | 5.5013        |
| Ag-110m+E      | 3.8468        | 4.5682        | 4.8568        | 4.9877        |
| Am-242m+E      | 0.8098        | 1.0583        | 1.9167        | 2.2580        |
| Am-243+E       | 3.3291        | 3.9715        | 5.3694        | 6.0779        |
| Ar-42+E        | 0.2255        | 0.2668        | 0.2854        | 0.2879        |
| At-211+E       | 0.6853        | 0.8241        | 1.2013        | 1.3961        |
| Ba-128+E       | 1.7479        | 2.0472        | 2.5194        | 2.7355        |
| Bi-210m+E      | 1.2825        | 1.4882        | 1.7365        | 1.8722        |
| Bi-212+E       | 0.2101        | 0.2677        | 0.4202        | 0.4929        |
| Bi-213+E       | 0.3962        | 0.4621        | 0.5350        | 0.5621        |
| Bi-214+E       | 1.6201        | 1.9111        | 2.0646        | 2.1044        |
| Bi-215+E       | 0.9551        | 1.1179        | 1.3398        | 1.4512        |
| Bi-216+E       | 1.7777        | 2.0725        | 2.2995        | 2.3668        |
| Cd-118+E       | 0.0821        | 0.0968        | 0.1045        | 0.1049        |
| Ce-134+E       | 1.3361        | 1.5824        | 1.9928        | 2.1955        |
| Ce-144+E       | 0.3194        | 0.3786        | 0.4252        | 0.4657        |
| Cl-34m+E       | 1.4293        | 1.7049        | 1.8153        | 1.8635        |
| Cm-245+E       | 1.7373        | 2.1041        | 2.9805        | 3.4195        |
| Cm-247+E       | 1.4871        | 1.7381        | 2.0918        | 2.2391        |
| Cm-250+E       | 18.3592       | 21.5933       | 23.5978       | 24.3073       |
| Cs-137+E       | 2.5188        | 2.9461        | 3.1431        | 3.2636        |
| Es-254+E       | 2.2841        | 2.8823        | 4.4950        | 5.1472        |
| Fe-60+E        | 2.6292        | 3.1506        | 3.8084        | 4.0452        |
| Fr-220+E       | 0.2376        | 0.2981        | 0.4895        | 0.5803        |
| Fr-221+E       | 0.2251        | 0.2639        | 0.3280        | 0.3535        |
| Ge-68+E        | 0.3321        | 0.4897        | 1.3717        | 1.8281        |
| Hf-172+E       | 2.5481        | 3.1042        | 4.6240        | 5.4447        |
| Hf-182+E       | 4.4718        | 5.2570        | 6.2305        | 6.7577        |
| Hg-193+E       | 2.8839        | 3.4624        | 4.6029        | 5.1854        |
| Hg-194+E       | 2.9745        | 3.5685        | 4.7752        | 5.3709        |
| In-114m+E      | 0.6846        | 0.8209        | 1.0436        | 1.1262        |
| Ir-192m+E      | 3.0829        | 3.6433        | 4.5690        | 4.9812        |
| Kr-76+E        | 2.2443        | 2.7515        | 3.9360        | 4.4484        |
| Mg-28+E        | 3.6080        | 4.2425        | 4.6712        | 4.7892        |
| Nd-140+E       | 1.3722        | 1.6550        | 2.0390        | 2.2429        |
| Ni-66+E        | 0.1196        | 0.1408        | 0.1513        | 0.1554        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3432        | 0.4802        | 1.0401        | 1.2645        |
| Np-237+E       | 2.7084        | 3.3505        | 5.1532        | 5.9226        |
| Os-194+E       | 0.4606        | 0.5835        | 0.9956        | 1.1991        |
| Pa-231+E       | 4.1599        | 5.1452        | 7.9255        | 9.1730        |
| Pb-202+E       | 2.4496        | 2.9441        | 4.1255        | 4.7107        |
| Pb-210+E       | 0.2400        | 0.3413        | 0.7860        | 0.9864        |
| Pd-103+E       | 0.7341        | 0.9274        | 1.4061        | 1.5300        |
| Pt-202+E       | 0.2854        | 0.3344        | 0.3672        | 0.3760        |
| Pu-239+E       | 0.0535        | 0.0754        | 0.1703        | 0.2105        |
| Pu-244+E       | 1.2951        | 1.6445        | 2.6201        | 2.9950        |
| Pu-246+E       | 3.4843        | 4.2078        | 5.4077        | 5.9424        |
| Ra-219+E       | 0.9175        | 1.0738        | 1.3102        | 1.4207        |
| Ra-221+E       | 0.5846        | 0.7382        | 1.1611        | 1.3597        |
| Ra-222+E       | 0.0398        | 0.0461        | 0.0525        | 0.0548        |
| Ra-223+E       | 2.0201        | 2.3931        | 3.0973        | 3.4638        |
| Ra-224+E       | 1.5039        | 1.7487        | 1.8956        | 1.8959        |
| Ra-226+E       | 4.2131        | 4.9603        | 5.6081        | 5.7811        |
| Ra-228+E       | 3.1745        | 3.8027        | 4.5544        | 4.8931        |
| Rb-81+E        | 1.8314        | 2.2662        | 3.2137        | 3.5317        |
| Rb-83+E        | 1.5664        | 1.9880        | 3.1214        | 3.5540        |
| Re-186m+E      | 1.0116        | 1.3293        | 2.6374        | 3.3308        |
| Rn-219+E       | 0.2562        | 0.2971        | 0.3443        | 0.3677        |
| Rn-220+E       | 1.4407        | 1.6754        | 1.8084        | 1.8014        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.2485        | 1.4650        | 1.6682        | 1.7211        |
| Ru-106+E       | 0.4034        | 0.4712        | 0.5113        | 0.5215        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.8203        | 2.1607        | 2.7007        | 2.9047        |
| Sn-121m+E      | 0.2013        | 0.2450        | 0.3533        | 0.4055        |
| Sn-126+E       | 4.9558        | 5.8112        | 6.4767        | 6.7981        |
| Sr-82+E        | 0.6054        | 0.8358        | 1.5551        | 1.8071        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.0423        | 1.2464        | 1.6427        | 1.8209        |
| Te-129m+E      | 0.5752        | 0.6875        | 0.9177        | 1.0253        |
| Th-229+E       | 3.2928        | 4.1055        | 6.3382        | 7.3348        |
| Th-232+E       | 8.4131        | 9.9852        | 11.8167       | 12.4721       |
| Th-234+E       | 0.2716        | 0.3370        | 0.5186        | 0.5998        |
| Ti-44+E        | 3.7742        | 4.3589        | 4.8135        | 5.1044        |
| U-228+E        | 0.3379        | 0.4228        | 0.6374        | 0.7230        |
| U-230+E        | 0.3070        | 0.3981        | 0.7054        | 0.8324        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5627        | 3.1231        | 4.4036        | 4.9148        |
| U-238+E        | 1.5065        | 1.7701        | 2.1031        | 2.1714        |
| W-178+E        | 1.8089        | 2.1905        | 3.1837        | 3.7197        |
| Xe-122+E       | 1.5405        | 1.8162        | 2.2519        | 2.4487        |
| Zr-93+E        | 0.0936        | 0.1248        | 0.2310        | 0.2642        |

Table 43: Glass 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3700  | 0.2991  | 0.3564  | 0.3909  | 0.3114  | 0.2653  | 0.3529  | 0.3985  |
| Ac-225+E  | 1.2538  | 1.0462  | 1.2228  | 1.3073  | 1.2244  | 1.1413  | 1.3382  | 1.3996  |
| Ac-227+E  | 4.2335  | 3.5582  | 4.1292  | 4.4155  | 4.0312  | 3.7246  | 4.4107  | 4.6634  |
| Ag-108m+E | 4.0000  | 3.3477  | 3.9236  | 4.1373  | 4.3740  | 4.2807  | 4.6884  | 4.6537  |
| Ag-110m+E | 3.9187  | 3.1333  | 3.8217  | 4.0715  | 4.4741  | 4.3945  | 4.8370  | 4.7288  |
| Am-242m+E | 1.1464  | 0.9806  | 1.1122  | 1.1964  | 0.9374  | 0.7986  | 1.0410  | 1.1846  |
| Am-243+E  | 3.8875  | 3.3679  | 3.8140  | 4.0274  | 3.7732  | 3.5562  | 4.0618  | 4.2372  |
| Ar-42+E   | 0.2122  | 0.1648  | 0.2055  | 0.2205  | 0.2467  | 0.2409  | 0.2677  | 0.2596  |
| At-211+E  | 0.8569  | 0.7273  | 0.8363  | 0.8935  | 0.7975  | 0.7338  | 0.8709  | 0.9283  |
| Ba-128+E  | 1.5897  | 1.4182  | 1.5658  | 1.6316  | 1.5918  | 1.5326  | 1.6780  | 1.7175  |
| Bi-210m+E | 1.4164  | 1.1941  | 1.3915  | 1.4693  | 1.5155  | 1.4767  | 1.6298  | 1.6314  |
| Bi-212+E  | 0.2872  | 0.2237  | 0.2757  | 0.3038  | 0.2624  | 0.2310  | 0.2966  | 0.3231  |
| Bi-213+E  | 0.4193  | 0.3484  | 0.4111  | 0.4352  | 0.4547  | 0.4436  | 0.4896  | 0.4879  |
| Bi-214+E  | 1.6103  | 1.2794  | 1.5671  | 1.6730  | 1.8403  | 1.8015  | 1.9913  | 1.9479  |
| Bi-215+E  | 1.0600  | 0.8900  | 1.0394  | 1.1003  | 1.1197  | 1.0838  | 1.2071  | 1.2149  |
| Bi-216+E  | 1.8504  | 1.5204  | 1.8129  | 1.9205  | 2.0609  | 2.0243  | 2.2195  | 2.1903  |
| Cd-118+E  | 0.0799  | 0.0629  | 0.0777  | 0.0831  | 0.0922  | 0.0903  | 0.0999  | 0.0971  |
| Ce-134+E  | 1.1793  | 1.0760  | 1.1619  | 1.2070  | 1.1195  | 1.0623  | 1.1721  | 1.2265  |
| Ce-144+E  | 0.3196  | 0.2808  | 0.3151  | 0.3288  | 0.3331  | 0.3252  | 0.3523  | 0.3545  |
| Cl-34m+E  | 1.4000  | 1.1391  | 1.3651  | 1.4493  | 1.5853  | 1.5531  | 1.7029  | 1.6684  |
| Cm-245+E  | 2.1153  | 1.8307  | 2.0719  | 2.1935  | 2.0115  | 1.8734  | 2.1756  | 2.2935  |
| Cm-247+E  | 1.5976  | 1.3541  | 1.5689  | 1.6549  | 1.6861  | 1.6363  | 1.8099  | 1.8222  |
| Cm-250+E  | 18.4525 | 15.0799 | 18.0344 | 19.1235 | 20.7255 | 20.3285 | 22.2974 | 21.8960 |
| Cs-137+E  | 2.4780  | 2.0111  | 2.4252  | 2.5658  | 2.7925  | 2.7516  | 3.0021  | 2.9431  |
| Es-254+E  | 2.8718  | 2.3509  | 2.7778  | 3.0047  | 2.6233  | 2.3397  | 2.9034  | 3.1471  |
| Fe-60+E   | 2.7928  | 2.1499  | 2.6947  | 2.9260  | 3.0190  | 2.8644  | 3.3199  | 3.3401  |
| Fr-220+E  | 0.3288  | 0.2742  | 0.3189  | 0.3448  | 0.2877  | 0.2539  | 0.3200  | 0.3525  |
| Fr-221+E  | 0.2588  | 0.2208  | 0.2544  | 0.2683  | 0.2693  | 0.2604  | 0.2895  | 0.2931  |
| Ge-68+E   | 0.8477  | 0.5868  | 0.7889  | 0.9279  | 0.5528  | 0.3582  | 0.6967  | 0.9102  |
| Hf-172+E  | 3.1362  | 2.5920  | 3.0386  | 3.2949  | 2.7677  | 2.4613  | 3.0573  | 3.3661  |
| Hf-182+E  | 4.8278  | 4.0158  | 4.7219  | 5.0187  | 5.0671  | 4.8794  | 5.4680  | 5.5276  |
| Hg-193+E  | 3.3878  | 2.7876  | 3.2966  | 3.5411  | 3.3322  | 3.1115  | 3.6425  | 3.8039  |
| Hg-194+E  | 3.5195  | 2.8683  | 3.4191  | 3.6841  | 3.4696  | 3.2306  | 3.8062  | 3.9773  |
| In-114m+E | 0.6537  | 0.5840  | 0.6446  | 0.6716  | 0.6543  | 0.6291  | 0.6906  | 0.7086  |
| Ir-192m+E | 3.5853  | 2.9356  | 3.4977  | 3.7437  | 3.7191  | 3.5471  | 4.0541  | 4.1381  |
| Kr-76+E   | 2.7889  | 2.3170  | 2.7159  | 2.9137  | 2.6846  | 2.4807  | 2.9533  | 3.1050  |
| Mg-28+E   | 3.3057  | 2.7027  | 3.2241  | 3.4161  | 3.7204  | 3.6414  | 3.9893  | 3.9066  |
| Nd-140+E  | 1.2217  | 1.1182  | 1.2047  | 1.2504  | 1.1509  | 1.0914  | 1.2030  | 1.2620  |
| Ni-66+E   | 0.1171  | 0.0924  | 0.1139  | 0.1217  | 0.1347  | 0.1320  | 0.1457  | 0.1419  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50   | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|---------|---------|
| Np-235+E  | 0.5955 | 0.4911 | 0.5718 | 0.6280 | 0.4394 | 0.3429 | 0.5070  | 0.6085  |
| Np-237+E  | 3.4490 | 2.9463 | 3.3645 | 3.5886 | 3.1570 | 2.8689 | 3.4556  | 3.7139  |
| Os-194+E  | 0.6804 | 0.5285 | 0.6518 | 0.7234 | 0.5866 | 0.5010 | 0.6694  | 0.7525  |
| Pa-231+E  | 5.4294 | 4.5456 | 5.2810 | 5.6744 | 4.9755 | 4.4998 | 5.4854  | 5.9107  |
| Pb-202+E  | 2.9956 | 2.4485 | 2.9096 | 3.1410 | 2.8716 | 2.6466 | 3.1600  | 3.3473  |
| Pb-210+E  | 0.4610 | 0.3596 | 0.4382 | 0.4929 | 0.3271 | 0.2422 | 0.3900  | 0.4788  |
| Pd-103+E  | 0.7526 | 0.7098 | 0.7440 | 0.7659 | 0.6632 | 0.6116 | 0.6904  | 0.7467  |
| Pt-202+E  | 0.2883 | 0.2334 | 0.2816 | 0.2994 | 0.3248 | 0.3187 | 0.3504  | 0.3439  |
| Pu-239+E  | 0.0987 | 0.0790 | 0.0942 | 0.1048 | 0.0709 | 0.0536 | 0.0831  | 0.1016  |
| Pu-244+E  | 1.6926 | 1.4127 | 1.6431 | 1.7666 | 1.5321 | 1.3694 | 1.6932  | 1.8370  |
| Pu-246+E  | 3.8699 | 3.2754 | 3.7859 | 4.0113 | 3.9162 | 3.7204 | 4.2251  | 4.3331  |
| Ra-219+E  | 1.0372 | 0.8777 | 1.0179 | 1.0761 | 1.0841 | 1.0474 | 1.1683  | 1.1807  |
| Ra-221+E  | 0.7959 | 0.6663 | 0.7733 | 0.8330 | 0.7149 | 0.6399 | 0.7912  | 0.8609  |
| Ra-222+E  | 0.0433 | 0.0363 | 0.0425 | 0.0448 | 0.0472 | 0.0463 | 0.0509  | 0.0505  |
| Ra-223+E  | 2.3559 | 1.9899 | 2.3066 | 2.4500 | 2.3687 | 2.2510 | 2.5645  | 2.6411  |
| Ra-224+E  | 1.4116 | 1.1535 | 1.3787 | 1.4601 | 1.5820 | 1.5669 | 1.6896  | 1.6616  |
| Ra-226+E  | 4.3291 | 3.5066 | 4.2234 | 4.4986 | 4.7856 | 4.6553 | 5.1700  | 5.1157  |
| Ra-228+E  | 3.3449 | 2.7186 | 3.2593 | 3.4804 | 3.5702 | 3.4211 | 3.8644  | 3.8930  |
| Rb-81+E   | 2.2735 | 1.9189 | 2.2216 | 2.3659 | 2.2306 | 2.0863 | 2.4387  | 2.5336  |
| Rb-83+E   | 2.0740 | 1.6962 | 2.0099 | 2.1731 | 1.9275 | 1.7355 | 2.1508  | 2.2983  |
| Re-186m+E | 1.7235 | 1.3103 | 1.6374 | 1.8487 | 1.3231 | 1.0414 | 1.5505  | 1.8518  |
| Rn-219+E  | 0.2777 | 0.2338 | 0.2729 | 0.2879 | 0.2998 | 0.2930 | 0.3220  | 0.3212  |
| Rn-220+E  | 1.3410 | 1.0934 | 1.3092 | 1.3869 | 1.5068 | 1.4937 | 1.6089  | 1.5807  |
| Rn-222+E  | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.2958 | 1.0700 | 1.2693 | 1.3443 | 1.4246 | 1.3940 | 1.5331  | 1.5191  |
| Ru-106+E  | 0.4149 | 0.3378 | 0.4060 | 0.4306 | 0.4686 | 0.4613 | 0.5049  | 0.4956  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.6595 | 1.4799 | 1.6371 | 1.7029 | 1.6850 | 1.6285 | 1.7764  | 1.8089  |
| Sn-121m+E | 0.1879 | 0.1683 | 0.1838 | 0.1939 | 0.1635 | 0.1474 | 0.1742  | 0.1917  |
| Sn-126+E  | 5.0849 | 4.2286 | 4.9851 | 5.2685 | 5.5868 | 5.4754 | 5.9984  | 5.9466  |
| Sr-82+E   | 0.9036 | 0.7748 | 0.8776 | 0.9407 | 0.7538 | 0.6452 | 0.8493  | 0.9411  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 0.8444 | 0.7914 | 0.8348 | 0.8599 | 0.7888 | 0.7465 | 0.8174  | 0.8600  |
| Te-129m+E | 0.5362 | 0.4739 | 0.5257 | 0.5527 | 0.5085 | 0.4760 | 0.5409  | 0.5704  |
| Th-229+E  | 4.2554 | 3.5960 | 4.1421 | 4.4405 | 3.8522 | 3.4729 | 4.2375  | 4.5854  |
| Th-232+E  | 8.7941 | 7.1642 | 8.5727 | 9.1466 | 9.4587 | 9.1288 | 10.2129 | 10.2441 |
| Th-234+E  | 0.3462 | 0.2956 | 0.3375 | 0.3603 | 0.3126 | 0.2824 | 0.3423  | 0.3700  |
| Ti-44+E   | 3.7777 | 3.2216 | 3.7158 | 3.9006 | 4.0735 | 4.0013 | 4.3338  | 4.3002  |
| U-228+E   | 0.4386 | 0.3732 | 0.4280 | 0.4567 | 0.4079 | 0.3730 | 0.4462  | 0.4770  |
| U-230+E   | 0.4475 | 0.3769 | 0.4339 | 0.4680 | 0.3788 | 0.3274 | 0.4229  | 0.4730  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.0168       | 2.5849       | 2.9533       | 3.1438       | 2.8669       | 2.6698       | 3.1212       | 3.2437       |
| U-238+E        | 1.3596       | 1.1399       | 1.3313       | 1.4074       | 1.4471       | 1.4075       | 1.5586       | 1.5426       |
| W-178+E        | 2.2097       | 1.8231       | 2.1422       | 2.3207       | 1.9779       | 1.7725       | 2.1817       | 2.3839       |
| Xe-122+E       | 1.3680       | 1.2301       | 1.3486       | 1.4018       | 1.3639       | 1.3125       | 1.4335       | 1.4695       |
| Zr-93+E        | 0.1320       | 0.1190       | 0.1292       | 0.1358       | 0.1068       | 0.0917       | 0.1159       | 0.1322       |

Table 44: Glass 1cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3079  | 0.2755  | 0.3599  | 0.3956  | 0.2496  | 0.2459  | 0.3466  | 0.3852  |
| Ac-225+E  | 1.2669  | 1.2377  | 1.3909  | 1.4119  | 1.1510  | 1.1738  | 1.3718  | 1.4032  |
| Ac-227+E  | 4.1249  | 3.9799  | 4.5535  | 4.6879  | 3.6989  | 3.7415  | 4.4691  | 4.6382  |
| Ag-108m+E | 4.6916  | 4.8231  | 4.9773  | 4.7818  | 4.5174  | 4.7261  | 4.9938  | 4.8033  |
| Ag-110m+E | 4.9145  | 5.1203  | 5.2165  | 4.9111  | 4.8164  | 5.1061  | 5.2967  | 4.9696  |
| Am-242m+E | 0.9015  | 0.7930  | 1.0463  | 1.1680  | 0.6951  | 0.6711  | 0.9890  | 1.1264  |
| Am-243+E  | 3.8512  | 3.7580  | 4.1691  | 4.2558  | 3.5200  | 3.5581  | 4.0972  | 4.2112  |
| Ar-42+E   | 0.2749  | 0.2869  | 0.2918  | 0.2706  | 0.2705  | 0.2888  | 0.2993  | 0.2772  |
| At-211+E  | 0.8064  | 0.7690  | 0.8897  | 0.9309  | 0.7204  | 0.7242  | 0.8728  | 0.9161  |
| Ba-128+E  | 1.6314  | 1.6137  | 1.7337  | 1.7387  | 1.5305  | 1.5430  | 1.7052  | 1.7109  |
| Bi-210m+E | 1.6076  | 1.6351  | 1.7141  | 1.6633  | 1.5482  | 1.5970  | 1.7142  | 1.6752  |
| Bi-212+E  | 0.2709  | 0.2547  | 0.3099  | 0.3259  | 0.2341  | 0.2393  | 0.3053  | 0.3208  |
| Bi-213+E  | 0.4864  | 0.4972  | 0.5183  | 0.4996  | 0.4694  | 0.4884  | 0.5203  | 0.5038  |
| Bi-214+E  | 2.0274  | 2.1112  | 2.1528  | 2.0213  | 1.9865  | 2.1090  | 2.1936  | 2.0550  |
| Bi-215+E  | 1.1852  | 1.1992  | 1.2694  | 1.2396  | 1.1327  | 1.1695  | 1.2687  | 1.2453  |
| Bi-216+E  | 2.2293  | 2.3048  | 2.3682  | 2.2534  | 2.1717  | 2.2771  | 2.3866  | 2.2825  |
| Cd-118+E  | 0.1020  | 0.1063  | 0.1083  | 0.1011  | 0.1002  | 0.1067  | 0.1107  | 0.1029  |
| Ce-134+E  | 1.1175  | 1.0769  | 1.1920  | 1.2307  | 1.0279  | 1.0168  | 1.1586  | 1.1940  |
| Ce-144+E  | 0.3469  | 0.3497  | 0.3650  | 0.3593  | 0.3342  | 0.3416  | 0.3633  | 0.3591  |
| Cl-34m+E  | 1.7339  | 1.7967  | 1.8286  | 1.7237  | 1.7034  | 1.7984  | 1.8686  | 1.7622  |
| Cm-245+E  | 2.0405  | 1.9713  | 2.2281  | 2.2953  | 1.8294  | 1.8432  | 2.1762  | 2.2672  |
| Cm-247+E  | 1.7801  | 1.8019  | 1.8990  | 1.8552  | 1.6978  | 1.7521  | 1.8941  | 1.8584  |
| Cm-250+E  | 22.5517 | 23.3388 | 23.8803 | 22.6044 | 22.0421 | 23.1888 | 24.2142 | 22.9325 |
| Cs-137+E  | 3.0543  | 3.1766  | 3.2263  | 3.0420  | 2.9847  | 3.1268  | 3.2915  | 3.0752  |
| Es-254+E  | 2.6748  | 2.5207  | 3.0145  | 3.1677  | 2.2851  | 2.3121  | 2.9446  | 3.1074  |
| Fe-60+E   | 3.2989  | 3.3504  | 3.5788  | 3.4497  | 3.1455  | 3.3266  | 3.6343  | 3.4815  |
| Fr-220+E  | 0.2860  | 0.2630  | 0.3255  | 0.3510  | 0.2414  | 0.2395  | 0.3154  | 0.3431  |
| Fr-221+E  | 0.2824  | 0.2843  | 0.3016  | 0.2968  | 0.2685  | 0.2753  | 0.3000  | 0.2973  |
| Ge-68+E   | 0.5112  | 0.3526  | 0.7013  | 0.8864  | 0.3067  | 0.2745  | 0.6595  | 0.8389  |
| Hf-172+E  | 2.7567  | 2.5374  | 3.0983  | 3.3475  | 2.4014  | 2.3803  | 3.0287  | 3.2616  |
| Hf-182+E  | 5.3658  | 5.4076  | 5.7393  | 5.6299  | 5.1335  | 5.3041  | 5.7575  | 5.6439  |
| Hg-193+E  | 3.4652  | 3.3900  | 3.7889  | 3.8474  | 3.1978  | 3.2707  | 3.7688  | 3.8188  |
| Hg-194+E  | 3.6203  | 3.5428  | 3.9777  | 4.0273  | 3.3369  | 3.4167  | 3.9573  | 4.0065  |
| In-114m+E | 0.6704  | 0.6640  | 0.7104  | 0.7167  | 0.6213  | 0.6275  | 0.6997  | 0.7059  |
| Ir-192m+E | 3.9364  | 3.9453  | 4.2799  | 4.2157  | 3.7158  | 3.8316  | 4.2662  | 4.2324  |
| Kr-76+E   | 2.7692  | 2.6841  | 3.0676  | 3.1314  | 2.4900  | 2.5329  | 3.0187  | 3.1087  |
| Mg-28+E   | 4.0600  | 4.1988  | 4.2896  | 4.0461  | 3.9657  | 4.1795  | 4.3612  | 4.0978  |
| Nd-140+E  | 1.1432  | 1.0975  | 1.2141  | 1.2621  | 1.0532  | 1.0395  | 1.1826  | 1.2245  |
| Ni-66+E   | 0.1488  | 0.1551  | 0.1577  | 0.1478  | 0.1461  | 0.1549  | 0.1610  | 0.1500  |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200 | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|--------|---------|---------|---------|
| Np-235+E  | 0.4092  | 0.3302  | 0.5056  | 0.5949  | 0.2756 | 0.2552  | 0.4693  | 0.5678  |
| Np-237+E  | 3.1744  | 3.0026  | 3.5422  | 3.7138  | 2.7460 | 2.7450  | 3.4351  | 3.6492  |
| Os-194+E  | 0.5911  | 0.5350  | 0.6911  | 0.7512  | 0.4945 | 0.4935  | 0.6736  | 0.7345  |
| Pa-231+E  | 5.0306  | 4.7545  | 5.6370  | 5.9174  | 4.3744 | 4.3875  | 5.4926  | 5.8222  |
| Pb-202+E  | 2.9630  | 2.8608  | 3.2768  | 3.3736  | 2.6893 | 2.7358  | 3.2423  | 3.3393  |
| Pb-210+E  | 0.3044  | 0.2347  | 0.3887  | 0.4677  | 0.2005 | 0.1850  | 0.3639  | 0.4457  |
| Pd-103+E  | 0.6366  | 0.5890  | 0.6850  | 0.7402  | 0.5207 | 0.5110  | 0.6489  | 0.7104  |
| Pt-202+E  | 0.3542  | 0.3667  | 0.3759  | 0.3555  | 0.3461 | 0.3645  | 0.3810  | 0.3603  |
| Pu-239+E  | 0.0658  | 0.0515  | 0.0829  | 0.0992  | 0.0432 | 0.0397  | 0.0770  | 0.0944  |
| Pu-244+E  | 1.5482  | 1.4558  | 1.7476  | 1.8409  | 1.3112 | 1.3202  | 1.6950  | 1.8070  |
| Pu-246+E  | 4.0903  | 4.0656  | 4.4103  | 4.3969  | 3.7952 | 3.8997  | 4.3749  | 4.3770  |
| Ra-219+E  | 1.1409  | 1.1496  | 1.2263  | 1.2022  | 1.0853 | 1.1153  | 1.2204  | 1.2067  |
| Ra-221+E  | 0.7173  | 0.6703  | 0.8086  | 0.8588  | 0.6161 | 0.6152  | 0.7854  | 0.8440  |
| Ra-222+E  | 0.0506  | 0.0519  | 0.0540  | 0.0517  | 0.0491 | 0.0508  | 0.0540  | 0.0522  |
| Ra-223+E  | 2.4633  | 2.4401  | 2.6655  | 2.6725  | 2.2981 | 2.3487  | 2.6428  | 2.6637  |
| Ra-224+E  | 1.7264  | 1.7885  | 1.8133  | 1.7211  | 1.6866 | 1.7621  | 1.8425  | 1.7330  |
| Ra-226+E  | 5.2040  | 5.3492  | 5.5194  | 5.2623  | 5.0451 | 5.2882  | 5.6624  | 5.3334  |
| Ra-228+E  | 3.8402  | 3.9014  | 4.1183  | 3.9841  | 3.6434 | 3.7866  | 4.1849  | 4.0166  |
| Rb-81+E   | 2.3093  | 2.2640  | 2.5328  | 2.5558  | 2.0914 | 2.1354  | 2.4941  | 2.5449  |
| Rb-83+E   | 1.9798  | 1.8873  | 2.2357  | 2.3163  | 1.7118 | 1.7463  | 2.1896  | 2.2945  |
| Re-186m+E | 1.2778  | 1.0570  | 1.5660  | 1.8213  | 0.9717 | 0.9326  | 1.5038  | 1.7514  |
| Rn-219+E  | 0.3190  | 0.3256  | 0.3392  | 0.3278  | 0.3079 | 0.3184  | 0.3397  | 0.3302  |
| Rn-220+E  | 1.6470  | 1.7078  | 1.7289  | 1.6390  | 1.6104 | 1.6836  | 1.7582  | 1.6504  |
| Rn-222+E  | 0.0011  | 0.0012  | 0.0012  | 0.0012  | 0.0011 | 0.0012  | 0.0012  | 0.0012  |
| Ru-103+E  | 1.5338  | 1.5759  | 1.6316  | 1.5614  | 1.4830 | 1.5517  | 1.6419  | 1.5831  |
| Ru-106+E  | 0.5103  | 0.5303  | 0.5413  | 0.5117  | 0.4993 | 0.5259  | 0.5472  | 0.5197  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 1.7364  | 1.7301  | 1.8358  | 1.8366  | 1.6176 | 1.6399  | 1.8127  | 1.8101  |
| Sn-121m+E | 0.1585  | 0.1449  | 0.1743  | 0.1910  | 0.1348 | 0.1297  | 0.1675  | 0.1825  |
| Sn-126+E  | 6.0055  | 6.1829  | 6.3687  | 6.1111  | 5.8309 | 6.0955  | 6.4057  | 6.1420  |
| Sr-82+E   | 0.7376  | 0.6621  | 0.8611  | 0.9366  | 0.5653 | 0.5582  | 0.8182  | 0.9108  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0000 | 0.0000  | 0.0001  | 0.0001  |
| Te-118+E  | 0.7777  | 0.7438  | 0.8217  | 0.8653  | 0.6941 | 0.6779  | 0.7963  | 0.8313  |
| Te-129m+E | 0.5128  | 0.4935  | 0.5539  | 0.5752  | 0.4623 | 0.4608  | 0.5412  | 0.5598  |
| Th-229+E  | 3.8680  | 3.6332  | 4.3324  | 4.5781  | 3.3394 | 3.3363  | 4.2101  | 4.4928  |
| Th-232+E  | 10.1968 | 10.3865 | 10.8774 | 10.5034 | 9.7485 | 10.1583 | 11.0843 | 10.6136 |
| Th-234+E  | 0.3125  | 0.2934  | 0.3488  | 0.3690  | 0.2692 | 0.2685  | 0.3387  | 0.3614  |
| Ti-44+E   | 4.3236  | 4.4139  | 4.5414  | 4.4005  | 4.2214 | 4.3727  | 4.5820  | 4.4155  |
| U-228+E   | 0.4128  | 0.3940  | 0.4586  | 0.4772  | 0.3613 | 0.3628  | 0.4461  | 0.4708  |
| U-230+E   | 0.3718  | 0.3354  | 0.4297  | 0.4689  | 0.2981 | 0.2920  | 0.4103  | 0.4563  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.9248        | 2.8455        | 3.2098        | 3.2950        | 2.6084        | 2.6321        | 3.1225        | 3.4187        |
| U-238+E        | 1.5395        | 1.5646        | 1.5939        | 1.5743        | 1.4699        | 1.5305        | 1.6564        | 1.6226        |
| W-178+E        | 1.9815        | 1.8397        | 2.2157        | 2.3736        | 1.7487        | 1.7415        | 2.1751        | 2.3179        |
| Xe-122+E       | 1.3937        | 1.3772        | 1.4773        | 1.4888        | 1.2998        | 1.3082        | 1.4517        | 1.4606        |
| Zr-93+E        | 0.1006        | 0.0886        | 0.1162        | 0.1297        | 0.0739        | 0.0694        | 0.1071        | 0.1245        |

Table 45: Glass 1cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2045        | 0.2306        | 0.3514        | 0.4096        |
| Ac-225+E       | 1.0405        | 1.1225        | 1.3684        | 1.4435        |
| Ac-227+E       | 3.3109        | 3.5719        | 4.4637        | 4.7801        |
| Ag-108m+E      | 4.2421        | 4.5247        | 4.9198        | 4.8647        |
| Ag-110m+E      | 4.6263        | 5.0076        | 5.2673        | 5.0502        |
| Am-242m+E      | 0.5136        | 0.5845        | 0.9888        | 1.1971        |
| Am-243+E       | 3.1921        | 3.3897        | 4.0808        | 4.2994        |
| Ar-42+E        | 0.2614        | 0.2858        | 0.3020        | 0.2831        |
| At-211+E       | 0.6488        | 0.6977        | 0.8746        | 0.9399        |
| Ba-128+E       | 1.3972        | 1.4437        | 1.6806        | 1.7662        |
| Bi-210m+E      | 1.4678        | 1.5498        | 1.7009        | 1.6876        |
| Bi-212+E       | 0.2050        | 0.2305        | 0.3093        | 0.3403        |
| Bi-213+E       | 0.4454        | 0.4721        | 0.5157        | 0.5081        |
| Bi-214+E       | 1.9107        | 2.0703        | 2.1882        | 2.0904        |
| Bi-215+E       | 1.0688        | 1.1364        | 1.2598        | 1.2560        |
| Bi-216+E       | 2.0733        | 2.2030        | 2.3588        | 2.3007        |
| Cd-118+E       | 0.0966        | 0.1051        | 0.1109        | 0.1047        |
| Ce-134+E       | 0.9223        | 0.9377        | 1.1438        | 1.2529        |
| Ce-144+E       | 0.3167        | 0.3282        | 0.3588        | 0.3636        |
| Cl-34m+E       | 1.6447        | 1.7713        | 1.8689        | 1.7887        |
| Cm-245+E       | 1.6247        | 1.7373        | 2.1627        | 2.3293        |
| Cm-247+E       | 1.5927        | 1.6835        | 1.8760        | 1.8760        |
| Cm-250+E       | 21.1307       | 22.6827       | 24.1124       | 23.2442       |
| Cs-137+E       | 2.8560        | 3.0575        | 3.1176        | 3.2950        |
| Es-254+E       | 1.9284        | 2.1557        | 2.9602        | 3.2764        |
| Fe-60+E        | 2.9799        | 3.2758        | 3.6703        | 3.5989        |
| Fr-220+E       | 0.2059        | 0.2270        | 0.3175        | 0.3593        |
| Fr-221+E       | 0.2519        | 0.2664        | 0.2976        | 0.3013        |
| Ge-68+E        | 0.1824        | 0.2545        | 0.7070        | 0.9584        |
| Hf-172+E       | 2.1341        | 2.2850        | 3.1017        | 3.4703        |
| Hf-182+E       | 4.8696        | 5.1822        | 5.7819        | 5.7651        |
| Hg-193+E       | 2.9608        | 3.1877        | 3.8063        | 3.9448        |
| Hg-194+E       | 3.0849        | 3.3296        | 3.9962        | 4.1362        |
| In-114m+E      | 0.5563        | 0.5821        | 0.6833        | 0.7198        |
| Ir-192m+E      | 3.4763        | 3.7149        | 4.2489        | 4.3023        |
| Kr-76+E        | 2.2345        | 2.4237        | 3.0103        | 3.2148        |
| Mg-28+E        | 3.7886        | 4.0794        | 4.3589        | 4.1864        |
| Nd-140+E       | 0.9517        | 0.9595        | 1.1663        | 1.2796        |
| Ni-66+E        | 0.1406        | 0.1529        | 0.1612        | 0.1533        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1692        | 0.2147        | 0.4756        | 0.6182        |
| Np-237+E       | 2.3517        | 2.5629        | 3.4193        | 3.7784        |
| Os-194+E       | 0.4236        | 0.4723        | 0.6870        | 0.7841        |
| Pa-231+E       | 3.8011        | 4.1481        | 5.4966        | 6.0524        |
| Pb-202+E       | 2.4576        | 2.6440        | 3.2709        | 3.4586        |
| Pb-210+E       | 0.1280        | 0.1657        | 0.3763        | 0.4954        |
| Pd-103+E       | 0.3840        | 0.4070        | 0.6264        | 0.7420        |
| Pt-202+E       | 0.3317        | 0.3556        | 0.3793        | 0.3649        |
| Pu-239+E       | 0.0260        | 0.0336        | 0.0789        | 0.1038        |
| Pu-244+E       | 1.0939        | 1.2178        | 1.6903        | 1.8922        |
| Pu-246+E       | 3.4711        | 3.7274        | 4.3526        | 4.4925        |
| Ra-219+E       | 1.0192        | 1.0819        | 1.2089        | 1.2113        |
| Ra-221+E       | 0.5315        | 0.5823        | 0.7872        | 0.8803        |
| Ra-222+E       | 0.0467        | 0.0494        | 0.0533        | 0.0522        |
| Ra-223+E       | 2.1316        | 2.2686        | 2.6313        | 2.7079        |
| Ra-224+E       | 1.6148        | 1.7149        | 1.7461        | 1.9383        |
| Ra-226+E       | 4.8180        | 5.1788        | 5.5697        | 5.5890        |
| Ra-228+E       | 3.4081        | 3.6823        | 4.0658        | 4.3023        |
| Rb-81+E        | 1.8790        | 2.0423        | 2.4739        | 2.6205        |
| Rb-83+E        | 1.4780        | 1.6517        | 2.1826        | 2.3980        |
| Re-186m+E      | 0.7722        | 0.8881        | 1.5717        | 1.9256        |
| Rn-219+E       | 0.2920        | 0.3081        | 0.3365        | 0.3327        |
| Rn-220+E       | 1.5428        | 1.6391        | 1.6626        | 1.8547        |
| Rn-222+E       | 0.0011        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.4035        | 1.4905        | 1.6234        | 1.5976        |
| Ru-106+E       | 0.4782        | 0.5101        | 0.5410        | 0.5243        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.4513        | 1.5143        | 1.7676        | 1.8390        |
| Sn-121m+E      | 0.1104        | 0.1147        | 0.1646        | 0.1930        |
| Sn-126+E       | 5.5501        | 5.9071        | 6.3349        | 6.2120        |
| Sr-82+E        | 0.4180        | 0.5063        | 0.8105        | 0.9652        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.5865        | 0.5996        | 0.7682        | 0.8591        |
| Te-129m+E      | 0.4052        | 0.4236        | 0.5325        | 0.5827        |
| Th-229+E       | 2.8808        | 3.1386        | 4.2097        | 4.6787        |
| Th-232+E       | 9.1950        | 9.9026        | 10.8697       | 11.4154       |
| Th-234+E       | 0.2313        | 0.2528        | 0.3407        | 0.3765        |
| Ti-44+E        | 4.0725        | 4.3040        | 4.5934        | 4.4356        |
| U-228+E        | 0.3135        | 0.3408        | 0.4440        | 0.4869        |
| U-230+E        | 0.2354        | 0.2664        | 0.4109        | 0.4808        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.3073        | 2.4864        | 3.0874        | 3.4652        |
| U-238+E        | 1.3884        | 1.4950        | 1.6848        | 1.7841        |
| W-178+E        | 1.5790        | 1.6905        | 2.2392        | 2.4621        |
| Xe-122+E       | 1.1734        | 1.2151        | 1.4225        | 1.5028        |
| Zr-93+E        | 0.0479        | 0.0555        | 0.1053        | 0.1299        |

## Appendix E

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 46: Wood Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.6333  | 0.3729  | 0.5485  | 0.6382  | 0.5268  | 0.3725  | 0.5987  | 0.6757  |
| Ac-225+E  | 1.6475  | 1.0907  | 1.4739  | 1.6614  | 1.5807  | 1.2775  | 1.7383  | 1.8594  |
| Ac-227+E  | 5.9648  | 3.9383  | 5.3262  | 6.0194  | 5.6176  | 4.4898  | 6.2015  | 6.6892  |
| Ag-108m+E | 3.8225  | 2.7730  | 3.5238  | 3.8473  | 4.3898  | 3.9782  | 4.6739  | 4.6621  |
| Ag-110m+E | 3.0074  | 2.1844  | 2.7837  | 3.0220  | 3.6442  | 3.3572  | 3.8598  | 3.7769  |
| Am-242m+E | 2.1560  | 1.3122  | 1.8830  | 2.1686  | 1.8711  | 1.3964  | 2.0966  | 2.3095  |
| Am-243+E  | 5.5333  | 3.8823  | 5.0195  | 5.5913  | 5.4749  | 4.6007  | 5.9702  | 6.3322  |
| Ar-42+E   | 0.1682  | 0.1198  | 0.1551  | 0.1688  | 0.2058  | 0.1888  | 0.2175  | 0.2114  |
| At-211+E  | 1.3433  | 0.9104  | 1.2051  | 1.3592  | 1.2545  | 1.0039  | 1.3862  | 1.5080  |
| Ba-128+E  | 2.2687  | 1.6087  | 2.0705  | 2.2850  | 2.4308  | 2.1434  | 2.5968  | 2.6948  |
| Bi-210m+E | 1.3821  | 1.0187  | 1.2773  | 1.3964  | 1.5182  | 1.3491  | 1.6318  | 1.6681  |
| Bi-212+E  | 0.4196  | 0.2416  | 0.3621  | 0.4224  | 0.3591  | 0.2570  | 0.4067  | 0.4541  |
| Bi-213+E  | 0.4020  | 0.2935  | 0.3709  | 0.4059  | 0.4485  | 0.3998  | 0.4804  | 0.4880  |
| Bi-214+E  | 1.2849  | 0.9270  | 1.1861  | 1.2911  | 1.5446  | 1.4144  | 1.6366  | 1.6062  |
| Bi-215+E  | 1.1210  | 0.8118  | 1.0296  | 1.1327  | 1.1989  | 1.0480  | 1.2932  | 1.3352  |
| Bi-216+E  | 1.5504  | 1.1427  | 1.4383  | 1.5617  | 1.8161  | 1.6557  | 1.9311  | 1.9217  |
| Cd-118+E  | 0.0624  | 0.0448  | 0.0576  | 0.0627  | 0.0761  | 0.0701  | 0.0803  | 0.0785  |
| Ce-134+E  | 1.9798  | 1.3827  | 1.7949  | 1.9956  | 2.0546  | 1.7831  | 2.2028  | 2.3257  |
| Ce-144+E  | 0.3883  | 0.2938  | 0.3603  | 0.3926  | 0.4264  | 0.3859  | 0.4536  | 0.4672  |
| Cl-34m+E  | 1.2216  | 0.9228  | 1.1391  | 1.2314  | 1.4555  | 1.3432  | 1.5372  | 1.5170  |
| Cm-245+E  | 3.0840  | 2.1099  | 2.7799  | 3.1119  | 2.9809  | 2.4617  | 3.2608  | 3.4799  |
| Cm-247+E  | 1.7317  | 1.2623  | 1.5935  | 1.7498  | 1.8743  | 1.6543  | 2.0149  | 2.0693  |
| Cm-250+E  | 15.8966 | 11.7841 | 14.7606 | 16.0116 | 18.7934 | 17.2350 | 19.9227 | 19.7411 |
| Cs-137+E  | 2.0607  | 1.5052  | 1.9123  | 2.0669  | 2.4596  | 2.2532  | 2.6017  | 2.5648  |
| Es-254+E  | 4.4236  | 2.6833  | 3.8676  | 4.4464  | 4.0090  | 3.0693  | 4.4654  | 4.8424  |
| Fe-60+E   | 2.7527  | 1.7540  | 2.4485  | 2.7671  | 2.8735  | 2.4002  | 3.1266  | 3.2372  |
| Fr-220+E  | 0.5561  | 0.3509  | 0.4897  | 0.5612  | 0.4872  | 0.3662  | 0.5457  | 0.6053  |
| Fr-221+E  | 0.2802  | 0.2042  | 0.2577  | 0.2834  | 0.2957  | 0.2576  | 0.3191  | 0.3310  |
| Ge-68+E   | 1.7954  | 0.8431  | 1.4749  | 1.8102  | 1.2030  | 0.6091  | 1.4607  | 1.8002  |
| Hf-172+E  | 5.3989  | 3.4261  | 4.7558  | 5.4632  | 4.8465  | 3.7148  | 5.4315  | 6.0027  |
| Hf-182+E  | 5.4312  | 3.8799  | 4.9627  | 5.4896  | 5.7416  | 4.9829  | 6.2159  | 6.4436  |
| Hg-193+E  | 4.5446  | 3.0379  | 4.0695  | 4.5925  | 4.3839  | 3.5591  | 4.8335  | 5.1791  |
| Hg-194+E  | 4.5961  | 3.0167  | 4.0982  | 4.6411  | 4.4073  | 3.5447  | 4.8711  | 5.2264  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| In-114m+E | 0.9242 | 0.6548 | 0.8435 | 0.9300 | 0.9859 | 0.8659 | 1.0535 | 1.0854 |
| Ir-192m+E | 3.7505 | 2.5255 | 3.3792 | 3.7838 | 3.8245 | 3.1997 | 4.1787 | 4.3826 |
| Kr-76+E   | 3.7594 | 2.4252 | 3.3401 | 3.7884 | 3.5221 | 2.7769 | 3.8929 | 4.2036 |
| Mg-28+E   | 3.1504 | 2.2917 | 2.9105 | 3.1664 | 3.7440 | 3.4364 | 3.9516 | 3.9115 |
| Nd-140+E  | 2.1018 | 1.4786 | 1.9054 | 2.1213 | 2.1685 | 1.8787 | 2.3236 | 2.4713 |
| Ni-66+E   | 0.0914 | 0.0657 | 0.0843 | 0.0917 | 0.1113 | 0.1025 | 0.1177 | 0.1149 |
| Np-235+E  | 1.2401 | 0.7035 | 1.0641 | 1.2460 | 0.9906 | 0.6726 | 1.1321 | 1.2861 |
| Np-237+E  | 5.3649 | 3.4824 | 4.7689 | 5.4039 | 4.9644 | 3.9242 | 5.4849 | 5.9319 |
| Os-194+E  | 1.0782 | 0.6065 | 0.9238 | 1.0875 | 0.8828 | 0.6045 | 1.0123 | 1.1555 |
| Pa-231+E  | 8.2672 | 5.2761 | 7.3144 | 8.3341 | 7.5140 | 5.8202 | 8.3531 | 9.1142 |
| Pb-202+E  | 4.1670 | 2.7026 | 3.7012 | 4.2105 | 3.8905 | 3.0688 | 4.3211 | 4.6915 |
| Pb-210+E  | 0.9833 | 0.5313 | 0.8334 | 0.9899 | 0.7402 | 0.4612 | 0.8615 | 1.0094 |
| Pd-103+E  | 1.4168 | 0.9500 | 1.2695 | 1.4257 | 1.4184 | 1.1998 | 1.5398 | 1.5964 |
| Pt-202+E  | 0.2382 | 0.1741 | 0.2205 | 0.2398 | 0.2824 | 0.2581 | 0.2997 | 0.2967 |
| Pu-239+E  | 0.2069 | 0.1134 | 0.1761 | 0.2081 | 0.1603 | 0.1044 | 0.1851 | 0.2133 |
| Pu-244+E  | 2.6381 | 1.6289 | 2.3166 | 2.6516 | 2.3840 | 1.8295 | 2.6518 | 2.8762 |
| Pu-246+E  | 4.8510 | 3.3430 | 4.3896 | 4.8891 | 4.9587 | 4.2172 | 5.3749 | 5.6131 |
| Ra-219+E  | 1.1267 | 0.8155 | 1.0343 | 1.1389 | 1.1921 | 1.0371 | 1.2878 | 1.3354 |
| Ra-221+E  | 1.2588 | 0.8009 | 1.1122 | 1.2696 | 1.1222 | 0.8566 | 1.2515 | 1.3756 |
| Ra-222+E  | 0.0380 | 0.0284 | 0.0353 | 0.0383 | 0.0434 | 0.0393 | 0.0463 | 0.0466 |
| Ra-223+E  | 2.9391 | 2.0582 | 2.6681 | 2.9716 | 2.9470 | 2.4777 | 3.2137 | 3.3999 |
| Ra-224+E  | 1.2351 | 0.9119 | 1.1454 | 1.2377 | 1.4682 | 1.3447 | 1.5649 | 1.5292 |
| Ra-226+E  | 3.9561 | 2.8349 | 3.6332 | 3.9823 | 4.4788 | 3.9984 | 4.7951 | 4.7988 |
| Ra-228+E  | 3.4967 | 2.3891 | 3.1674 | 3.5128 | 3.7329 | 3.2114 | 4.0376 | 4.1220 |
| Rb-81+E   | 2.9317 | 1.9498 | 2.6287 | 2.9522 | 2.8131 | 2.2679 | 3.0838 | 3.2842 |
| Rb-83+E   | 3.0361 | 1.8609 | 2.6637 | 3.0502 | 2.7070 | 2.0314 | 3.0177 | 3.2964 |
| Re-186m+E | 3.2837 | 1.7863 | 2.7855 | 3.3152 | 2.5230 | 1.6131 | 2.9418 | 3.4425 |
| Rn-219+E  | 0.2633 | 0.1953 | 0.2440 | 0.2660 | 0.2938 | 0.2633 | 0.3147 | 0.3198 |
| Rn-220+E  | 1.1653 | 0.8602 | 1.0808 | 1.1672 | 1.3919 | 1.2768 | 1.4830 | 1.4454 |
| Rn-222+E  | 0.0008 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0010 | 0.0010 |
| Ru-103+E  | 1.1589 | 0.8363 | 1.0684 | 1.1664 | 1.3302 | 1.1988 | 1.4182 | 1.4190 |
| Ru-106+E  | 0.3257 | 0.2405 | 0.3028 | 0.3275 | 0.3918 | 0.3611 | 0.4150 | 0.4082 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.3138 | 1.6461 | 2.1152 | 2.3267 | 2.5159 | 2.2313 | 2.6791 | 2.7416 |
| Sn-121m+E | 0.3687 | 0.2395 | 0.3278 | 0.3708 | 0.3563 | 0.2916 | 0.3876 | 0.4170 |
| Sn-126+E  | 4.7913 | 3.5372 | 4.4360 | 4.8314 | 5.4983 | 4.9912 | 5.8562 | 5.8814 |
| Sr-82+E   | 1.6983 | 1.0413 | 1.4880 | 1.7030 | 1.4504 | 1.0584 | 1.6200 | 1.7850 |
| Sr-90+E   | 0.0002 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |
| Te-118+E  | 1.5882 | 1.1041 | 1.4404 | 1.5948 | 1.6665 | 1.4534 | 1.7761 | 1.8494 |
| Te-129m+E | 0.8758 | 0.5877 | 0.7867 | 0.8807 | 0.8872 | 0.7506 | 0.9577 | 1.0109 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-229+E       | 6.7705       | 4.3523       | 5.9976       | 6.8258       | 6.1570       | 4.7900       | 6.8280       | 7.4624       |
| Th-232+E       | 8.9568       | 6.2395       | 8.1512       | 9.0091       | 9.6838       | 8.4186       | 10.4409      | 10.6353      |
| Th-234+E       | 0.5715       | 0.3742       | 0.5085       | 0.5761       | 0.5255       | 0.4146       | 0.5818       | 0.6307       |
| Ti-44+E        | 4.3731       | 3.4016       | 4.0877       | 4.4332       | 4.8979       | 4.4576       | 5.2334       | 5.3312       |
| U-228+E        | 0.6441       | 0.4199       | 0.5734       | 0.6490       | 0.5982       | 0.4735       | 0.6606       | 0.7124       |
| U-230+E        | 0.7814       | 0.4779       | 0.6836       | 0.7859       | 0.6745       | 0.4999       | 0.7565       | 0.8362       |
| U-235+E        | 4.3804       | 2.9364       | 3.9286       | 4.4097       | 4.2066       | 3.4292       | 4.6170       | 4.9246       |
| U-238+E        | 1.7469       | 1.2759       | 1.6042       | 1.7517       | 1.8873       | 1.6710       | 2.0123       | 2.0542       |
| W-178+E        | 3.7452       | 2.4085       | 3.3094       | 3.7921       | 3.3897       | 2.6188       | 3.7970       | 4.1826       |
| Xe-122+E       | 2.0365       | 1.4439       | 1.8588       | 2.0489       | 2.1873       | 1.9320       | 2.3320       | 2.4114       |
| Zr-93+E        | 0.2545       | 0.1599       | 0.2243       | 0.2552       | 0.2294       | 0.1794       | 0.2538       | 0.2725       |

Table 47: Wood Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5274  | 0.4107  | 0.7043  | 0.6329  | 0.3824  | 0.3574  | 0.6119  | 0.7011  |
| Ac-225+E  | 1.6725  | 1.4722  | 1.9533  | 1.8851  | 1.3961  | 1.3941  | 1.8959  | 2.0024  |
| Ac-227+E  | 5.8862  | 5.1187  | 6.9978  | 6.6813  | 4.8425  | 4.8002  | 6.6601  | 7.1477  |
| Ag-108m+E | 4.9606  | 4.8240  | 4.9591  | 5.2054  | 4.5969  | 4.8590  | 5.4643  | 5.2285  |
| Ag-110m+E | 4.2519  | 4.2129  | 4.1125  | 4.4073  | 4.1467  | 4.4798  | 4.7766  | 4.4217  |
| Am-242m+E | 1.8784  | 1.5166  | 2.3877  | 2.1828  | 1.3331  | 1.2501  | 2.0870  | 2.3540  |
| Am-243+E  | 5.7989  | 5.2359  | 6.6132  | 6.4537  | 4.9522  | 4.9645  | 6.4649  | 6.8103  |
| Ar-42+E   | 0.2425  | 0.2406  | 0.2313  | 0.2503  | 0.2379  | 0.2554  | 0.2737  | 0.2511  |
| At-211+E  | 1.3053  | 1.1320  | 1.5674  | 1.4875  | 1.0834  | 1.0692  | 1.4800  | 1.6239  |
| Ba-128+E  | 2.6700  | 2.5289  | 2.8249  | 2.8675  | 2.3733  | 2.4584  | 2.9136  | 2.9691  |
| Bi-210m+E | 1.6880  | 1.6174  | 1.7696  | 1.8222  | 1.5782  | 1.6383  | 1.8936  | 1.8694  |
| Bi-212+E  | 0.3699  | 0.2957  | 0.4778  | 0.4369  | 0.2826  | 0.2743  | 0.4325  | 0.4808  |
| Bi-213+E  | 0.5033  | 0.4846  | 0.5204  | 0.5386  | 0.4722  | 0.4941  | 0.5670  | 0.5520  |
| Bi-214+E  | 1.7998  | 1.7775  | 1.7478  | 1.8693  | 1.7510  | 1.8787  | 2.0272  | 1.8834  |
| Bi-215+E  | 1.3208  | 1.2462  | 1.4118  | 1.4336  | 1.2113  | 1.2527  | 1.4830  | 1.4901  |
| Bi-216+E  | 2.0803  | 2.0433  | 2.0721  | 2.1890  | 1.9995  | 2.1219  | 2.3392  | 2.2107  |
| Cd-118+E  | 0.0893  | 0.0885  | 0.0858  | 0.0922  | 0.0874  | 0.0937  | 0.1004  | 0.0927  |
| Ce-134+E  | 2.2317  | 2.0823  | 2.4243  | 2.4156  | 1.9497  | 2.0076  | 2.4321  | 2.5445  |
| Ce-144+E  | 0.4706  | 0.4528  | 0.4926  | 0.5047  | 0.4383  | 0.4553  | 0.5193  | 0.5202  |
| Cl-34m+E  | 1.6747  | 1.6563  | 1.6388  | 1.7557  | 1.6349  | 1.7350  | 1.8757  | 1.7676  |
| Cm-245+E  | 3.1257  | 2.7708  | 3.6303  | 3.5131  | 2.5874  | 2.5681  | 3.4918  | 3.6946  |
| Cm-247+E  | 2.0669  | 1.9637  | 2.1856  | 2.2303  | 1.8893  | 1.9558  | 2.3129  | 2.2968  |
| Cm-250+E  | 21.5900 | 21.2764 | 21.2810 | 22.6197 | 20.8368 | 22.1611 | 24.1612 | 22.7983 |
| Cs-137+E  | 2.8483  | 2.8131  | 2.9026  | 2.8592  | 2.7696  | 2.9658  | 3.1835  | 2.9929  |
| Es-254+E  | 4.1586  | 3.4855  | 5.0739  | 4.7484  | 3.1784  | 3.0976  | 4.6554  | 5.0796  |
| Fe-60+E   | 3.2281  | 2.9720  | 3.4993  | 3.5165  | 2.9338  | 3.0542  | 3.7075  | 3.6748  |
| Fr-220+E  | 0.4953  | 0.4061  | 0.6288  | 0.5792  | 0.3810  | 0.3654  | 0.5662  | 0.6367  |
| Fr-221+E  | 0.3226  | 0.3027  | 0.3497  | 0.3539  | 0.2929  | 0.3001  | 0.3627  | 0.3666  |
| Ge-68+E   | 1.1151  | 0.6405  | 1.8871  | 1.5257  | 0.6272  | 0.4875  | 1.4103  | 1.8147  |
| Hf-172+E  | 5.0179  | 4.2379  | 6.3045  | 5.8288  | 4.1012  | 4.0322  | 5.7280  | 6.3146  |
| Hf-182+E  | 6.3204  | 5.9393  | 6.8534  | 6.9008  | 5.8254  | 6.0032  | 7.1184  | 7.1718  |
| Hg-193+E  | 4.6733  | 4.1491  | 5.4634  | 5.2705  | 4.0401  | 4.0595  | 5.3270  | 5.6473  |
| Hg-194+E  | 4.7038  | 4.1551  | 5.5231  | 5.3158  | 4.0475  | 4.0658  | 5.3783  | 5.6875  |
| In-114m+E | 1.0733  | 1.0100  | 1.1296  | 1.1535  | 0.9299  | 0.9559  | 1.1501  | 1.1665  |
| Ir-192m+E | 4.1867  | 3.8374  | 4.6609  | 4.6336  | 3.7434  | 3.8441  | 4.7686  | 4.8370  |
| Kr-76+E   | 3.7035  | 3.2008  | 4.3956  | 4.2032  | 3.0276  | 3.0099  | 4.2073  | 4.4817  |
| Mg-28+E   | 4.3155  | 4.2583  | 4.2055  | 4.4849  | 4.1214  | 4.3905  | 4.7867  | 4.5284  |
| Nd-140+E  | 2.3502  | 2.1899  | 2.5612  | 2.5413  | 2.0624  | 2.1234  | 2.5505  | 2.6858  |
| Ni-66+E   | 0.1305  | 0.1294  | 0.1255  | 0.1351  | 0.1276  | 0.1369  | 0.1460  | 0.1360  |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200 | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|--------|---------|---------|---------|
| Np-235+E  | 0.9622  | 0.7102  | 1.3286  | 1.1635  | 0.6140 | 0.5441  | 1.0933  | 1.2924  |
| Np-237+E  | 5.1355  | 4.3950  | 6.1723  | 5.8383  | 4.0353 | 3.9475  | 5.7435  | 6.2314  |
| Os-194+E  | 0.8928  | 0.6872  | 1.2130  | 1.0839  | 0.6640 | 0.6276  | 1.0557  | 1.2084  |
| Pa-231+E  | 7.7619  | 6.5564  | 9.5109  | 8.9218  | 6.1213 | 5.9737  | 8.7939  | 9.6196  |
| Pb-202+E  | 4.1030  | 3.5580  | 4.9390  | 4.6926  | 3.4566 | 3.4346  | 4.7159  | 5.0736  |
| Pb-210+E  | 0.7089  | 0.4882  | 1.0442  | 0.8917  | 0.4432 | 0.3829  | 0.8378  | 1.0183  |
| Pd-103+E  | 1.4855  | 1.3398  | 1.6191  | 1.6031  | 1.1400 | 1.1207  | 1.5420  | 1.6243  |
| Pt-202+E  | 0.3259  | 0.3212  | 0.3210  | 0.3413  | 0.3154 | 0.3357  | 0.3667  | 0.3441  |
| Pu-239+E  | 0.1546  | 0.1102  | 0.2210  | 0.1907  | 0.0968 | 0.0842  | 0.1785  | 0.2143  |
| Pu-244+E  | 2.4549  | 2.0518  | 3.0017  | 2.8029  | 1.8539 | 1.7984  | 2.7457  | 2.9982  |
| Pu-246+E  | 5.3579  | 4.9137  | 5.9083  | 5.8666  | 4.6367 | 4.7305  | 5.9464  | 6.0879  |
| Ra-219+E  | 1.3051  | 1.2249  | 1.4078  | 1.4217  | 1.1851 | 1.2223  | 1.4625  | 1.4782  |
| Ra-221+E  | 1.1482  | 0.9543  | 1.4334  | 1.3348  | 0.8937 | 0.8630  | 1.3071  | 1.4484  |
| Ra-222+E  | 0.0490  | 0.0478  | 0.0496  | 0.0521  | 0.0465 | 0.0489  | 0.0548  | 0.0527  |
| Ra-223+E  | 3.1628  | 2.8775  | 3.5697  | 3.5166  | 2.7770 | 2.8148  | 3.5713  | 3.7203  |
| Ra-224+E  | 1.7001  | 1.6711  | 1.7921  | 1.6728  | 1.6576 | 1.7552  | 1.8932  | 1.7800  |
| Ra-226+E  | 5.0939  | 4.9058  | 5.3065  | 5.2850  | 4.8294 | 5.0865  | 5.7426  | 5.4904  |
| Ra-228+E  | 4.1462  | 3.9876  | 4.5252  | 4.3545  | 3.7376 | 3.8700  | 4.6461  | 4.5917  |
| Rb-81+E   | 2.9663  | 2.6016  | 3.4351  | 3.3360  | 2.4355 | 2.4255  | 3.3462  | 3.5200  |
| Rb-83+E   | 2.7904  | 2.3025  | 3.4370  | 3.2122  | 2.1228 | 2.0599  | 3.1852  | 3.4760  |
| Re-186m+E | 2.4737  | 1.7768  | 3.6095  | 3.1144  | 1.7284 | 1.5584  | 2.9706  | 3.5477  |
| Rn-219+E  | 0.3285  | 0.3170  | 0.3397  | 0.3526  | 0.3088 | 0.3217  | 0.3690  | 0.3597  |
| Rn-220+E  | 1.6157  | 1.5903  | 1.7033  | 1.5813  | 1.5792 | 1.6744  | 1.7985  | 1.6864  |
| Rn-222+E  | 0.0011  | 0.0010  | 0.0010  | 0.0011  | 0.0010 | 0.0011  | 0.0012  | 0.0011  |
| Ru-103+E  | 1.5115  | 1.4705  | 1.5237  | 1.5972  | 1.4221 | 1.4967  | 1.6854  | 1.6150  |
| Ru-106+E  | 0.4540  | 0.4501  | 0.4432  | 0.4732  | 0.4416 | 0.4720  | 0.5093  | 0.4751  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 2.7592  | 2.6224  | 2.8498  | 2.9355  | 2.4085 | 2.4902  | 2.9523  | 2.9516  |
| Sn-121m+E | 0.3765  | 0.3339  | 0.4311  | 0.4185  | 0.3043 | 0.3051  | 0.4075  | 0.4393  |
| Sn-126+E  | 6.2284  | 6.0709  | 6.2848  | 6.5786  | 5.9052 | 6.2580  | 6.9502  | 6.6785  |
| Sr-82+E   | 1.4389  | 1.1329  | 1.8277  | 1.6671  | 0.9732 | 0.9045  | 1.6064  | 1.8176  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0002  | 0.0002  | 0.0001 | 0.0001  | 0.0002  | 0.0002  |
| Te-118+E  | 1.8005  | 1.6803  | 1.9079  | 1.9310  | 1.5162 | 1.5544  | 1.8977  | 1.9657  |
| Te-129m+E | 0.9558  | 0.8738  | 1.0534  | 1.0453  | 0.8068 | 0.8233  | 1.0389  | 1.0861  |
| Th-229+E  | 6.3488  | 5.3694  | 7.7661  | 7.2829  | 4.9971 | 4.8726  | 7.1662  | 7.8664  |
| Th-232+E  | 10.8166 | 10.3094 | 11.7589 | 11.3099 | 9.9288 | 10.3237 | 12.1847 | 11.9660 |
| Th-234+E  | 0.5416  | 0.4626  | 0.6568  | 0.6177  | 0.4284 | 0.4172  | 0.6071  | 0.6633  |
| Ti-44+E   | 5.4477  | 5.2945  | 5.6456  | 5.8045  | 5.2091 | 5.4225  | 6.0486  | 6.0624  |
| U-228+E   | 0.6200  | 0.5318  | 0.7443  | 0.7060  | 0.4911 | 0.4810  | 0.6948  | 0.7514  |
| U-230+E   | 0.6777  | 0.5448  | 0.8686  | 0.7920  | 0.4882 | 0.4596  | 0.7640  | 0.8607  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 4.4169        | 3.8742        | 5.2714        | 4.8343        | 3.6345        | 3.5985        | 4.8901        | 5.1872        |
| U-238+E        | 2.0942        | 1.9936        | 2.2771        | 2.1066        | 1.9482        | 2.0175        | 2.3225        | 2.2555        |
| W-178+E        | 3.5217        | 2.9994        | 4.4017        | 4.0791        | 2.9258        | 2.8855        | 4.0280        | 4.4228        |
| Xe-122+E       | 2.3975        | 2.2700        | 2.5198        | 2.5663        | 2.1087        | 2.1844        | 2.5881        | 2.6338        |
| Zr-93+E        | 0.2302        | 0.1914        | 0.2832        | 0.2595        | 0.1588        | 0.1496        | 0.2457        | 0.2739        |

Table 48: Wood Surface Contamination 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2802        | 0.3484        | 0.6096        | 0.7323        |
| Ac-225+E       | 1.1704        | 1.3813        | 1.9055        | 2.1496        |
| Ac-227+E       | 4.0031        | 4.7144        | 6.6622        | 7.6387        |
| Ag-108m+E      | 4.1247        | 4.8125        | 5.5649        | 5.8060        |
| Ag-110m+E      | 3.9456        | 4.6002        | 4.9732        | 5.0776        |
| Am-242m+E      | 0.8988        | 1.1487        | 2.0702        | 2.4131        |
| Am-243+E       | 4.1947        | 4.8425        | 6.4438        | 7.2824        |
| Ar-42+E        | 0.2285        | 0.2700        | 0.2886        | 0.2897        |
| At-211+E       | 0.9090        | 1.0585        | 1.4694        | 1.7249        |
| Ba-128+E       | 2.0178        | 2.3173        | 2.9153        | 3.1926        |
| Bi-210m+E      | 1.4525        | 1.6488        | 1.9161        | 2.0974        |
| Bi-212+E       | 0.2219        | 0.2751        | 0.4376        | 0.5154        |
| Bi-213+E       | 0.4359        | 0.5009        | 0.5761        | 0.6154        |
| Bi-214+E       | 1.6669        | 1.9491        | 2.1190        | 2.1549        |
| Bi-215+E       | 1.1000        | 1.2617        | 1.4994        | 1.6524        |
| Bi-216+E       | 1.8778        | 2.1641        | 2.3996        | 2.4931        |
| Cd-118+E       | 0.0836        | 0.0982        | 0.1058        | 0.1065        |
| Ce-134+E       | 1.6298        | 1.8571        | 2.4308        | 2.7311        |
| Ce-144+E       | 0.3971        | 0.4452        | 0.5259        | 0.5757        |
| Cl-34m+E       | 1.5606        | 1.7937        | 1.9730        | 2.0172        |
| Cm-245+E       | 2.1229        | 2.4840        | 3.4873        | 3.9000        |
| Cm-247+E       | 1.6982        | 1.9480        | 2.3289        | 2.5242        |
| Cm-250+E       | 19.6290       | 22.6631       | 25.0005       | 25.8561       |
| Cs-137+E       | 2.6143        | 3.0424        | 3.2909        | 3.3890        |
| Es-254+E       | 2.3886        | 2.9839        | 4.7092        | 5.3620        |
| Fe-60+E        | 2.6839        | 3.2020        | 3.8714        | 4.1192        |
| Fr-220+E       | 0.2966        | 0.3571        | 0.5633        | 0.6690        |
| Fr-221+E       | 0.2634        | 0.2989        | 0.3647        | 0.4015        |
| Ge-68+E        | 0.3439        | 0.4967        | 1.4024        | 1.8703        |
| Hf-172+E       | 3.3964        | 3.9011        | 5.6554        | 6.7595        |
| Hf-182+E       | 5.3270        | 6.0510        | 7.2190        | 7.9962        |
| Hg-193+E       | 3.5281        | 4.0784        | 5.3548        | 6.1777        |
| Hg-194+E       | 3.5261        | 4.1026        | 5.4148        | 6.2484        |
| In-114m+E      | 0.7639        | 0.8987        | 1.1518        | 1.2622        |
| Ir-192m+E      | 3.3528        | 3.8927        | 4.8309        | 5.3882        |
| Kr-76+E        | 2.4955        | 2.9732        | 4.2281        | 4.8370        |
| Mg-28+E        | 3.8098        | 4.4438        | 4.9568        | 5.0920        |
| Nd-140+E       | 1.7404        | 1.9689        | 2.5689        | 2.9644        |
| Ni-66+E        | 0.1218        | 0.1429        | 0.1549        | 0.1568        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3604        | 0.4968        | 1.0832        | 1.3127        |
| Np-237+E       | 3.1356        | 3.7854        | 5.7260        | 6.5561        |
| Os-194+E       | 0.5109        | 0.6261        | 1.0589        | 1.2927        |
| Pa-231+E       | 4.8414        | 5.8111        | 8.7813        | 10.1855       |
| Pb-202+E       | 2.9591        | 3.4485        | 4.7211        | 5.4976        |
| Pb-210+E       | 0.2677        | 0.3652        | 0.8301        | 1.0452        |
| Pd-103+E       | 0.7867        | 0.9847        | 1.5235        | 1.6556        |
| Pt-202+E       | 0.2983        | 0.3457        | 0.3797        | 0.3918        |
| Pu-239+E       | 0.0561        | 0.0777        | 0.1769        | 0.2181        |
| Pu-244+E       | 1.3728        | 1.7157        | 2.7540        | 3.1401        |
| Pu-246+E       | 3.9569        | 4.6323        | 6.0216        | 6.6011        |
| Ra-219+E       | 1.0667        | 1.2251        | 1.4718        | 1.6350        |
| Ra-221+E       | 0.7018        | 0.8413        | 1.3103        | 1.5283        |
| Ra-222+E       | 0.0432        | 0.0495        | 0.0555        | 0.0599        |
| Ra-223+E       | 2.4381        | 2.8057        | 3.5855        | 4.0403        |
| Ra-224+E       | 1.5681        | 1.8226        | 1.9412        | 2.0774        |
| Ra-226+E       | 4.5032        | 5.2471        | 5.9675        | 6.2437        |
| Ra-228+E       | 3.3354        | 3.9611        | 4.8129        | 5.0945        |
| Rb-81+E        | 2.0055        | 2.3939        | 3.3746        | 3.7732        |
| Rb-83+E        | 1.6264        | 2.0431        | 3.2108        | 3.6699        |
| Re-186m+E      | 1.2538        | 1.5449        | 2.9519        | 3.7393        |
| Rn-219+E       | 0.2848        | 0.3239        | 0.3738        | 0.4027        |
| Rn-220+E       | 1.4966        | 1.7418        | 1.8454        | 1.9736        |
| Rn-222+E       | 0.0010        | 0.0011        | 0.0012        | 0.0013        |
| Ru-103+E       | 1.3064        | 1.5198        | 1.7306        | 1.8044        |
| Ru-106+E       | 0.4183        | 0.4841        | 0.5269        | 0.5395        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.9849        | 2.3463        | 2.9517        | 3.2060        |
| Sn-121m+E      | 0.2321        | 0.2786        | 0.4045        | 0.4668        |
| Sn-126+E       | 5.4557        | 6.2706        | 7.0714        | 7.4814        |
| Sr-82+E        | 0.6244        | 0.8489        | 1.6008        | 1.8607        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.1825        | 1.4124        | 1.8830        | 2.0968        |
| Te-129m+E      | 0.6487        | 0.7676        | 1.0357        | 1.1596        |
| Th-229+E       | 3.9341        | 4.7125        | 7.1674        | 8.3421        |
| Th-232+E       | 9.0159        | 10.5903       | 12.6096       | 13.5034       |
| Th-234+E       | 0.3374        | 0.4027        | 0.6040        | 0.7013        |
| Ti-44+E        | 4.8793        | 5.4836        | 6.1007        | 6.7703        |
| U-228+E        | 0.3871        | 0.4633        | 0.6979        | 0.7953        |
| U-230+E        | 0.3440        | 0.4344        | 0.7602        | 0.8911        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.9666        | 3.4953        | 4.9135        | 5.6487        |
| U-238+E        | 1.7771        | 2.0512        | 2.4600        | 2.6217        |
| W-178+E        | 2.4740        | 2.8151        | 3.9783        | 4.7725        |
| Xe-122+E       | 1.7600        | 2.0453        | 2.5861        | 2.8292        |
| Zr-93+E        | 0.0979        | 0.1292        | 0.2436        | 0.2767        |

Table 49: Wood 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 3.7775  | 2.8416  | 3.5728  | 4.0696  | 2.5285  | 1.6023  | 3.3463  | 4.2820  |
| Ac-225+E  | 7.2938  | 5.6845  | 6.9223  | 7.7317  | 5.4076  | 3.6960  | 6.4044  | 8.2918  |
| Ac-227+E  | 27.5165 | 21.3926 | 26.1274 | 29.2294 | 20.1573 | 13.7439 | 24.2302 | 31.0706 |
| Ag-108m+E | 9.3223  | 7.6058  | 8.8650  | 9.4155  | 9.8556  | 8.2499  | 9.1350  | 12.0012 |
| Ag-110m+E | 4.3251  | 3.3240  | 3.9509  | 4.1433  | 5.3020  | 4.7692  | 5.0767  | 6.0346  |
| Am-242m+E | 13.3107 | 10.5009 | 12.7751 | 14.1796 | 9.7056  | 6.6296  | 11.1021 | 15.5169 |
| Am-243+E  | 22.4188 | 17.8310 | 21.3648 | 23.6525 | 17.6280 | 12.7676 | 19.8370 | 25.2767 |
| Ar-42+E   | 0.2215  | 0.1651  | 0.2031  | 0.2021  | 0.2803  | 0.2494  | 0.2739  | 0.3088  |
| At-211+E  | 6.0032  | 4.6523  | 5.6515  | 6.3874  | 4.3456  | 2.8988  | 5.3722  | 6.4951  |
| Ba-128+E  | 6.9010  | 5.3839  | 6.5989  | 7.2646  | 6.2425  | 5.1919  | 6.5570  | 8.6537  |
| Bi-210m+E | 3.3379  | 2.5986  | 3.1319  | 3.4214  | 3.0447  | 2.4350  | 3.4460  | 3.8511  |
| Bi-212+E  | 2.3309  | 1.7046  | 2.1879  | 2.5165  | 1.5486  | 0.9748  | 2.1564  | 2.6550  |
| Bi-213+E  | 0.9358  | 0.7352  | 0.8702  | 0.9565  | 0.8758  | 0.6842  | 0.9330  | 1.1010  |
| Bi-214+E  | 1.9599  | 1.4964  | 1.7960  | 1.8815  | 2.3008  | 2.0102  | 2.2608  | 2.6414  |
| Bi-215+E  | 3.1920  | 2.5042  | 3.0057  | 3.3066  | 2.7342  | 2.0719  | 3.0841  | 3.6123  |
| Bi-216+E  | 2.6954  | 2.1204  | 2.4722  | 2.6670  | 2.9557  | 2.4782  | 2.8973  | 3.4347  |
| Cd-118+E  | 0.0846  | 0.0638  | 0.0779  | 0.0803  | 0.1054  | 0.0948  | 0.1032  | 0.1205  |
| Ce-134+E  | 6.7093  | 5.1572  | 6.4097  | 7.1438  | 5.6809  | 4.6861  | 6.3579  | 7.9448  |
| Ce-144+E  | 0.9152  | 0.7260  | 0.8715  | 0.9508  | 0.8515  | 0.7256  | 0.9456  | 1.0763  |
| Cl-34m+E  | 1.7120  | 1.3564  | 1.6043  | 1.6417  | 2.0303  | 1.8567  | 2.0590  | 2.2461  |
| Cm-245+E  | 13.8414 | 11.0669 | 13.3059 | 14.6538 | 10.6401 | 7.5927  | 11.7839 | 15.8482 |
| Cm-247+E  | 4.9477  | 3.9693  | 4.6808  | 5.1120  | 4.4105  | 3.4110  | 4.6375  | 5.7623  |
| Cm-250+E  | 26.2907 | 20.8742 | 24.5980 | 25.7990 | 29.7233 | 26.0712 | 28.9848 | 33.8449 |
| Cs-137+E  | 3.1055  | 2.3955  | 2.9178  | 3.1314  | 3.5847  | 3.3020  | 3.6817  | 3.9873  |
| Es-254+E  | 24.6283 | 18.9869 | 23.4715 | 26.2536 | 18.0827 | 12.5174 | 21.6011 | 29.3397 |
| Fe-60+E   | 9.0572  | 6.3749  | 8.3938  | 9.5912  | 6.9999  | 5.0683  | 9.5496  | 11.0531 |
| Fr-220+E  | 2.9788  | 2.2930  | 2.8212  | 3.1870  | 2.0604  | 1.3251  | 2.5872  | 3.2980  |
| Fr-221+E  | 0.8442  | 0.6701  | 0.8028  | 0.8855  | 0.7077  | 0.5396  | 0.8115  | 0.9488  |
| Ge-68+E   | 13.3151 | 9.1363  | 12.3707 | 14.6853 | 7.8674  | 4.5663  | 13.1277 | 15.2302 |
| Hf-172+E  | 25.3452 | 18.1995 | 23.6162 | 27.4944 | 17.6111 | 11.8966 | 25.4180 | 28.4597 |
| Hf-182+E  | 15.3297 | 11.3682 | 14.1898 | 16.0945 | 12.7397 | 9.7299  | 16.1880 | 17.3267 |
| Hg-193+E  | 18.0694 | 13.3458 | 16.7751 | 19.2804 | 13.2051 | 9.0384  | 17.6848 | 20.0410 |
| Hg-194+E  | 18.6828 | 13.6582 | 17.3566 | 19.9494 | 13.5289 | 9.1694  | 18.3340 | 20.9330 |
| In-114m+E | 3.1017  | 2.4924  | 2.9994  | 3.2531  | 2.9335  | 2.2993  | 2.9674  | 4.2853  |
| Ir-192m+E | 12.7803 | 9.3727  | 11.9487 | 13.5294 | 9.9217  | 7.0877  | 12.8187 | 14.8929 |
| Kr-76+E   | 17.4214 | 13.5309 | 16.5765 | 18.4941 | 12.5660 | 8.2494  | 15.0348 | 19.3175 |
| Mg-28+E   | 5.4849  | 4.3501  | 5.1904  | 5.3844  | 6.3386  | 5.6940  | 5.7980  | 7.4570  |
| Nd-140+E  | 7.0786  | 5.4267  | 6.7583  | 7.5561  | 5.9068  | 4.7723  | 6.9256  | 8.2039  |
| Ni-66+E   | 0.1242  | 0.0945  | 0.1141  | 0.1185  | 0.1528  | 0.1382  | 0.1481  | 0.1769  |

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 8.5948  | 6.6929  | 8.2141  | 9.1993  | 5.8832  | 3.7733  | 7.0884  | 9.8860  |
| Np-237+E  | 27.5966 | 21.9215 | 26.4577 | 29.2499 | 20.4449 | 14.0071 | 22.9765 | 31.7233 |
| Os-194+E  | 6.2181  | 4.4118  | 5.8111  | 6.7743  | 3.9998  | 2.4922  | 6.0264  | 7.0801  |
| Pa-231+E  | 42.3347 | 32.8580 | 40.2608 | 45.0982 | 30.3238 | 20.2643 | 36.6468 | 48.1964 |
| Pb-202+E  | 18.1108 | 13.2781 | 16.8201 | 19.4266 | 12.8143 | 8.5102  | 17.5415 | 20.1922 |
| Pb-210+E  | 6.7835  | 5.0709  | 6.4158  | 7.3410  | 4.3322  | 2.5831  | 5.9045  | 7.5532  |
| Pd-103+E  | 7.3975  | 6.1458  | 7.2378  | 7.7434  | 6.7082  | 5.2856  | 6.3085  | 8.7855  |
| Pt-202+E  | 0.3803  | 0.2936  | 0.3491  | 0.3729  | 0.4301  | 0.3695  | 0.4291  | 0.4978  |
| Pu-239+E  | 1.4554  | 1.1049  | 1.3830  | 1.5677  | 0.9716  | 0.6163  | 1.2532  | 1.6761  |
| Pu-244+E  | 14.9115 | 11.7648 | 14.2713 | 15.8209 | 10.9530 | 7.4681  | 12.4401 | 17.4265 |
| Pu-246+E  | 18.7448 | 14.9178 | 17.9672 | 19.7027 | 15.2909 | 11.4368 | 16.7220 | 22.0781 |
| Ra-219+E  | 3.4088  | 2.6939  | 3.2363  | 3.5421  | 2.8792  | 2.1434  | 3.1834  | 3.8437  |
| Ra-221+E  | 6.5995  | 5.1133  | 6.2728  | 7.0448  | 4.6253  | 3.0269  | 5.6958  | 7.4165  |
| Ra-222+E  | 0.0763  | 0.0609  | 0.0728  | 0.0764  | 0.0781  | 0.0640  | 0.0779  | 0.0922  |
| Ra-223+E  | 10.7299 | 8.3337  | 10.1243 | 11.3209 | 8.3242  | 5.9280  | 9.9426  | 11.9682 |
| Ra-224+E  | 1.6803  | 1.3079  | 1.6110  | 1.7357  | 1.9295  | 1.8352  | 2.0900  | 2.0358  |
| Ra-226+E  | 8.7487  | 6.7347  | 8.2144  | 8.9609  | 8.3036  | 6.7421  | 9.1491  | 10.4093 |
| Ra-228+E  | 11.4450 | 9.0091  | 10.9228 | 11.9833 | 9.5077  | 7.1936  | 10.4716 | 13.5816 |
| Rb-81+E   | 13.2775 | 10.7589 | 12.7515 | 13.9809 | 9.8622  | 6.4843  | 10.6649 | 14.5750 |
| Rb-83+E   | 16.5600 | 13.1136 | 15.7918 | 17.5486 | 11.6073 | 7.1993  | 13.2059 | 18.2806 |
| Re-186m+E | 20.4667 | 14.3106 | 19.0268 | 22.4221 | 12.7351 | 7.7660  | 20.1299 | 23.1367 |
| Rn-219+E  | 0.5961  | 0.4741  | 0.5608  | 0.6060  | 0.5652  | 0.4576  | 0.6043  | 0.6985  |
| Rn-220+E  | 1.5028  | 1.1655  | 1.4425  | 1.5530  | 1.7690  | 1.7051  | 1.9133  | 1.8303  |
| Rn-222+E  | 0.0013  | 0.0010  | 0.0011  | 0.0012  | 0.0014  | 0.0012  | 0.0014  | 0.0016  |
| Ru-103+E  | 2.5463  | 2.0018  | 2.3723  | 2.5795  | 2.6221  | 2.1582  | 2.6212  | 3.2145  |
| Ru-106+E  | 0.4657  | 0.3651  | 0.4220  | 0.4476  | 0.5758  | 0.5065  | 0.5359  | 0.6359  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 7.3328  | 5.9629  | 7.0911  | 7.6149  | 7.2321  | 5.6966  | 6.8934  | 10.4315 |
| Sn-121m+E | 1.6184  | 1.2256  | 1.5432  | 1.7360  | 1.3050  | 0.9518  | 1.5414  | 2.1350  |
| Sn-126+E  | 9.7013  | 7.6104  | 9.0204  | 9.8077  | 10.1243 | 8.4549  | 10.3028 | 12.3960 |
| Sr-82+E   | 10.9009 | 9.1121  | 10.5627 | 11.4461 | 7.6949  | 4.7053  | 7.5735  | 11.8676 |
| Sr-90+E   | 0.0011  | 0.0009  | 0.0010  | 0.0011  | 0.0008  | 0.0006  | 0.0007  | 0.0013  |
| Te-118+E  | 5.6996  | 4.5555  | 5.5166  | 6.0057  | 5.3435  | 4.1484  | 5.3064  | 8.2841  |
| Te-129m+E | 3.3553  | 2.5668  | 3.2002  | 3.5723  | 2.8371  | 2.1546  | 3.1952  | 4.4415  |
| Th-229+E  | 34.7412 | 27.1427 | 33.1030 | 37.0142 | 24.9174 | 16.6626 | 29.7609 | 39.2869 |
| Th-232+E  | 26.0955 | 20.2834 | 24.7409 | 27.3252 | 22.1596 | 17.0955 | 25.1950 | 30.4931 |
| Th-234+E  | 2.9055  | 2.2944  | 2.7663  | 3.0810  | 2.1279  | 1.4385  | 2.4484  | 3.2684  |
| Ti-44+E   | 8.6593  | 6.8528  | 7.8222  | 8.7419  | 8.6187  | 7.0748  | 9.5516  | 9.0108  |
| U-228+E   | 3.2770  | 2.6034  | 3.1392  | 3.4732  | 2.4146  | 1.6579  | 2.7533  | 3.7830  |
| U-230+E   | 4.7305  | 3.7391  | 4.5312  | 5.0333  | 3.3416  | 2.2020  | 3.8615  | 5.4474  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 19.8426      | 15.7222      | 19.0435      | 21.0975      | 14.9362      | 10.5488      | 17.1684      | 23.1223      |
| U-238+E        | 4.3862       | 3.4896       | 4.1865       | 4.6017       | 3.7914       | 3.0285       | 4.2141       | 5.0610       |
| W-178+E        | 16.9730      | 12.1347      | 15.7313      | 18.3917      | 11.7411      | 7.8965       | 17.1397      | 18.5964      |
| Xe-122+E       | 6.3409       | 5.0131       | 6.0909       | 6.6557       | 5.9205       | 4.8219       | 5.9887       | 8.5071       |
| Zr-93+E        | 1.7050       | 1.4167       | 1.6580       | 1.7900       | 1.3138       | 0.9548       | 1.2976       | 2.1133       |

Table 50: Wood 1cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 2.4723  | 1.8548  | 3.2453  | 4.6418  | 1.6057  | 1.3513  | 3.2706  | 3.6038  |
| Ac-225+E  | 5.3762  | 4.2330  | 6.9180  | 9.0833  | 3.9018  | 3.3212  | 7.8506  | 7.2752  |
| Ac-227+E  | 19.9902 | 15.7019 | 25.9115 | 33.9398 | 14.3196 | 12.2887 | 28.5019 | 26.8124 |
| Ag-108m+E | 10.2835 | 8.3134  | 13.3945 | 12.0069 | 9.1044  | 7.3215  | 19.2799 | 10.6218 |
| Ag-110m+E | 5.9954  | 5.2630  | 6.7554  | 5.9080  | 5.9085  | 4.6084  | 14.4851 | 7.7008  |
| Am-242m+E | 9.4884  | 7.3502  | 13.3267 | 16.2135 | 6.5180  | 5.4870  | 12.6472 | 11.4057 |
| Am-243+E  | 17.6775 | 14.0616 | 22.8059 | 26.9795 | 13.3694 | 11.5580 | 25.6154 | 20.8754 |
| Ar-42+E   | 0.3181  | 0.2848  | 0.3469  | 0.2975  | 0.3155  | 0.2593  | 0.7626  | 0.3447  |
| At-211+E  | 4.3000  | 3.2777  | 5.5124  | 7.4775  | 3.0532  | 2.8517  | 5.9507  | 5.5317  |
| Ba-128+E  | 6.5991  | 5.1609  | 6.8376  | 8.2373  | 5.5142  | 4.0367  | 11.3308 | 7.6468  |
| Bi-210m+E | 3.1697  | 2.6862  | 3.5879  | 4.0662  | 2.7043  | 2.3434  | 5.5405  | 4.1618  |
| Bi-212+E  | 1.5300  | 1.1247  | 1.9794  | 2.9135  | 0.9977  | 0.8179  | 2.1603  | 2.4372  |
| Bi-213+E  | 0.9150  | 0.7516  | 1.0384  | 1.1980  | 0.7914  | 0.6773  | 1.6826  | 1.2045  |
| Bi-214+E  | 2.5673  | 2.2466  | 2.8484  | 2.5878  | 2.4875  | 2.0030  | 5.9818  | 3.1651  |
| Bi-215+E  | 2.8146  | 2.3103  | 3.3423  | 3.9664  | 2.3009  | 2.0361  | 4.5888  | 3.5824  |
| Bi-216+E  | 3.1840  | 2.6866  | 3.4353  | 3.4751  | 2.9863  | 2.4148  | 6.6246  | 4.2747  |
| Cd-118+E  | 0.1193  | 0.1091  | 0.1354  | 0.1136  | 0.1186  | 0.0972  | 0.3212  | 0.1523  |
| Ce-134+E  | 6.0434  | 4.6655  | 6.3708  | 7.8954  | 4.9067  | 3.6210  | 9.3231  | 8.2890  |
| Ce-144+E  | 0.9161  | 0.7529  | 0.9695  | 1.1050  | 0.7956  | 0.6268  | 1.5271  | 1.3737  |
| Cl-34m+E  | 2.2510  | 2.0306  | 2.4163  | 2.3461  | 2.2181  | 1.8128  | 4.7191  | 2.7739  |
| Cm-245+E  | 10.6160 | 8.4319  | 13.9759 | 16.7946 | 7.8857  | 6.3929  | 15.1462 | 12.9278 |
| Cm-247+E  | 4.5361  | 3.7149  | 5.4804  | 6.1205  | 3.7569  | 3.2310  | 7.5764  | 5.4296  |
| Cm-250+E  | 32.5390 | 28.5701 | 36.2666 | 33.6959 | 31.0082 | 25.0220 | 68.4572 | 39.2991 |
| Cs-137+E  | 4.0223  | 3.7899  | 4.3348  | 4.0442  | 3.8775  | 3.5699  | 6.5581  | 4.7491  |
| Es-254+E  | 17.9014 | 13.8950 | 24.2789 | 29.7134 | 12.4492 | 10.3623 | 25.5511 | 22.1942 |
| Fe-60+E   | 7.3245  | 5.8411  | 8.7758  | 11.1914 | 5.6112  | 4.5905  | 14.2506 | 10.8779 |
| Fr-220+E  | 2.0169  | 1.5272  | 2.6683  | 3.7292  | 1.3655  | 1.1996  | 2.7081  | 2.8114  |
| Fr-221+E  | 0.7216  | 0.6064  | 0.8787  | 1.0271  | 0.5843  | 0.5017  | 1.1086  | 0.9191  |
| Ge-68+E   | 7.6620  | 5.2396  | 9.5894  | 15.9245 | 4.2129  | 3.3968  | 9.4507  | 13.2066 |
| Hf-172+E  | 17.5098 | 13.0592 | 22.3747 | 29.8566 | 11.9296 | 9.8960  | 24.9601 | 24.7587 |
| Hf-182+E  | 13.1924 | 10.6692 | 15.4640 | 18.2553 | 10.6932 | 9.3279  | 22.7100 | 17.2659 |
| Hg-193+E  | 13.2690 | 10.0798 | 16.2960 | 22.0937 | 9.5818  | 8.7092  | 19.7105 | 18.1083 |
| Hg-194+E  | 13.5955 | 10.2711 | 16.5790 | 22.7751 | 9.7018  | 8.6669  | 19.7797 | 19.0113 |
| In-114m+E | 2.9513  | 2.2561  | 3.4128  | 3.6564  | 2.4335  | 1.7053  | 5.1953  | 2.8669  |
| Ir-192m+E | 10.1365 | 7.9351  | 11.8692 | 15.6394 | 7.6695  | 6.3830  | 15.1958 | 14.8824 |
| Kr-76+E   | 12.3762 | 9.5543  | 16.5283 | 22.5374 | 8.8265  | 7.3546  | 17.6397 | 18.4701 |
| Mg-28+E   | 7.0196  | 5.9770  | 7.2942  | 7.0128  | 6.6761  | 5.1531  | 15.2201 | 7.2354  |
| Nd-140+E  | 6.2678  | 4.8179  | 6.7279  | 8.0407  | 5.0871  | 3.7130  | 9.0574  | 10.8943 |
| Ni-66+E   | 0.1744  | 0.1566  | 0.1983  | 0.1668  | 0.1726  | 0.1381  | 0.4396  | 0.2041  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 5.6986        | 4.3627        | 7.9346        | 10.6058       | 3.7144        | 3.1525        | 7.3920        | 7.5951        |
| Np-237+E       | 20.1785       | 15.8762       | 26.8938       | 33.9028       | 14.4086       | 12.0593       | 27.9130       | 25.3161       |
| Os-194+E       | 3.9465        | 2.8407        | 4.9466        | 7.5327        | 2.4637        | 2.0003        | 5.1603        | 6.5639        |
| Pa-231+E       | 29.8803       | 23.2481       | 39.1890       | 52.2058       | 20.8377       | 17.7064       | 41.7349       | 40.3310       |
| Pb-202+E       | 12.7801       | 9.5129        | 15.6813       | 22.1935       | 8.8994        | 7.9776        | 18.5052       | 18.2443       |
| Pb-210+E       | 4.1756        | 3.0382        | 5.7106        | 8.5525        | 2.5692        | 2.1459        | 5.3217        | 6.5304        |
| Pd-103+E       | 6.5701        | 4.9457        | 10.7476       | 9.4195        | 5.0319        | 4.3595        | 8.8560        | 4.9060        |
| Pt-202+E       | 0.4716        | 0.4091        | 0.5163        | 0.5016        | 0.4496        | 0.3683        | 1.0698        | 0.6179        |
| Pu-239+E       | 0.9428        | 0.7083        | 1.2903        | 1.7779        | 0.5977        | 0.5036        | 1.2092        | 1.3128        |
| Pu-244+E       | 10.7672       | 8.4371        | 14.8276       | 18.3406       | 7.5380        | 6.3368        | 15.0482       | 13.5371       |
| Pu-246+E       | 15.5032       | 12.5636       | 20.3332       | 22.7483       | 12.0466       | 9.7745        | 24.1142       | 19.2674       |
| Ra-219+E       | 2.9490        | 2.3986        | 3.5282        | 4.2016        | 2.3756        | 2.0710        | 4.3126        | 3.7081        |
| Ra-221+E       | 4.5365        | 3.4855        | 5.9992        | 8.2827        | 3.1203        | 2.6561        | 6.1199        | 6.3553        |
| Ra-222+E       | 0.0828        | 0.0710        | 0.0913        | 0.0948        | 0.0742        | 0.0621        | 0.1296        | 0.1056        |
| Ra-223+E       | 8.3953        | 6.6355        | 10.3201       | 13.2651       | 6.3763        | 5.5894        | 12.5809       | 11.0242       |
| Ra-224+E       | 2.1604        | 2.2138        | 2.3068        | 2.1873        | 2.0894        | 2.2072        | 2.4848        | 2.2540        |
| Ra-226+E       | 8.8714        | 7.7167        | 10.1973       | 11.1300       | 7.7853        | 7.0299        | 14.8232       | 10.9229       |
| Ra-228+E       | 9.8054        | 8.4705        | 12.3191       | 14.3321       | 7.8360        | 6.9743        | 14.4900       | 12.0919       |
| Rb-81+E        | 9.6336        | 7.6252        | 13.3608       | 17.7891       | 7.0888        | 6.0077        | 13.5287       | 13.4613       |
| Rb-83+E        | 11.2387       | 8.5243        | 15.7134       | 22.0727       | 7.7629        | 6.6005        | 15.9814       | 16.3402       |
| Re-186m+E      | 12.4926       | 8.7996        | 15.6579       | 24.5087       | 7.4624        | 6.1997        | 16.0296       | 20.4995       |
| Rn-219+E       | 0.5905        | 0.5055        | 0.6664        | 0.7465        | 0.5154        | 0.4391        | 1.0963        | 0.7780        |
| Rn-220+E       | 1.9947        | 2.0688        | 2.1129        | 1.9729        | 1.9479        | 2.0879        | 2.1823        | 2.0377        |
| Rn-222+E       | 0.0015        | 0.0013        | 0.0016        | 0.0016        | 0.0015        | 0.0012        | 0.0033        | 0.0021        |
| Ru-103+E       | 2.7505        | 2.2445        | 3.3206        | 3.2062        | 2.4500        | 1.9968        | 5.2019        | 3.3928        |
| Ru-106+E       | 0.6345        | 0.5452        | 0.6717        | 0.5987        | 0.6242        | 0.4907        | 1.4261        | 0.8422        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 7.2919        | 5.5328        | 8.2226        | 8.7534        | 6.1186        | 4.2558        | 13.7210       | 6.8324        |
| Sn-121m+E      | 1.3108        | 0.9519        | 1.4130        | 1.8838        | 0.9836        | 0.6656        | 2.2048        | 1.5749        |
| Sn-126+E       | 10.8425       | 8.8892        | 11.8276       | 12.0731       | 9.8656        | 7.7987        | 21.9206       | 12.9357       |
| Sr-82+E        | 7.3350        | 5.7379        | 10.9629       | 14.8564       | 5.0749        | 4.4295        | 9.9884        | 9.7682        |
| Sr-90+E        | 0.0008        | 0.0007        | 0.0011        | 0.0012        | 0.0006        | 0.0005        | 0.0011        | 0.0008        |
| Te-118+E       | 5.3926        | 3.9821        | 5.4875        | 6.5594        | 4.4171        | 2.8224        | 10.2493       | 5.0324        |
| Te-129m+E      | 2.8898        | 2.1500        | 3.0744        | 3.9539        | 2.2595        | 1.5615        | 5.0545        | 3.2542        |
| Th-229+E       | 24.5979       | 19.1007       | 32.2381       | 42.7127       | 17.2607       | 14.5389       | 33.6440       | 34.6137       |
| Th-232+E       | 23.0368       | 19.9467       | 27.9501       | 32.7419       | 18.8128       | 17.2976       | 33.9200       | 28.5339       |
| Th-234+E       | 2.0950        | 1.6353        | 2.8055        | 3.5618        | 1.4893        | 1.3001        | 2.9031        | 2.6019        |
| Ti-44+E        | 9.1220        | 7.5271        | 10.2048       | 10.2054       | 8.1717        | 8.4244        | 16.4596       | 8.3345        |
| U-228+E        | 2.3803        | 1.9033        | 3.1720        | 4.0198        | 1.7016        | 1.4307        | 3.2447        | 3.0900        |
| U-230+E        | 3.2636        | 2.5637        | 4.4371        | 5.8140        | 2.2199        | 1.8825        | 4.3772        | 4.2557        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 14.8103       | 12.0651       | 19.3958       | 24.5443       | 10.7941       | 9.6244        | 19.2612       | 18.4170       |
| U-238+E        | 3.9331        | 3.5069        | 4.7457        | 5.4057        | 3.2721        | 3.1570        | 4.9084        | 4.4683        |
| W-178+E        | 11.6900       | 8.7427        | 14.9655       | 19.9208       | 8.0098        | 6.9172        | 16.4496       | 16.5721       |
| Xe-122+E       | 6.1578        | 4.7275        | 6.3282        | 7.4999        | 5.1591        | 3.5986        | 11.1115       | 6.3783        |
| Zr-93+E        | 1.2951        | 1.0941        | 1.7844        | 1.9200        | 0.9225        | 0.7859        | 1.7418        | 1.3188        |

Table 51: Wood 1cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.9912        | 1.2726        | 4.5740        | 2.9846        |
| Ac-225+E       | 2.7603        | 3.0591        | 8.6887        | 6.5041        |
| Ac-227+E       | 9.9836        | 11.2295       | 33.2379       | 24.0188       |
| Ag-108m+E      | 7.8389        | 6.6320        | 12.9901       | 12.7818       |
| Ag-110m+E      | 5.7235        | 3.9488        | 6.9282        | 9.8568        |
| Am-242m+E      | 4.1501        | 5.0458        | 15.3758       | 11.0324       |
| Am-243+E       | 9.8678        | 10.3823       | 25.6608       | 21.6421       |
| Ar-42+E        | 0.3094        | 0.2312        | 0.3889        | 0.4472        |
| At-211+E       | 2.1597        | 2.6060        | 7.0116        | 5.0058        |
| Ba-128+E       | 4.4519        | 3.0814        | 7.8259        | 7.2701        |
| Bi-210m+E      | 2.3281        | 1.9710        | 5.3328        | 4.1652        |
| Bi-212+E       | 0.6392        | 0.7723        | 2.9711        | 1.9436        |
| Bi-213+E       | 0.6836        | 0.6229        | 1.1199        | 1.1000        |
| Bi-214+E       | 2.3850        | 1.7286        | 2.9360        | 4.0879        |
| Bi-215+E       | 1.9051        | 1.7586        | 4.2198        | 3.4640        |
| Bi-216+E       | 2.7628        | 2.1230        | 3.6482        | 4.2414        |
| Cd-118+E       | 0.1158        | 0.0830        | 0.1174        | 0.2151        |
| Ce-134+E       | 3.8648        | 2.4317        | 6.5397        | 6.6406        |
| Ce-144+E       | 0.6931        | 0.5231        | 0.9698        | 1.0128        |
| Cl-34m+E       | 2.1467        | 1.5959        | 3.0815        | 3.1129        |
| Cm-245+E       | 5.5820        | 5.8483        | 15.4490       | 12.4868       |
| Cm-247+E       | 3.0621        | 3.0063        | 5.5352        | 5.1931        |
| Cm-250+E       | 29.0242       | 21.5422       | 37.5333       | 45.9904       |
| Cs-137+E       | 3.6629        | 3.2798        | 4.5108        | 5.4415        |
| Es-254+E       | 8.2996        | 9.5793        | 29.5386       | 21.8436       |
| Fe-60+E        | 4.5401        | 4.1922        | 12.1870       | 11.0306       |
| Fr-220+E       | 0.8880        | 1.1143        | 3.5320        | 2.4094        |
| Fr-221+E       | 0.4733        | 0.4399        | 1.1263        | 0.8505        |
| Ge-68+E        | 2.1843        | 3.4129        | 17.6620       | 9.3006        |
| Hf-172+E       | 8.3329        | 9.4902        | 32.8743       | 24.2245       |
| Hf-182+E       | 8.9325        | 8.1558        | 22.0658       | 20.7789       |
| Hg-193+E       | 7.1432        | 7.8867        | 23.6098       | 19.0948       |
| Hg-194+E       | 7.1749        | 7.8041        | 24.3056       | 19.6614       |
| In-114m+E      | 1.9123        | 1.8611        | 4.8251        | 3.2154        |
| Ir-192m+E      | 6.0447        | 5.5798        | 17.0225       | 13.0736       |
| Kr-76+E        | 6.0814        | 6.7110        | 21.2382       | 15.3005       |
| Mg-28+E        | 6.1255        | 4.2348        | 6.7688        | 9.2657        |
| Nd-140+E       | 3.9977        | 2.6801        | 6.7568        | 7.0155        |
| Ni-66+E        | 0.1695        | 0.1180        | 0.1595        | 0.3035        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 2.1931        | 2.9404        | 9.9483        | 6.8250        |
| Np-237+E       | 9.7055        | 10.9358       | 31.2181       | 24.0066       |
| Os-194+E       | 1.5320        | 1.8995        | 8.0188        | 4.8596        |
| Pa-231+E       | 13.9308       | 16.3420       | 50.6936       | 35.9409       |
| Pb-202+E       | 6.3562        | 7.4190        | 22.9644       | 17.0520       |
| Pb-210+E       | 1.4437        | 2.0612        | 8.2338        | 5.1159        |
| Pd-103+E       | 3.6232        | 3.8246        | 9.3643        | 6.5546        |
| Pt-202+E       | 0.4233        | 0.3294        | 0.4966        | 0.6912        |
| Pu-239+E       | 0.3473        | 0.4740        | 1.7371        | 1.1272        |
| Pu-244+E       | 4.9538        | 5.7842        | 17.4073       | 13.0140       |
| Pu-246+E       | 9.1010        | 8.7758        | 21.9409       | 19.0395       |
| Ra-219+E       | 1.9321        | 1.7725        | 4.0027        | 3.4879        |
| Ra-221+E       | 2.0494        | 2.4689        | 8.0619        | 5.3884        |
| Ra-222+E       | 0.0670        | 0.0505        | 0.0934        | 0.1012        |
| Ra-223+E       | 4.8504        | 5.0531        | 13.2891       | 9.9018        |
| Ra-224+E       | 1.9755        | 2.1715        | 2.4203        | 2.6044        |
| Ra-226+E       | 6.8860        | 6.4177        | 12.0025       | 11.6690       |
| Ra-228+E       | 6.1840        | 6.4860        | 14.0076       | 12.2716       |
| Rb-81+E        | 4.9200        | 5.4680        | 15.8595       | 11.8080       |
| Rb-83+E        | 4.9830        | 6.0774        | 19.4870       | 14.1662       |
| Re-186m+E      | 4.4097        | 6.0147        | 26.8376       | 16.2846       |
| Rn-219+E       | 0.4455        | 0.3889        | 0.8982        | 0.7191        |
| Rn-220+E       | 1.8568        | 2.0692        | 2.1207        | 2.3999        |
| Rn-222+E       | 0.0014        | 0.0010        | 0.0018        | 0.0020        |
| Ru-103+E       | 2.1683        | 1.6893        | 3.5809        | 3.3759        |
| Ru-106+E       | 0.6015        | 0.4083        | 0.7194        | 0.9249        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 4.8340        | 4.8515        | 10.9886       | 7.8460        |
| Sn-121m+E      | 0.7092        | 0.7158        | 2.2602        | 1.4534        |
| Sn-126+E       | 8.8512        | 7.2044        | 13.4683       | 14.8314       |
| Sr-82+E        | 3.0453        | 4.0757        | 11.6898       | 9.2492        |
| Sr-90+E        | 0.0004        | 0.0004        | 0.0010        | 0.0010        |
| Te-118+E       | 3.3848        | 3.2713        | 8.6361        | 5.8303        |
| Te-129m+E      | 1.7071        | 1.5588        | 4.5996        | 3.2368        |
| Th-229+E       | 11.5233       | 13.3231       | 39.7418       | 29.4936       |
| Th-232+E       | 15.3701       | 16.1138       | 33.8222       | 28.9258       |
| Th-234+E       | 1.0052        | 1.1784        | 3.3242        | 2.7972        |
| Ti-44+E        | 7.5361        | 7.2008        | 10.6776       | 14.9450       |
| U-228+E        | 1.1475        | 1.3034        | 3.9114        | 2.8242        |
| U-230+E        | 1.3929        | 1.7360        | 5.3430        | 3.9461        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 7.5419        | 9.1805        | 23.3572       | 17.5947       |
| U-238+E        | 2.6960        | 3.0018        | 5.5592        | 5.0204        |
| W-178+E        | 5.6679        | 6.4037        | 21.9459       | 17.7530       |
| Xe-122+E       | 4.1331        | 3.2523        | 8.2367        | 6.8211        |
| Zr-93+E        | 0.5897        | 0.7031        | 1.7403        | 1.5187        |

Table 52: Wood 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 3.8748  | 3.0532  | 3.6993  | 4.1246  | 2.7748  | 1.8113  | 4.1590  | 3.6695  |
| Ac-225+E  | 8.0802  | 6.6662  | 7.7546  | 8.4190  | 6.4098  | 4.7252  | 9.2141  | 8.5087  |
| Ac-227+E  | 30.5346 | 25.1557 | 29.4026 | 31.8619 | 23.9529 | 17.4437 | 34.2947 | 30.8332 |
| Ag-108m+E | 16.4925 | 15.0406 | 16.0237 | 16.4782 | 17.2220 | 14.2712 | 17.2429 | 25.4672 |
| Ag-110m+E | 6.6487  | 5.6173  | 6.2807  | 6.4723  | 8.0705  | 7.4516  | 7.4620  | 13.1134 |
| Am-242m+E | 16.3075 | 13.9923 | 15.8097 | 17.0423 | 12.4382 | 9.2226  | 18.7577 | 16.6459 |
| Am-243+E  | 27.8888 | 23.9273 | 27.0647 | 28.7297 | 22.9904 | 17.5696 | 31.1251 | 28.4826 |
| Ar-42+E   | 0.3173  | 0.2571  | 0.2936  | 0.2983  | 0.3831  | 0.3641  | 0.3767  | 0.4743  |
| At-211+E  | 6.3372  | 5.1643  | 6.1504  | 6.6158  | 4.9599  | 3.4153  | 6.7226  | 6.0125  |
| Ba-128+E  | 13.5388 | 12.0911 | 13.2561 | 13.8543 | 13.2621 | 11.6654 | 13.7195 | 15.7668 |
| Bi-210m+E | 4.2814  | 3.5367  | 4.0685  | 4.2647  | 4.1304  | 3.3968  | 4.5755  | 5.1477  |
| Bi-212+E  | 2.3059  | 1.7434  | 2.1782  | 2.4664  | 1.6961  | 1.0679  | 2.3291  | 2.3111  |
| Bi-213+E  | 1.2473  | 1.0517  | 1.1828  | 1.2452  | 1.2357  | 1.0215  | 1.3315  | 1.6948  |
| Bi-214+E  | 2.8325  | 2.3579  | 2.6693  | 2.7635  | 3.3181  | 3.0301  | 3.2066  | 4.8318  |
| Bi-215+E  | 3.8410  | 3.1975  | 3.7102  | 3.8869  | 3.5200  | 2.7984  | 4.1527  | 4.4379  |
| Bi-216+E  | 4.0861  | 3.4929  | 3.8434  | 4.0187  | 4.5289  | 3.9687  | 4.4239  | 6.7576  |
| Cd-118+E  | 0.1239  | 0.1025  | 0.1174  | 0.1214  | 0.1506  | 0.1429  | 0.1436  | 0.2045  |
| Ce-134+E  | 12.5078 | 11.0245 | 12.2622 | 12.9202 | 11.7362 | 10.6792 | 13.0207 | 11.9171 |
| Ce-144+E  | 1.5190  | 1.3286  | 1.4867  | 1.5189  | 1.4956  | 1.3030  | 1.6081  | 1.6936  |
| Cl-34m+E  | 2.4305  | 2.0451  | 2.3050  | 2.2670  | 2.7726  | 2.5908  | 2.8210  | 3.5284  |
| Cm-245+E  | 16.8957 | 14.5677 | 16.4204 | 17.5342 | 13.5413 | 10.3609 | 19.4057 | 17.4031 |
| Cm-247+E  | 6.8060  | 5.9124  | 6.5628  | 6.8640  | 6.2829  | 5.1283  | 7.4882  | 8.2107  |
| Cm-250+E  | 40.7635 | 35.1946 | 38.9015 | 39.8480 | 45.2777 | 41.0469 | 46.2113 | 62.0889 |
| Cs-137+E  | 4.4794  | 3.8179  | 4.3513  | 4.5345  | 5.1069  | 4.8321  | 5.0991  | 6.5630  |
| Es-254+E  | 30.3283 | 25.5167 | 29.2417 | 31.7077 | 23.5780 | 17.3202 | 33.6443 | 32.8439 |
| Fe-60+E   | 9.6443  | 7.1254  | 9.0393  | 10.1520 | 8.2243  | 5.9841  | 9.2434  | 10.8378 |
| Fr-220+E  | 3.0677  | 2.4732  | 2.9513  | 3.2344  | 2.2866  | 1.5462  | 3.3762  | 2.9170  |
| Fr-221+E  | 0.9950  | 0.8401  | 0.9657  | 1.0248  | 0.8835  | 0.6986  | 1.1548  | 1.1270  |
| Ge-68+E   | 12.2592 | 8.4529  | 11.4321 | 13.4719 | 7.7850  | 3.6394  | 10.2364 | 10.3487 |
| Hf-172+E  | 28.8852 | 22.2344 | 27.2366 | 30.5118 | 23.1721 | 14.6814 | 25.6922 | 28.1487 |
| Hf-182+E  | 18.6680 | 14.7746 | 17.4529 | 18.9600 | 16.8908 | 12.7677 | 18.0908 | 19.7837 |
| Hg-193+E  | 19.4770 | 15.0737 | 18.3066 | 20.2268 | 15.6774 | 10.6350 | 18.9304 | 19.1899 |
| Hg-194+E  | 20.0053 | 15.2791 | 18.7313 | 20.8125 | 15.9764 | 10.7421 | 19.1574 | 19.6062 |
| In-114m+E | 6.1454  | 5.6411  | 6.0555  | 6.2631  | 6.4108  | 4.5465  | 5.8080  | 10.5209 |
| Ir-192m+E | 14.3694 | 11.1138 | 13.5534 | 14.8695 | 12.3148 | 8.9690  | 14.0319 | 16.2832 |
| Kr-76+E   | 18.0170 | 14.5743 | 17.2160 | 18.8615 | 14.5067 | 10.3856 | 20.4618 | 18.8116 |
| Mg-28+E   | 11.2109 | 10.0413 | 10.8572 | 11.0919 | 12.3155 | 11.5092 | 12.0897 | 15.3548 |
| Nd-140+E  | 12.8075 | 11.2123 | 12.5473 | 13.2617 | 12.1899 | 10.5389 | 13.5285 | 12.6669 |
| Ni-66+E   | 0.1803  | 0.1502  | 0.1701  | 0.1745  | 0.2181  | 0.2079  | 0.2061  | 0.3567  |

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 9.4794  | 7.8755  | 9.1282  | 10.0040 | 6.8130  | 4.8093  | 11.0979 | 9.2354  |
| Np-237+E  | 32.7865 | 27.9829 | 31.7892 | 34.1488 | 25.6920 | 19.4268 | 38.3637 | 33.8111 |
| Os-194+E  | 6.1630  | 4.5115  | 5.8008  | 6.6416  | 4.4163  | 2.5828  | 5.6682  | 5.7193  |
| Pa-231+E  | 46.9806 | 38.7245 | 45.2238 | 49.2169 | 36.1192 | 25.9146 | 53.0927 | 47.6371 |
| Pb-202+E  | 19.1565 | 14.6852 | 18.0113 | 20.0640 | 14.9892 | 9.8161  | 18.2463 | 18.8208 |
| Pb-210+E  | 6.4898  | 4.9920  | 6.1643  | 6.9774  | 4.5076  | 2.7285  | 6.9122  | 5.9263  |
| Pd-103+E  | 12.6527 | 11.8516 | 12.4912 | 12.8887 | 11.3826 | 9.0609  | 13.2836 | 14.6889 |
| Pt-202+E  | 0.5706  | 0.4795  | 0.5335  | 0.5568  | 0.6454  | 0.5796  | 0.6195  | 0.9368  |
| Pu-239+E  | 4.5191  | 3.9281  | 4.4528  | 4.6880  | 4.3699  | 3.9946  | 5.1194  | 4.8706  |
| Pu-244+E  | 17.8031 | 15.1621 | 17.1983 | 18.5773 | 13.7243 | 10.3210 | 20.9440 | 18.7680 |
| Pu-246+E  | 24.8228 | 21.5325 | 24.1011 | 25.5674 | 21.3487 | 16.9443 | 28.3680 | 28.2784 |
| Ra-219+E  | 4.1049  | 3.4477  | 3.9950  | 4.1728  | 3.6850  | 2.9149  | 4.4777  | 4.5891  |
| Ra-221+E  | 6.9062  | 5.6199  | 6.6384  | 7.2521  | 5.1635  | 3.6018  | 7.8017  | 6.7464  |
| Ra-222+E  | 0.1071  | 0.0910  | 0.1035  | 0.1051  | 0.1112  | 0.0968  | 0.1173  | 0.1446  |
| Ra-223+E  | 12.1448 | 9.9931  | 11.7200 | 12.5288 | 10.1475 | 7.5294  | 12.9786 | 12.6846 |
| Ra-224+E  | 2.1793  | 1.8442  | 2.1463  | 2.2433  | 2.4504  | 2.4029  | 2.6562  | 2.5502  |
| Ra-226+E  | 10.7252 | 8.8189  | 10.2687 | 10.8487 | 10.7162 | 9.1034  | 11.8917 | 13.6996 |
| Ra-228+E  | 13.5832 | 11.4542 | 13.1096 | 14.0164 | 11.6975 | 9.6489  | 16.3255 | 15.6384 |
| Rb-81+E   | 13.3189 | 11.2320 | 12.8308 | 13.8770 | 10.7967 | 8.1229  | 17.0356 | 14.6955 |
| Rb-83+E   | 16.1231 | 13.2114 | 15.4059 | 16.9495 | 12.3977 | 8.7648  | 19.6450 | 17.2295 |
| Re-186m+E | 19.8996 | 14.2430 | 18.5764 | 21.5175 | 13.6406 | 7.3387  | 17.3582 | 17.2235 |
| Rn-219+E  | 0.7961  | 0.6730  | 0.7563  | 0.7888  | 0.7884  | 0.6673  | 0.8823  | 1.0235  |
| Rn-220+E  | 1.9516  | 1.6503  | 1.9285  | 2.0141  | 2.2361  | 2.2227  | 2.3878  | 2.2768  |
| Rn-222+E  | 0.0020  | 0.0017  | 0.0019  | 0.0020  | 0.0022  | 0.0020  | 0.0022  | 0.0034  |
| Ru-103+E  | 4.0446  | 3.5316  | 3.8494  | 4.0368  | 4.1709  | 3.5338  | 4.2459  | 6.0412  |
| Ru-106+E  | 0.7725  | 0.6658  | 0.7262  | 0.7533  | 0.9195  | 0.8326  | 0.8449  | 1.4403  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 15.6992 | 14.5380 | 15.4213 | 15.8759 | 16.7562 | 11.9969 | 14.6441 | 27.7537 |
| Sn-121m+E | 2.8374  | 2.4862  | 2.7725  | 2.9410  | 2.7600  | 1.9201  | 2.5794  | 4.2846  |
| Sn-126+E  | 16.0469 | 14.0128 | 15.4442 | 16.0157 | 17.4236 | 14.2013 | 15.9428 | 25.9760 |
| Sr-82+E   | 10.7391 | 9.3616  | 10.4185 | 11.1917 | 8.0721  | 6.1286  | 14.9814 | 11.1788 |
| Sr-90+E   | 0.0015  | 0.0014  | 0.0015  | 0.0015  | 0.0011  | 0.0010  | 0.0021  | 0.0016  |
| Te-118+E  | 12.7833 | 11.7929 | 12.6252 | 13.0467 | 13.5810 | 9.6361  | 11.6287 | 22.4070 |
| Te-129m+E | 6.1245  | 5.4117  | 5.9866  | 6.3133  | 6.0399  | 4.4717  | 5.6920  | 9.0614  |
| Th-229+E  | 39.0192 | 32.4454 | 37.6608 | 40.9098 | 30.1357 | 21.9001 | 44.9798 | 38.9306 |
| Th-232+E  | 30.4145 | 25.2385 | 29.3096 | 31.3882 | 27.1094 | 22.2117 | 35.2660 | 34.5053 |
| Th-234+E  | 3.3400  | 2.8125  | 3.2061  | 3.4691  | 2.5769  | 1.9015  | 3.8749  | 3.2785  |
| Ti-44+E   | 12.2380 | 10.4089 | 11.7377 | 11.8551 | 12.3657 | 9.9793  | 11.7859 | 13.0436 |
| U-228+E   | 3.7807  | 3.2098  | 3.6571  | 3.9387  | 2.8975  | 2.1965  | 4.5619  | 3.8739  |
| U-230+E   | 5.3084  | 4.4697  | 5.1252  | 5.5621  | 3.9014  | 2.8744  | 6.4093  | 5.2611  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 26.3545      | 22.7717      | 25.6799      | 27.4786      | 21.8179      | 17.3058      | 30.1148      | 28.2949      |
| U-238+E        | 5.5125       | 4.6965       | 5.3318       | 5.6850       | 4.9610       | 4.2596       | 6.4142       | 5.7440       |
| W-178+E        | 18.6607      | 14.0908      | 17.4062      | 19.6769      | 14.6845      | 9.3242       | 16.6322      | 16.3869      |
| Xe-122+E       | 13.2472      | 12.0264      | 13.0255      | 13.5146      | 13.5480      | 10.9156      | 12.8245      | 19.0828      |
| Zr-93+E        | 2.4246       | 2.1971       | 2.3746       | 2.4995       | 1.8060       | 1.5126       | 3.1823       | 2.5038       |

Table 53: Wood 5cm Contamination Thickness for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 2.6787  | 1.7846  | 2.6535  | 4.7263  | 1.8031  | 1.4396  | 3.3118  | 3.7857  |
| Ac-225+E  | 6.3218  | 4.5760  | 6.1607  | 9.9635  | 4.7960  | 3.8546  | 8.2743  | 8.3060  |
| Ac-227+E  | 23.5121 | 16.9139 | 23.2849 | 37.2993 | 17.6535 | 14.0008 | 30.4057 | 30.1979 |
| Ag-108m+E | 17.2058 | 14.0562 | 21.3041 | 23.8784 | 15.1938 | 11.4734 | 29.7926 | 17.7295 |
| Ag-110m+E | 8.7784  | 7.4067  | 9.4494  | 9.0775  | 8.6598  | 6.2725  | 22.1680 | 12.5473 |
| Am-242m+E | 12.1398 | 8.8559  | 14.1454 | 22.0983 | 8.7561  | 6.8787  | 15.1130 | 14.0876 |
| Am-243+E  | 22.9286 | 17.2323 | 24.2320 | 34.9744 | 18.1007 | 14.5893 | 29.4939 | 24.8766 |
| Ar-42+E   | 0.4151  | 0.3721  | 0.4415  | 0.4164  | 0.4127  | 0.3248  | 1.0953  | 0.4996  |
| At-211+E  | 4.8582  | 3.4140  | 4.5127  | 7.3805  | 3.6144  | 2.9480  | 5.7838  | 5.9689  |
| Ba-128+E  | 13.1422 | 9.5266  | 14.8865 | 15.0407 | 11.6431 | 9.0779  | 21.5538 | 11.1893 |
| Bi-210m+E | 4.1924  | 3.3845  | 4.0388  | 5.2000  | 3.6921  | 2.9765  | 6.8272  | 4.7272  |
| Bi-212+E  | 1.6363  | 1.0673  | 1.6376  | 2.7818  | 1.1174  | 0.8582  | 2.4432  | 2.4756  |
| Bi-213+E  | 1.2677  | 0.9983  | 1.2311  | 1.5160  | 1.1277  | 0.8961  | 1.8534  | 1.6011  |
| Bi-214+E  | 3.5867  | 3.0475  | 3.7323  | 3.7469  | 3.5032  | 2.6320  | 8.6988  | 4.8848  |
| Bi-215+E  | 3.5578  | 2.7749  | 3.3855  | 4.5931  | 3.0309  | 2.4019  | 5.3748  | 4.2112  |
| Bi-216+E  | 4.7669  | 3.8790  | 4.7184  | 5.1125  | 4.5189  | 3.5060  | 8.2393  | 6.2227  |
| Cd-118+E  | 0.1659  | 0.1467  | 0.1794  | 0.1724  | 0.1655  | 0.1273  | 0.4663  | 0.2615  |
| Ce-134+E  | 11.8987 | 8.2542  | 13.5701 | 13.9105 | 10.6048 | 7.8237  | 20.0226 | 10.0384 |
| Ce-144+E  | 1.5330  | 1.1505  | 1.6130  | 1.7186  | 1.4144  | 1.0852  | 2.5584  | 1.4798  |
| Cl-34m+E  | 2.9778  | 2.5911  | 3.0653  | 3.2313  | 2.9371  | 2.3654  | 6.2669  | 4.2132  |
| Cm-245+E  | 13.4407 | 10.0344 | 14.2487 | 21.7675 | 10.3824 | 8.1863  | 16.9090 | 15.3624 |
| Cm-247+E  | 6.3678  | 4.9739  | 6.5987  | 8.6711  | 5.4220  | 4.2347  | 8.7212  | 7.2729  |
| Cm-250+E  | 47.7833 | 40.0680 | 50.4415 | 52.3685 | 45.6958 | 35.2908 | 97.0079 | 58.0334 |
| Cs-137+E  | 5.4946  | 4.9086  | 5.7920  | 5.6184  | 5.3406  | 4.5339  | 9.6061  | 6.4149  |
| Es-254+E  | 23.1627 | 16.9450 | 27.0746 | 40.6471 | 16.9591 | 13.3371 | 32.3022 | 28.1385 |
| Fe-60+E   | 8.4656  | 6.3303  | 9.0798  | 12.1646 | 6.7997  | 5.2761  | 18.8899 | 13.5767 |
| Fr-220+E  | 2.2080  | 1.5082  | 2.1073  | 3.6731  | 1.5577  | 1.2527  | 2.6583  | 2.9841  |
| Fr-221+E  | 0.8893  | 0.6936  | 0.8456  | 1.2583  | 0.7438  | 0.5957  | 1.3708  | 1.0192  |
| Ge-68+E   | 7.3433  | 4.0786  | 7.6619  | 14.5076 | 3.9679  | 3.1220  | 9.7610  | 12.2132 |
| Hf-172+E  | 22.0906 | 15.1348 | 25.7860 | 32.1176 | 16.1817 | 13.0946 | 32.2222 | 26.7778 |
| Hf-182+E  | 17.1453 | 13.1442 | 18.1572 | 21.4880 | 14.4387 | 12.1640 | 29.0948 | 20.8363 |
| Hg-193+E  | 15.5382 | 10.9923 | 15.7164 | 22.3791 | 11.7628 | 10.1174 | 22.4756 | 19.9685 |
| Hg-194+E  | 15.7770 | 11.0977 | 16.0071 | 22.8115 | 11.8132 | 10.1268 | 22.6440 | 20.6040 |
| In-114m+E | 5.8105  | 4.6074  | 6.7486  | 7.2452  | 4.8249  | 4.0312  | 8.6017  | 5.0122  |
| Ir-192m+E | 12.2726 | 9.0121  | 12.1839 | 16.9110 | 9.7845  | 7.7578  | 18.2440 | 16.4741 |
| Kr-76+E   | 13.8819 | 9.8226  | 13.2986 | 21.5605 | 10.4397 | 8.0743  | 19.0200 | 19.0718 |
| Mg-28+E   | 12.6495 | 10.1026 | 14.1906 | 13.1848 | 11.9761 | 9.4012  | 25.5749 | 12.2498 |
| Nd-140+E  | 12.2346 | 8.5240  | 13.6185 | 14.1339 | 10.9887 | 7.6611  | 20.4296 | 10.5744 |
| Ni-66+E   | 0.2411  | 0.2129  | 0.2698  | 0.2582  | 0.2392  | 0.1815  | 0.6465  | 0.3559  |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Np-235+E  | 6.5840  | 4.5673  | 7.0350  | 12.2507 | 4.4796  | 3.5769  | 7.8220  | 8.7265  |
| Np-237+E  | 25.1767 | 18.3413 | 26.2427 | 41.4032 | 18.8813 | 14.9727 | 31.2906 | 30.2508 |
| Os-194+E  | 4.2270  | 2.6560  | 4.3410  | 7.2443  | 2.7766  | 2.1157  | 5.9181  | 6.2935  |
| Pa-231+E  | 35.1616 | 24.9528 | 35.2112 | 57.5975 | 25.7313 | 20.5253 | 44.6241 | 45.5981 |
| Pb-202+E  | 14.7306 | 10.1106 | 14.6916 | 22.0863 | 10.7879 | 9.1269  | 19.5031 | 19.6454 |
| Pb-210+E  | 4.2208  | 2.6512  | 4.1465  | 7.7650  | 2.6560  | 2.0851  | 5.2185  | 6.4080  |
| Pd-103+E  | 11.0096 | 8.8899  | 16.7011 | 20.9715 | 8.6420  | 6.4543  | 15.5909 | 8.2607  |
| Pt-202+E  | 0.6870  | 0.5753  | 0.7113  | 0.7368  | 0.6575  | 0.5141  | 1.3871  | 0.9469  |
| Pu-239+E  | 4.4863  | 4.2336  | 4.7145  | 5.3874  | 4.0740  | 4.0493  | 4.8275  | 4.8468  |
| Pu-244+E  | 13.4833 | 9.8348  | 14.9613 | 23.6215 | 9.9161  | 7.7876  | 17.6421 | 16.7342 |
| Pu-246+E  | 21.3191 | 16.3369 | 24.0222 | 32.6372 | 17.3313 | 13.2780 | 32.3070 | 24.0703 |
| Ra-219+E  | 3.7015  | 2.8534  | 3.4916  | 4.7970  | 3.1100  | 2.4325  | 4.9621  | 4.3309  |
| Ra-221+E  | 5.0089  | 3.4694  | 4.8344  | 8.4593  | 3.5750  | 2.8590  | 6.0726  | 7.0818  |
| Ra-222+E  | 0.1137  | 0.0933  | 0.1088  | 0.1248  | 0.1043  | 0.0797  | 0.1707  | 0.1342  |
| Ra-223+E  | 10.1046 | 7.4560  | 9.6156  | 14.5016 | 8.0259  | 6.3838  | 13.3828 | 12.5220 |
| Ra-224+E  | 2.6279  | 2.6840  | 2.7348  | 2.6837  | 2.5640  | 2.6284  | 2.9093  | 2.6624  |
| Ra-226+E  | 11.1443 | 9.3508  | 11.1500 | 13.1549 | 10.0466 | 8.4033  | 18.5577 | 13.6610 |
| Ra-228+E  | 11.9334 | 9.5987  | 12.4202 | 17.3923 | 9.8327  | 8.2764  | 16.9728 | 14.9735 |
| Rb-81+E   | 10.3342 | 7.5232  | 9.2685  | 16.6878 | 7.8500  | 6.2993  | 13.6746 | 14.8780 |
| Rb-83+E   | 11.7612 | 8.1548  | 10.6246 | 19.7064 | 8.4225  | 6.8223  | 14.7918 | 17.4969 |
| Re-186m+E | 13.0151 | 7.8618  | 13.7524 | 23.0339 | 8.0441  | 6.5612  | 17.5972 | 19.5511 |
| Rn-219+E  | 0.8033  | 0.6531  | 0.7669  | 0.9975  | 0.7181  | 0.5682  | 1.2812  | 0.9394  |
| Rn-220+E  | 2.4103  | 2.5057  | 2.5266  | 2.3851  | 2.3735  | 2.4757  | 2.5386  | 2.4244  |
| Rn-222+E  | 0.0024  | 0.0020  | 0.0024  | 0.0025  | 0.0023  | 0.0019  | 0.0039  | 0.0030  |
| Ru-103+E  | 4.2902  | 3.4938  | 4.9526  | 5.5647  | 3.8750  | 3.0683  | 6.7480  | 4.8853  |
| Ru-106+E  | 0.9857  | 0.8222  | 1.0036  | 0.9934  | 0.9685  | 0.7450  | 1.9315  | 1.2986  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 15.1419 | 12.0710 | 17.5195 | 18.1943 | 12.6913 | 10.6386 | 21.7958 | 12.7932 |
| Sn-121m+E | 2.5076  | 1.8468  | 2.7862  | 3.0439  | 2.0196  | 1.6778  | 3.6693  | 2.2639  |
| Sn-126+E  | 17.5604 | 14.0044 | 18.4005 | 19.1013 | 16.0308 | 12.4153 | 31.5723 | 19.9177 |
| Sr-82+E   | 7.5745  | 5.3872  | 6.6034  | 13.4055 | 5.3712  | 4.3853  | 8.5598  | 10.9405 |
| Sr-90+E   | 0.0011  | 0.0009  | 0.0012  | 0.0020  | 0.0009  | 0.0007  | 0.0012  | 0.0013  |
| Te-118+E  | 12.1243 | 9.3664  | 13.5842 | 13.3339 | 10.1402 | 8.6536  | 17.8083 | 9.6567  |
| Te-129m+E | 5.6011  | 4.1500  | 6.2582  | 6.6363  | 4.6397  | 3.8318  | 8.5138  | 5.0310  |
| Th-229+E  | 29.4829 | 20.8056 | 29.1662 | 47.7136 | 21.9283 | 17.0980 | 37.2986 | 37.5005 |
| Th-232+E  | 27.7145 | 22.6987 | 28.1282 | 38.0134 | 23.3409 | 20.1553 | 39.3647 | 33.6110 |
| Th-234+E  | 2.5367  | 1.8366  | 2.6287  | 4.1297  | 1.8820  | 1.5667  | 3.1107  | 3.0730  |
| Ti-44+E   | 12.9777 | 10.4756 | 13.1039 | 12.9523 | 11.8209 | 10.5446 | 20.4686 | 12.5229 |
| U-228+E   | 2.8590  | 2.0791  | 2.9169  | 4.8477  | 2.1272  | 1.6815  | 3.5372  | 3.7801  |
| U-230+E   | 3.8160  | 2.7106  | 3.8943  | 6.7341  | 2.7120  | 2.1842  | 4.5323  | 4.9888  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 21.3343       | 17.1885       | 22.1392       | 32.1657       | 16.8378       | 14.9962       | 24.2955       | 25.4436       |
| U-238+E        | 5.0809        | 4.4219        | 5.1733        | 6.6739        | 4.3735        | 4.1208        | 5.9073        | 5.8127        |
| W-178+E        | 14.2107       | 9.6388        | 16.4769       | 20.2887       | 10.4162       | 8.6186        | 20.7300       | 17.6218       |
| Xe-122+E       | 12.8482       | 9.6144        | 14.4740       | 14.3282       | 11.1562       | 9.0583        | 20.2498       | 10.7841       |
| Zr-93+E        | 1.8338        | 1.3976        | 2.1159        | 3.3193        | 1.3757        | 1.0947        | 2.1277        | 2.0574        |

Table 54: Wood 5cm Contamination Thickness for 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 1.1650        | 1.3175        | 3.2576        | 3.6934        |
| Ac-225+E       | 3.5871        | 3.5548        | 8.1520        | 7.9849        |
| Ac-227+E       | 13.0140       | 13.2338       | 28.7047       | 29.5977       |
| Ag-108m+E      | 13.1342       | 10.7342       | 23.9611       | 18.9299       |
| Ag-110m+E      | 8.3102        | 5.3366        | 17.1424       | 11.4163       |
| Am-242m+E      | 5.8164        | 6.3444        | 13.2986       | 16.0221       |
| Am-243+E       | 13.9262       | 13.6174       | 29.8103       | 25.7566       |
| Ar-42+E        | 0.4121        | 0.3551        | 0.8234        | 0.3798        |
| At-211+E       | 2.6832        | 2.9741        | 5.8910        | 5.7412        |
| Ba-128+E       | 9.7818        | 8.9787        | 13.8682       | 18.3010       |
| Bi-210m+E      | 3.3438        | 3.0078        | 5.2024        | 4.4841        |
| Bi-212+E       | 0.7633        | 0.7792        | 2.0511        | 2.2873        |
| Bi-213+E       | 1.0275        | 0.8725        | 1.7256        | 1.2311        |
| Bi-214+E       | 3.3393        | 2.2920        | 7.4120        | 4.3734        |
| Bi-215+E       | 2.6241        | 2.4433        | 4.6097        | 3.9722        |
| Bi-216+E       | 4.2284        | 2.9827        | 7.8357        | 5.1215        |
| Cd-118+E       | 0.1614        | 0.1039        | 0.4014        | 0.2520        |
| Ce-134+E       | 8.7293        | 8.0506        | 12.1453       | 16.4324       |
| Ce-144+E       | 1.2271        | 0.9790        | 1.5573        | 1.5736        |
| Cl-34m+E       | 2.8732        | 1.9417        | 4.2865        | 3.0602        |
| Cm-245+E       | 7.6594        | 7.2557        | 18.8636       | 15.9920       |
| Cm-247+E       | 4.6598        | 4.4017        | 8.4389        | 6.0795        |
| Cm-250+E       | 43.1402       | 31.8633       | 77.0145       | 53.2358       |
| Cs-137+E       | 4.9718        | 4.1740        | 8.8797        | 6.6161        |
| Es-254+E       | 11.8178       | 12.1840       | 24.7701       | 31.3658       |
| Fe-60+E        | 5.7916        | 4.6344        | 16.1010       | 12.3225       |
| Fr-220+E       | 1.0632        | 1.1829        | 2.6028        | 2.9050        |
| Fr-221+E       | 0.6308        | 0.5675        | 1.4229        | 1.0043        |
| Ge-68+E        | 2.0887        | 2.8581        | 8.7314        | 10.5133       |
| Hf-172+E       | 12.6168       | 11.1566       | 24.5681       | 23.3328       |
| Hf-182+E       | 12.8474       | 10.9974       | 23.9178       | 17.9781       |
| Hg-193+E       | 9.4450        | 9.5135        | 19.0528       | 17.5744       |
| Hg-194+E       | 9.4336        | 9.6491        | 19.1021       | 17.9274       |
| In-114m+E      | 3.9734        | 3.6172        | 6.2462        | 7.2467        |
| Ir-192m+E      | 8.2437        | 7.6369        | 15.6057       | 14.1577       |
| Kr-76+E        | 7.7864        | 7.5592        | 16.0894       | 17.9164       |
| Mg-28+E        | 10.9378       | 9.2554        | 17.4334       | 16.2725       |
| Nd-140+E       | 9.0064        | 8.0080        | 11.3860       | 14.6416       |
| Ni-66+E        | 0.2368        | 0.1527        | 0.3529        | 0.3533        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 2.7268        | 3.2235        | 7.0279        | 9.5025        |
| Np-237+E       | 13.3301       | 13.9293       | 30.2822       | 33.2404       |
| Os-194+E       | 1.8781        | 2.0274        | 4.9371        | 5.5010        |
| Pa-231+E       | 18.1682       | 19.0980       | 41.3364       | 46.5107       |
| Pb-202+E       | 8.3864        | 8.6846        | 17.5926       | 16.6879       |
| Pb-210+E       | 1.5524        | 1.8517        | 4.6685        | 6.1363        |
| Pd-103+E       | 6.4631        | 6.6453        | 10.1289       | 11.6481       |
| Pt-202+E       | 0.6354        | 0.4652        | 1.1260        | 0.7674        |
| Pu-239+E       | 3.6503        | 3.8367        | 4.8259        | 5.3844        |
| Pu-244+E       | 6.7559        | 7.0006        | 15.4604       | 18.4299       |
| Pu-246+E       | 13.5897       | 11.9760       | 26.9973       | 25.6466       |
| Ra-219+E       | 2.6379        | 2.5576        | 4.8525        | 3.9965        |
| Ra-221+E       | 2.4574        | 2.6115        | 5.8968        | 6.7245        |
| Ra-222+E       | 0.0969        | 0.0881        | 0.1472        | 0.1122        |
| Ra-223+E       | 6.4689        | 6.3573        | 13.1775       | 11.3648       |
| Ra-224+E       | 2.4513        | 2.5395        | 2.7017        | 2.9428        |
| Ra-226+E       | 9.1207        | 8.0824        | 16.4041       | 12.5023       |
| Ra-228+E       | 7.9359        | 7.6395        | 14.4509       | 15.5636       |
| Rb-81+E        | 5.7669        | 5.5944        | 13.8485       | 14.4641       |
| Rb-83+E        | 5.6558        | 5.6451        | 14.0663       | 17.7511       |
| Re-186m+E      | 5.1697        | 5.8479        | 14.9289       | 16.6815       |
| Rn-219+E       | 0.6585        | 0.5866        | 1.0375        | 0.8038        |
| Rn-220+E       | 2.2829        | 2.3947        | 2.3960        | 2.6912        |
| Rn-222+E       | 0.0022        | 0.0013        | 0.0034        | 0.0028        |
| Ru-103+E       | 3.4480        | 2.4500        | 5.4612        | 4.9201        |
| Ru-106+E       | 0.9142        | 0.5596        | 1.7608        | 1.1981        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 10.5922       | 9.8681        | 15.0883       | 18.1188       |
| Sn-121m+E      | 1.6017        | 1.5295        | 2.4451        | 3.3923        |
| Sn-126+E       | 14.5427       | 11.5014       | 28.3826       | 19.3130       |
| Sr-82+E        | 3.2497        | 3.7601        | 8.1621        | 12.2187       |
| Sr-90+E        | 0.0005        | 0.0006        | 0.0012        | 0.0017        |
| Te-118+E       | 8.3004        | 7.7317        | 11.6318       | 16.4642       |
| Te-129m+E      | 3.7694        | 3.5163        | 5.7828        | 7.7262        |
| Th-229+E       | 15.4210       | 15.9140       | 35.2059       | 38.0791       |
| Th-232+E       | 19.5756       | 18.8604       | 34.5660       | 34.3316       |
| Th-234+E       | 1.3336        | 1.4112        | 3.0579        | 3.2170        |
| Ti-44+E        | 11.0565       | 10.4336       | 16.9484       | 11.1468       |
| U-228+E        | 1.4876        | 1.5380        | 3.4517        | 3.8520        |
| U-230+E        | 1.7496        | 1.9460        | 4.3273        | 5.3844        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 12.8129       | 13.8198       | 22.3317       | 27.9166       |
| U-238+E        | 3.7192        | 3.9106        | 5.8603        | 6.5844        |
| W-178+E        | 8.2601        | 7.3836        | 16.4122       | 14.2459       |
| Xe-122+E       | 9.3163        | 8.5103        | 13.4871       | 17.7510       |
| Zr-93+E        | 0.8846        | 0.9805        | 1.8818        | 2.5762        |

## Appendix F

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 55: Composite 1 Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5151  | 0.3189  | 0.4675  | 0.5416  | 0.4241  | 0.3148  | 0.5001  | 0.5682  |
| Ac-225+E  | 1.3742  | 0.9243  | 1.2603  | 1.4225  | 1.3183  | 1.0931  | 1.4812  | 1.5829  |
| Ac-227+E  | 4.8255  | 3.2193  | 4.4212  | 5.0068  | 4.5243  | 3.7063  | 5.1125  | 5.5140  |
| Ag-108m+E | 3.5305  | 2.5463  | 3.2604  | 3.5737  | 4.0605  | 3.7036  | 4.3405  | 4.3131  |
| Ag-110m+E | 2.9479  | 2.1265  | 2.7165  | 2.9720  | 3.5458  | 3.2631  | 3.7637  | 3.6964  |
| Am-242m+E | 1.7973  | 1.1491  | 1.6390  | 1.8728  | 1.5510  | 1.2089  | 1.7925  | 1.9736  |
| Am-243+E  | 4.2585  | 2.9374  | 3.9192  | 4.3931  | 4.1944  | 3.5604  | 4.6583  | 4.9144  |
| Ar-42+E   | 0.1675  | 0.1189  | 0.1536  | 0.1683  | 0.2033  | 0.1861  | 0.2150  | 0.2107  |
| At-211+E  | 0.9969  | 0.6622  | 0.9134  | 1.0379  | 0.9160  | 0.7422  | 1.0400  | 1.1310  |
| Ba-128+E  | 1.8186  | 1.2687  | 1.6689  | 1.8515  | 1.9796  | 1.7598  | 2.1357  | 2.1621  |
| Bi-210m+E | 1.1786  | 0.8537  | 1.0902  | 1.2035  | 1.3015  | 1.1661  | 1.4058  | 1.4362  |
| Bi-212+E  | 0.3566  | 0.2196  | 0.3228  | 0.3737  | 0.3074  | 0.2337  | 0.3584  | 0.4012  |
| Bi-213+E  | 0.3544  | 0.2551  | 0.3274  | 0.3610  | 0.3971  | 0.3570  | 0.4285  | 0.4337  |
| Bi-214+E  | 1.2492  | 0.8954  | 1.1497  | 1.2599  | 1.4941  | 1.3679  | 1.5861  | 1.5632  |
| Bi-215+E  | 0.9346  | 0.6652  | 0.8626  | 0.9567  | 1.0048  | 0.8883  | 1.0931  | 1.1247  |
| Bi-216+E  | 1.4529  | 1.0582  | 1.3433  | 1.4717  | 1.6992  | 1.5534  | 1.8139  | 1.8067  |
| Cd-118+E  | 0.0617  | 0.0441  | 0.0567  | 0.0621  | 0.0747  | 0.0687  | 0.0791  | 0.0775  |
| Ce-134+E  | 1.4879  | 1.0141  | 1.3605  | 1.5206  | 1.5693  | 1.3715  | 1.7052  | 1.7447  |
| Ce-144+E  | 0.2926  | 0.2125  | 0.2704  | 0.2980  | 0.3263  | 0.2946  | 0.3501  | 0.3533  |
| Cl-34m+E  | 1.0983  | 0.8056  | 1.0141  | 1.1077  | 1.3116  | 1.2061  | 1.3887  | 1.3708  |
| Cm-245+E  | 2.4491  | 1.6740  | 2.2522  | 2.5305  | 2.3511  | 1.9677  | 2.6311  | 2.7978  |
| Cm-247+E  | 1.4586  | 1.0452  | 1.3477  | 1.4893  | 1.5870  | 1.4131  | 1.7220  | 1.7568  |
| Cm-250+E  | 14.6401 | 10.6530 | 13.5148 | 14.7873 | 17.3141 | 15.8747 | 18.4036 | 18.2130 |
| Cs-137+E  | 1.9792  | 1.4315  | 1.8270  | 1.9957  | 2.3592  | 2.1640  | 2.4928  | 2.4590  |
| Es-254+E  | 3.8253  | 2.4514  | 3.4821  | 3.9715  | 3.4913  | 2.7933  | 3.9767  | 4.3078  |
| Fe-60+E   | 2.5501  | 1.6883  | 2.3204  | 2.6157  | 2.6983  | 2.3159  | 2.9618  | 3.0710  |
| Fr-220+E  | 0.4345  | 0.2784  | 0.3963  | 0.4547  | 0.3741  | 0.2889  | 0.4339  | 0.4831  |
| Fr-221+E  | 0.2306  | 0.1654  | 0.2133  | 0.2366  | 0.2441  | 0.2146  | 0.2663  | 0.2752  |
| Ge-68+E   | 1.4351  | 0.7604  | 1.2755  | 1.5463  | 0.9433  | 0.5355  | 1.2138  | 1.5335  |
| Hf-172+E  | 3.9098  | 2.4534  | 3.5439  | 4.0969  | 3.4511  | 2.6870  | 3.9717  | 4.4265  |
| Hf-182+E  | 4.3151  | 3.0153  | 3.9655  | 4.4257  | 4.6061  | 4.0346  | 5.0192  | 5.1870  |
| Hg-193+E  | 3.5263  | 2.3382  | 3.2216  | 3.6586  | 3.4008  | 2.8118  | 3.8168  | 4.0971  |
| Hg-194+E  | 3.6583  | 2.4092  | 3.3382  | 3.7974  | 3.5159  | 2.8968  | 3.9535  | 4.2595  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| In-114m+E | 0.7771 | 0.5480 | 0.7154 | 0.7911 | 0.8380 | 0.7467 | 0.9059 | 0.9158 |
| Ir-192m+E | 3.2715 | 2.2398 | 3.0006 | 3.3711 | 3.3631 | 2.8889 | 3.7149 | 3.9123 |
| Kr-76+E   | 3.1775 | 2.1103 | 2.9094 | 3.2952 | 2.9775 | 2.4318 | 3.3714 | 3.6376 |
| Mg-28+E   | 2.8957 | 2.0737 | 2.6617 | 2.9142 | 3.4559 | 3.1689 | 3.6594 | 3.5903 |
| Nd-140+E  | 1.5223 | 1.0354 | 1.3917 | 1.5577 | 1.5948 | 1.3896 | 1.7380 | 1.7818 |
| Ni-66+E   | 0.0903 | 0.0647 | 0.0830 | 0.0910 | 0.1092 | 0.0999 | 0.1156 | 0.1134 |
| Np-235+E  | 1.0426 | 0.6395 | 0.9465 | 1.0953 | 0.8266 | 0.5998 | 0.9843 | 1.1213 |
| Np-237+E  | 4.4134 | 2.9288 | 4.0437 | 4.5764 | 4.0610 | 3.3026 | 4.6073 | 4.9721 |
| Os-194+E  | 0.8788 | 0.5269 | 0.7926 | 0.9279 | 0.7186 | 0.5234 | 0.8525 | 0.9825 |
| Pa-231+E  | 6.7474 | 4.4117 | 6.1673 | 7.0221 | 6.0969 | 4.8748 | 6.9668 | 7.6070 |
| Pb-202+E  | 3.2699 | 2.1294 | 2.9816 | 3.4066 | 3.0459 | 2.4625 | 3.4583 | 3.7689 |
| Pb-210+E  | 0.7980 | 0.4676 | 0.7198 | 0.8463 | 0.5897 | 0.3957 | 0.7223 | 0.8542 |
| Pd-103+E  | 1.2189 | 0.8360 | 1.1203 | 1.2447 | 1.2262 | 1.0660 | 1.3438 | 1.3768 |
| Pt-202+E  | 0.2263 | 0.1637 | 0.2087 | 0.2288 | 0.2676 | 0.2449 | 0.2851 | 0.2825 |
| Pu-239+E  | 0.1722 | 0.1029 | 0.1557 | 0.1817 | 0.1324 | 0.0929 | 0.1595 | 0.1850 |
| Pu-244+E  | 2.2768 | 1.4787 | 2.0796 | 2.3632 | 2.0623 | 1.6526 | 2.3530 | 2.5490 |
| Pu-246+E  | 4.0614 | 2.8038 | 3.7324 | 4.1660 | 4.1678 | 3.5972 | 4.5839 | 4.7516 |
| Ra-219+E  | 0.9315 | 0.6632 | 0.8602 | 0.9547 | 0.9892 | 0.8724 | 1.0795 | 1.1167 |
| Ra-221+E  | 1.0091 | 0.6562 | 0.9222 | 1.0531 | 0.8890 | 0.6991 | 1.0238 | 1.1292 |
| Ra-222+E  | 0.0343 | 0.0252 | 0.0318 | 0.0348 | 0.0392 | 0.0358 | 0.0420 | 0.0424 |
| Ra-223+E  | 2.3347 | 1.6135 | 2.1479 | 2.4088 | 2.3414 | 1.9972 | 2.5951 | 2.7375 |
| Ra-224+E  | 1.1853 | 0.8655 | 1.0940 | 1.1938 | 1.4084 | 1.2945 | 1.4853 | 1.4658 |
| Ra-226+E  | 3.6081 | 2.5663 | 3.3210 | 3.6632 | 4.1033 | 3.6919 | 4.4022 | 4.4232 |
| Ra-228+E  | 3.1963 | 2.2177 | 2.9385 | 3.2596 | 3.4289 | 3.0168 | 3.7297 | 3.8107 |
| Rb-81+E   | 2.5421 | 1.7357 | 2.3391 | 2.6250 | 2.4345 | 2.0245 | 2.7349 | 2.9074 |
| Rb-83+E   | 2.6690 | 1.7336 | 2.4400 | 2.7750 | 2.3852 | 1.8864 | 2.7407 | 2.9885 |
| Re-186m+E | 2.5184 | 1.4419 | 2.2587 | 2.6832 | 1.8841 | 1.2607 | 2.3030 | 2.7542 |
| Rn-219+E  | 0.2303 | 0.1679 | 0.2132 | 0.2346 | 0.2579 | 0.2324 | 0.2778 | 0.2818 |
| Rn-220+E  | 1.1255 | 0.8219 | 1.0386 | 1.1328 | 1.3428 | 1.2359 | 1.4144 | 1.3935 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0007 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.0864 | 0.7820 | 1.0025 | 1.1020 | 1.2473 | 1.1323 | 1.3359 | 1.3360 |
| Ru-106+E  | 0.3149 | 0.2299 | 0.2910 | 0.3180 | 0.3765 | 0.3467 | 0.3996 | 0.3945 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 1.9909 | 1.4106 | 1.8334 | 2.0207 | 2.1878 | 1.9661 | 2.3568 | 2.3634 |
| Sn-121m+E | 0.2928 | 0.1920 | 0.2666 | 0.3018 | 0.2858 | 0.2398 | 0.3179 | 0.3345 |
| Sn-126+E  | 4.2101 | 3.0454 | 3.8882 | 4.2690 | 4.8639 | 4.4333 | 5.2002 | 5.1866 |
| Sr-82+E   | 1.4873 | 0.9702 | 1.3646 | 1.5457 | 1.2591 | 0.9722 | 1.4668 | 1.6059 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Te-118+E  | 1.2876 | 0.8890 | 1.1803 | 1.3097 | 1.3722 | 1.2152 | 1.4850 | 1.4977 |
| Te-129m+E | 0.7134 | 0.4807 | 0.6519 | 0.7312 | 0.7325 | 0.6319 | 0.8035 | 0.8302 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-229+E       | 5.4298       | 3.5527       | 4.9646       | 5.6494       | 4.8942       | 3.9107       | 5.5943       | 6.0989       |
| Th-232+E       | 8.0497       | 5.6317       | 7.4029       | 8.2070       | 8.7600       | 7.7435       | 9.4873       | 9.6704       |
| Th-234+E       | 0.4487       | 0.2959       | 0.4109       | 0.4661       | 0.4075       | 0.3282       | 0.4640       | 0.5030       |
| Ti-44+E        | 3.1495       | 2.3030       | 2.9141       | 3.2028       | 3.6014       | 3.2802       | 3.8423       | 3.8484       |
| U-228+E        | 0.5354       | 0.3575       | 0.4910       | 0.5552       | 0.4948       | 0.4032       | 0.5607       | 0.6047       |
| U-230+E        | 0.6520       | 0.4182       | 0.5952       | 0.6803       | 0.5582       | 0.4316       | 0.6479       | 0.7171       |
| U-235+E        | 3.6203       | 2.4623       | 3.3269       | 3.7398       | 3.4616       | 2.8809       | 3.8576       | 4.1388       |
| U-238+E        | 1.4076       | 1.0040       | 1.2976       | 1.4338       | 1.5483       | 1.3909       | 1.6569       | 1.7030       |
| W-178+E        | 2.6528       | 1.6700       | 2.4054       | 2.7796       | 2.3549       | 1.8389       | 2.7058       | 3.0122       |
| Xe-122+E       | 1.6518       | 1.1548       | 1.5167       | 1.6796       | 1.8018       | 1.6073       | 1.9414       | 1.9566       |
| Zr-93+E        | 0.2210       | 0.1461       | 0.2027       | 0.2283       | 0.1984       | 0.1607       | 0.2256       | 0.2413       |

Table 56: Composite 1 Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4253  | 0.3439  | 0.5161  | 0.5777  | 0.3092  | 0.3012  | 0.5094  | 0.5812  |
| Ac-225+E  | 1.4055  | 1.2664  | 1.5819  | 1.6401  | 1.1791  | 1.2075  | 1.6146  | 1.6931  |
| Ac-227+E  | 4.7735  | 4.2462  | 5.4279  | 5.6854  | 3.9284  | 3.9994  | 5.5018  | 5.8349  |
| Ag-108m+E | 4.6044  | 4.5172  | 4.8113  | 4.5843  | 4.2860  | 4.5346  | 5.0650  | 4.8607  |
| Ag-110m+E | 4.1372  | 4.1170  | 4.2810  | 4.0204  | 4.0279  | 4.3163  | 4.6323  | 4.3233  |
| Am-242m+E | 1.5543  | 1.3023  | 1.8340  | 1.9938  | 1.1105  | 1.0791  | 1.7819  | 1.9909  |
| Am-243+E  | 4.4814  | 4.1113  | 4.9745  | 5.0789  | 3.8004  | 3.9164  | 5.0641  | 5.2353  |
| Ar-42+E   | 0.2393  | 0.2376  | 0.2462  | 0.2292  | 0.2344  | 0.2524  | 0.2698  | 0.2482  |
| At-211+E  | 0.9602  | 0.8458  | 1.0993  | 1.1628  | 0.7852  | 0.8013  | 1.1124  | 1.2015  |
| Ba-128+E  | 2.1995  | 2.1209  | 2.3245  | 2.2523  | 1.9761  | 2.0882  | 2.4132  | 2.3415  |
| Bi-210m+E | 1.4628  | 1.4150  | 1.5623  | 1.5182  | 1.3685  | 1.4431  | 1.6447  | 1.6009  |
| Bi-212+E  | 0.3191  | 0.2673  | 0.3778  | 0.4141  | 0.2495  | 0.2502  | 0.3822  | 0.4216  |
| Bi-213+E  | 0.4496  | 0.4365  | 0.4755  | 0.4606  | 0.4227  | 0.4474  | 0.5036  | 0.4906  |
| Bi-214+E  | 1.7429  | 1.7282  | 1.8050  | 1.6945  | 1.6942  | 1.8152  | 1.9604  | 1.8289  |
| Bi-215+E  | 1.1196  | 1.0704  | 1.2052  | 1.1853  | 1.0285  | 1.0814  | 1.2631  | 1.2499  |
| Bi-216+E  | 1.9543  | 1.9268  | 2.0376  | 1.9408  | 1.8778  | 1.9993  | 2.1795  | 2.0803  |
| Cd-118+E  | 0.0875  | 0.0871  | 0.0903  | 0.0846  | 0.0855  | 0.0919  | 0.0982  | 0.0912  |
| Ce-134+E  | 1.7277  | 1.6452  | 1.8405  | 1.8049  | 1.5250  | 1.6118  | 1.9026  | 1.8644  |
| Ce-144+E  | 0.3663  | 0.3573  | 0.3857  | 0.3720  | 0.3424  | 0.3631  | 0.4070  | 0.3887  |
| Cl-34m+E  | 1.5225  | 1.5130  | 1.5774  | 1.4785  | 1.4845  | 1.5889  | 1.7192  | 1.5850  |
| Cm-245+E  | 2.4791  | 2.2389  | 2.7857  | 2.8815  | 2.0404  | 2.0761  | 2.8087  | 2.9357  |
| Cm-247+E  | 1.7677  | 1.6975  | 1.8875  | 1.8443  | 1.6189  | 1.7002  | 1.9729  | 1.9479  |
| Cm-250+E  | 20.0062 | 19.8216 | 20.7909 | 19.6002 | 19.3099 | 20.6278 | 22.3861 | 21.0054 |
| Cs-137+E  | 2.7389  | 2.7138  | 2.8479  | 2.6623  | 2.6533  | 2.8239  | 3.0833  | 2.8572  |
| Es-254+E  | 3.6360  | 3.1762  | 4.1816  | 4.4255  | 2.8384  | 2.8520  | 4.1898  | 4.4893  |
| Fe-60+E   | 3.0522  | 2.8769  | 3.3025  | 3.2864  | 2.8100  | 2.9693  | 3.5217  | 3.4696  |
| Fr-220+E  | 0.3811  | 0.3199  | 0.4511  | 0.4929  | 0.2899  | 0.2881  | 0.4488  | 0.5002  |
| Fr-221+E  | 0.2695  | 0.2566  | 0.2920  | 0.2886  | 0.2446  | 0.2557  | 0.3047  | 0.3041  |
| Ge-68+E   | 0.8719  | 0.5413  | 1.2160  | 1.5398  | 0.4949  | 0.4256  | 1.1713  | 1.5108  |
| Hf-172+E  | 3.6068  | 3.0983  | 4.1956  | 4.5415  | 2.9173  | 2.9828  | 4.2677  | 4.6175  |
| Hf-182+E  | 5.1518  | 4.9143  | 5.5529  | 5.4854  | 4.7601  | 5.0380  | 5.8616  | 5.7610  |
| Hg-193+E  | 3.6736  | 3.3286  | 4.1213  | 4.2685  | 3.1772  | 3.3058  | 4.2662  | 4.4375  |
| Hg-194+E  | 3.7996  | 3.4305  | 4.2721  | 4.4343  | 3.2827  | 3.4096  | 4.4226  | 4.6053  |
| In-114m+E | 0.9183  | 0.8823  | 0.9766  | 0.9499  | 0.8026  | 0.8368  | 1.0008  | 0.9843  |
| Ir-192m+E | 3.7152  | 3.4711  | 4.0744  | 4.1077  | 3.3505  | 3.4974  | 4.2543  | 4.3011  |
| Kr-76+E   | 3.1516  | 2.7996  | 3.5875  | 3.7596  | 2.6010  | 2.6517  | 3.6453  | 3.8570  |
| Mg-28+E   | 4.0053  | 3.9775  | 4.1281  | 3.8523  | 3.8438  | 4.1231  | 4.4573  | 4.1293  |
| Nd-140+E  | 1.7541  | 1.6658  | 1.8729  | 1.8426  | 1.5519  | 1.6424  | 1.9411  | 1.9058  |
| Ni-66+E   | 0.1278  | 0.1280  | 0.1327  | 0.1238  | 0.1248  | 0.1343  | 0.1444  | 0.1330  |

| Element   | avg100 | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.7997 | 0.6215 | 0.9898  | 1.1252  | 0.5171 | 0.4817 | 0.9475  | 1.1134  |
| Np-237+E  | 4.2134 | 3.6998 | 4.8248  | 5.0863  | 3.3166 | 3.3321 | 4.8130  | 5.1678  |
| Os-194+E  | 0.7318 | 0.5893 | 0.8910  | 1.0046  | 0.5531 | 0.5458 | 0.8935  | 1.0149  |
| Pa-231+E  | 6.3271 | 5.4919 | 7.3160  | 7.7980  | 4.9996 | 5.0250 | 7.3359  | 7.9410  |
| Pb-202+E  | 3.2489 | 2.8804 | 3.7004  | 3.9061  | 2.7409 | 2.8235 | 3.7976  | 4.0425  |
| Pb-210+E  | 0.5621 | 0.4074 | 0.7256  | 0.8587  | 0.3510 | 0.3221 | 0.6983  | 0.8486  |
| Pd-103+E  | 1.2816 | 1.1892 | 1.3965  | 1.3949  | 0.9972 | 1.0078 | 1.3597  | 1.4048  |
| Pt-202+E  | 0.3099 | 0.3067 | 0.3222  | 0.3049  | 0.2998 | 0.3204 | 0.3468  | 0.3272  |
| Pu-239+E  | 0.1272 | 0.0959 | 0.1603  | 0.1856  | 0.0807 | 0.0744 | 0.1535  | 0.1833  |
| Pu-244+E  | 2.1288 | 1.8454 | 2.4548  | 2.6087  | 1.6353 | 1.6312 | 2.4404  | 2.6433  |
| Pu-246+E  | 4.5391 | 4.2476 | 4.9571  | 4.9628  | 3.9490 | 4.1018 | 5.1106  | 5.1359  |
| Ra-219+E  | 1.0946 | 1.0410 | 1.1834  | 1.1702  | 0.9954 | 1.0424 | 1.2330  | 1.2313  |
| Ra-221+E  | 0.9128 | 0.7792 | 1.0692  | 1.1559  | 0.7074 | 0.7055 | 1.0684  | 1.1699  |
| Ra-222+E  | 0.0444 | 0.0436 | 0.0469  | 0.0449  | 0.0423 | 0.0447 | 0.0495  | 0.0477  |
| Ra-223+E  | 2.5417 | 2.3513 | 2.8078  | 2.8524  | 2.2297 | 2.3139 | 2.8983  | 2.9705  |
| Ra-224+E  | 1.6332 | 1.6220 | 1.7103  | 1.5837  | 1.5837 | 1.6854 | 1.8276  | 1.7039  |
| Ra-226+E  | 4.6983 | 4.5822 | 4.9534  | 4.7063  | 4.4599 | 4.7290 | 5.3135  | 5.0335  |
| Ra-228+E  | 3.8330 | 3.6657 | 4.1280  | 4.0308  | 3.4776 | 3.6470 | 4.3203  | 4.2508  |
| Rb-81+E   | 2.5802 | 2.3253 | 2.9100  | 3.0112  | 2.1366 | 2.1796 | 2.9584  | 3.1056  |
| Rb-83+E   | 2.4690 | 2.1204 | 2.8712  | 3.0809  | 1.9169 | 1.9220 | 2.8759  | 3.1393  |
| Re-186m+E | 1.8476 | 1.3696 | 2.3624  | 2.7912  | 1.2748 | 1.2195 | 2.3330  | 2.7802  |
| Rn-219+E  | 0.2909 | 0.2828 | 0.3089  | 0.2982  | 0.2734 | 0.2886 | 0.3257  | 0.3156  |
| Rn-220+E  | 1.5599 | 1.5512 | 1.6318  | 1.5073  | 1.5157 | 1.6140 | 1.7452  | 1.6236  |
| Rn-222+E  | 0.0010 | 0.0010 | 0.0010  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4220 | 1.3929 | 1.4901  | 1.4322  | 1.3420 | 1.4252 | 1.5818  | 1.5224  |
| Ru-106+E  | 0.4367 | 0.4339 | 0.4523  | 0.4271  | 0.4239 | 0.4530 | 0.4868  | 0.4591  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.4129 | 2.3330 | 2.5444  | 2.4521  | 2.1280 | 2.2254 | 2.6113  | 2.5481  |
| Sn-121m+E | 0.3041 | 0.2779 | 0.3353  | 0.3420  | 0.2486 | 0.2555 | 0.3376  | 0.3475  |
| Sn-126+E  | 5.5594 | 5.4652 | 5.8089  | 5.5370  | 5.2818 | 5.6169 | 6.1787  | 5.9078  |
| Sr-82+E   | 1.2459 | 1.0252 | 1.4881  | 1.6273  | 0.8569 | 0.8258 | 1.4388  | 1.6283  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001  | 0.0001  | 0.0001 | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 1.4927 | 1.4272 | 1.5827  | 1.5400  | 1.2714 | 1.3253 | 1.6058  | 1.5787  |
| Te-129m+E | 0.7958 | 0.7462 | 0.8604  | 0.8576  | 0.6806 | 0.7083 | 0.8788  | 0.8813  |
| Th-229+E  | 5.0658 | 4.3921 | 5.8560  | 6.2445  | 3.9789 | 3.9992 | 5.8641  | 6.3554  |
| Th-232+E  | 9.8599 | 9.4676 | 10.5547 | 10.2440 | 9.0872 | 9.5661 | 11.1635 | 10.8624 |
| Th-234+E  | 0.4214 | 0.3673 | 0.4851  | 0.5146  | 0.3299 | 0.3328 | 0.4843  | 0.5228  |
| Ti-44+E   | 4.1023 | 4.0391 | 4.2920  | 4.0946  | 3.9252 | 4.2177 | 4.5803  | 4.3993  |
| U-228+E   | 0.5147 | 0.4535 | 0.5891  | 0.6203  | 0.4089 | 0.4110 | 0.5907  | 0.6313  |
| U-230+E   | 0.5603 | 0.4665 | 0.6654  | 0.7271  | 0.4056 | 0.3951 | 0.6515  | 0.7292  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.6582        | 3.2916        | 4.1253        | 4.2625        | 3.0128        | 3.0558        | 4.1338        | 4.3843        |
| U-238+E        | 1.7381        | 1.6781        | 1.8194        | 1.7613        | 1.6119        | 1.7118        | 1.9525        | 1.8710        |
| W-178+E        | 2.4737        | 2.1347        | 2.8702        | 3.0981        | 2.0298        | 2.0920        | 2.9356        | 3.1631        |
| Xe-122+E       | 1.9946        | 1.9251        | 2.1041        | 2.0344        | 1.7728        | 1.8673        | 2.1734        | 2.1101        |
| Zr-93+E        | 0.1980        | 0.1700        | 0.2286        | 0.2420        | 0.1385        | 0.1333        | 0.2196        | 0.2408        |

Table 57: Composite 1 Surface Contamination 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2263        | 0.2929        | 0.5187        | 0.5806        |
| Ac-225+E       | 0.9915        | 1.2037        | 1.6694        | 1.7464        |
| Ac-227+E       | 3.2461        | 3.9575        | 5.6688        | 5.9581        |
| Ag-108m+E      | 3.8644        | 4.5444        | 5.2715        | 5.3871        |
| Ag-110m+E      | 3.8295        | 4.5169        | 4.8995        | 5.0216        |
| Am-242m+E      | 0.7486        | 0.9815        | 1.7864        | 1.9632        |
| Am-243+E       | 3.1987        | 3.8391        | 5.2203        | 5.2947        |
| Ar-42+E        | 0.2250        | 0.2670        | 0.2868        | 0.2849        |
| At-211+E       | 0.6512        | 0.7955        | 1.1458        | 1.1994        |
| Ba-128+E       | 1.7080        | 2.0211        | 2.4726        | 2.4460        |
| Bi-210m+E      | 1.2627        | 1.4639        | 1.7265        | 1.7180        |
| Bi-212+E       | 0.2000        | 0.2531        | 0.3935        | 0.4412        |
| Bi-213+E       | 0.3907        | 0.4568        | 0.5293        | 0.5360        |
| Bi-214+E       | 1.6124        | 1.9055        | 2.0753        | 2.1092        |
| Bi-215+E       | 0.9364        | 1.0978        | 1.3218        | 1.3376        |
| Bi-216+E       | 1.7628        | 2.0615        | 2.3015        | 2.3407        |
| Cd-118+E       | 0.0817        | 0.0968        | 0.1047        | 0.1051        |
| Ce-134+E       | 1.2977        | 1.5502        | 1.9409        | 1.9164        |
| Ce-144+E       | 0.3124        | 0.3628        | 0.4244        | 0.4070        |
| Cl-34m+E       | 1.4175        | 1.6592        | 1.8221        | 1.7654        |
| Cm-245+E       | 1.6608        | 2.0154        | 2.8837        | 2.9565        |
| Cm-247+E       | 1.4573        | 1.7059        | 2.0565        | 2.0762        |
| Cm-250+E       | 18.2140       | 21.3616       | 23.6362       | 23.5569       |
| Cs-137+E       | 2.5051        | 2.9212        | 3.1896        | 3.2730        |
| Es-254+E       | 2.1755        | 2.7506        | 4.2509        | 4.6406        |
| Fe-60+E        | 2.5920        | 3.1197        | 3.7219        | 3.8790        |
| Fr-220+E       | 0.2226        | 0.2818        | 0.4588        | 0.4975        |
| Fr-221+E       | 0.2201        | 0.2576        | 0.3179        | 0.3112        |
| Ge-68+E        | 0.2750        | 0.4189        | 1.1796        | 1.4927        |
| Hf-172+E       | 2.4107        | 2.9497        | 4.3828        | 4.6684        |
| Hf-182+E       | 4.3771        | 5.1470        | 6.1575        | 6.1413        |
| Hg-193+E       | 2.7845        | 3.3468        | 4.4377        | 4.6126        |
| Hg-194+E       | 2.8765        | 3.4548        | 4.6002        | 4.8521        |
| In-114m+E      | 0.6667        | 0.7877        | 1.0122        | 1.0034        |
| Ir-192m+E      | 3.0193        | 3.5535        | 4.4444        | 4.6710        |
| Kr-76+E        | 2.1617        | 2.6418        | 3.7633        | 4.0153        |
| Mg-28+E        | 3.5813        | 4.2341        | 4.6713        | 4.6306        |
| Nd-140+E       | 1.3312        | 1.5887        | 1.9818        | 1.9452        |
| Ni-66+E        | 0.1191        | 0.1413        | 0.1521        | 0.1550        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3060        | 0.4357        | 0.9469        | 1.0897        |
| Np-237+E       | 2.5734        | 3.2034        | 4.9083        | 5.2273        |
| Os-194+E       | 0.4325        | 0.5458        | 0.9153        | 1.0435        |
| Pa-231+E       | 3.9542        | 4.9133        | 7.5138        | 8.0441        |
| Pb-202+E       | 2.3536        | 2.8437        | 3.9396        | 4.1842        |
| Pb-210+E       | 0.2103        | 0.3056        | 0.7029        | 0.8337        |
| Pd-103+E       | 0.6970        | 0.8554        | 1.3391        | 1.3835        |
| Pt-202+E       | 0.2834        | 0.3325        | 0.3669        | 0.3705        |
| Pu-239+E       | 0.0472        | 0.0677        | 0.1535        | 0.1795        |
| Pu-244+E       | 1.2288        | 1.5634        | 2.4813        | 2.7041        |
| Pu-246+E       | 3.3867        | 4.0710        | 5.2785        | 5.3849        |
| Ra-219+E       | 0.8973        | 1.0505        | 1.2858        | 1.3172        |
| Ra-221+E       | 0.5515        | 0.6907        | 1.0943        | 1.1710        |
| Ra-222+E       | 0.0393        | 0.0453        | 0.0521        | 0.0533        |
| Ra-223+E       | 1.9579        | 2.3240        | 3.0127        | 3.0795        |
| Ra-224+E       | 1.4954        | 1.7318        | 1.8629        | 1.9249        |
| Ra-226+E       | 4.1707        | 4.9101        | 5.6277        | 5.7620        |
| Ra-228+E       | 3.1242        | 3.7362        | 4.5072        | 4.7093        |
| Rb-81+E        | 1.7681        | 2.1679        | 3.0554        | 3.1781        |
| Rb-83+E        | 1.4941        | 1.9093        | 2.9587        | 3.2559        |
| Re-186m+E      | 0.9159        | 1.2060        | 2.3765        | 2.7684        |
| Rn-219+E       | 0.2526        | 0.2928        | 0.3420        | 0.3397        |
| Rn-220+E       | 1.4333        | 1.6596        | 1.7765        | 1.8413        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0012        |
| Ru-103+E       | 1.2353        | 1.4532        | 1.6646        | 1.6877        |
| Ru-106+E       | 0.4011        | 0.4704        | 0.5153        | 0.5248        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.7783        | 2.0935        | 2.6420        | 2.6504        |
| Sn-121m+E      | 0.1928        | 0.2342        | 0.3368        | 0.3479        |
| Sn-126+E       | 4.8963        | 5.7294        | 6.4758        | 6.5696        |
| Sr-82+E        | 0.5587        | 0.7786        | 1.4554        | 1.6246        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0001        |
| Te-118+E       | 1.0094        | 1.2059        | 1.5986        | 1.5915        |
| Te-129m+E      | 0.5572        | 0.6683        | 0.8878        | 0.9054        |
| Th-229+E       | 3.1215        | 3.9004        | 5.9985        | 6.3858        |
| Th-232+E       | 8.2892        | 9.8370        | 11.6493       | 11.9743       |
| Th-234+E       | 0.2568        | 0.3218        | 0.4952        | 0.5243        |
| Ti-44+E        | 3.6983        | 4.3180        | 4.8272        | 4.6723        |
| U-228+E        | 0.3219        | 0.3993        | 0.6045        | 0.6347        |
| U-230+E        | 0.2854        | 0.3733        | 0.6598        | 0.7261        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4574        | 2.9950        | 4.2173        | 4.5046        |
| U-238+E        | 1.4732        | 1.7700        | 2.0835        | 2.1079        |
| W-178+E        | 1.7147        | 2.0941        | 3.0323        | 3.2101        |
| Xe-122+E       | 1.5034        | 1.7816        | 2.2103        | 2.1956        |
| Zr-93+E        | 0.0863        | 0.1167        | 0.2180        | 0.2358        |

Table 58: Composite 1 – 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3277  | 0.2781  | 0.3211  | 0.3460  | 0.2849  | 0.2583  | 0.3154  | 0.3473  |
| Ac-225+E  | 1.1725  | 1.0015  | 1.1575  | 1.2231  | 1.1695  | 1.1220  | 1.2638  | 1.3006  |
| Ac-227+E  | 3.9093  | 3.3772  | 3.8606  | 4.0778  | 3.8100  | 3.6446  | 4.1108  | 4.2652  |
| Ag-108m+E | 3.9060  | 3.2882  | 3.8719  | 4.0525  | 4.3095  | 4.2475  | 4.6128  | 4.5446  |
| Ag-110m+E | 3.9024  | 3.1289  | 3.8402  | 4.0738  | 4.4686  | 4.3933  | 4.8316  | 4.7212  |
| Am-242m+E | 0.9978  | 0.9007  | 0.9870  | 1.0412  | 0.8417  | 0.7703  | 0.9120  | 1.0053  |
| Am-243+E  | 3.5813  | 3.1852  | 3.5533  | 3.7133  | 3.5494  | 3.4562  | 3.7732  | 3.8600  |
| Ar-42+E   | 0.2116  | 0.1656  | 0.2068  | 0.2204  | 0.2466  | 0.2413  | 0.2678  | 0.2596  |
| At-211+E  | 0.7749  | 0.6813  | 0.7664  | 0.8082  | 0.7394  | 0.7090  | 0.7935  | 0.8285  |
| Ba-128+E  | 1.4675  | 1.3429  | 1.4643  | 1.5073  | 1.5018  | 1.4898  | 1.5645  | 1.5669  |
| Bi-210m+E | 1.3785  | 1.1668  | 1.3634  | 1.4306  | 1.4852  | 1.4618  | 1.5907  | 1.5807  |
| Bi-212+E  | 0.2623  | 0.2125  | 0.2561  | 0.2776  | 0.2477  | 0.2280  | 0.2752  | 0.2936  |
| Bi-213+E  | 0.4096  | 0.3422  | 0.4056  | 0.4254  | 0.4476  | 0.4397  | 0.4808  | 0.4763  |
| Bi-214+E  | 1.6012  | 1.2766  | 1.5721  | 1.6683  | 1.8358  | 1.8005  | 1.9875  | 1.9405  |
| Bi-215+E  | 1.0216  | 0.8647  | 1.0099  | 1.0615  | 1.0907  | 1.0701  | 1.1694  | 1.1664  |
| Bi-216+E  | 1.8320  | 1.5082  | 1.8117  | 1.9037  | 2.0480  | 2.0154  | 2.2041  | 2.1697  |
| Cd-118+E  | 0.0797  | 0.0628  | 0.0780  | 0.0831  | 0.0921  | 0.0904  | 0.0998  | 0.0971  |
| Ce-134+E  | 1.0502  | 0.9997  | 1.0512  | 1.0755  | 1.0245  | 1.0180  | 1.0507  | 1.0673  |
| Ce-144+E  | 0.3013  | 0.2690  | 0.2993  | 0.3106  | 0.3184  | 0.3170  | 0.3341  | 0.3323  |
| Cl-34m+E  | 1.3807  | 1.1259  | 1.3536  | 1.4320  | 1.5686  | 1.5405  | 1.6916  | 1.6469  |
| Cm-245+E  | 1.9399  | 1.7274  | 1.9224  | 2.0132  | 1.8871  | 1.8228  | 2.0125  | 2.0793  |
| Cm-247+E  | 1.5369  | 1.3153  | 1.5260  | 1.5938  | 1.6412  | 1.6134  | 1.7548  | 1.7474  |
| Cm-250+E  | 18.2190 | 14.9274 | 17.9470 | 18.9318 | 20.5442 | 20.2188 | 22.1283 | 21.6388 |
| Cs-137+E  | 2.4618  | 1.9979  | 2.4153  | 2.5615  | 2.7869  | 2.7440  | 2.9883  | 2.9348  |
| Es-254+E  | 2.6066  | 2.2162  | 2.5661  | 2.7316  | 2.4590  | 2.2985  | 2.6829  | 2.8334  |
| Fe-60+E   | 2.7113  | 2.1190  | 2.6426  | 2.8438  | 2.9750  | 2.8639  | 3.2551  | 3.2489  |
| Fr-220+E  | 0.2930  | 0.2551  | 0.2886  | 0.3071  | 0.2638  | 0.2458  | 0.2870  | 0.3090  |
| Fr-221+E  | 0.2485  | 0.2142  | 0.2459  | 0.2582  | 0.2612  | 0.2565  | 0.2792  | 0.2798  |
| Ge-68+E   | 0.6961  | 0.5255  | 0.6646  | 0.7626  | 0.4671  | 0.3451  | 0.5715  | 0.7279  |
| Hf-172+E  | 2.7667  | 2.4050  | 2.7264  | 2.9047  | 2.5169  | 2.3656  | 2.7209  | 2.9119  |
| Hf-182+E  | 4.6100  | 3.8895  | 4.5484  | 4.7971  | 4.9051  | 4.8062  | 5.2586  | 5.2546  |
| Hg-193+E  | 3.1473  | 2.6607  | 3.1011  | 3.2923  | 3.1663  | 3.0463  | 3.4214  | 3.5096  |
| Hg-194+E  | 3.2842  | 2.7444  | 3.2312  | 3.4379  | 3.3114  | 3.1740  | 3.5922  | 3.6870  |
| In-114m+E | 0.6080  | 0.5548  | 0.6063  | 0.6257  | 0.6212  | 0.6137  | 0.6501  | 0.6518  |
| Ir-192m+E | 3.4539  | 2.8583  | 3.4037  | 3.6059  | 3.6324  | 3.5181  | 3.9342  | 3.9704  |
| Kr-76+E   | 2.6039  | 2.2134  | 2.5673  | 2.7192  | 2.5626  | 2.4436  | 2.7790  | 2.8794  |
| Mg-28+E   | 3.2370  | 2.6639  | 3.1867  | 3.3537  | 3.6707  | 3.6190  | 3.9317  | 3.8285  |
| Nd-140+E  | 1.0816  | 1.0361  | 1.0838  | 1.1073  | 1.0465  | 1.0421  | 1.0699  | 1.0887  |
| Ni-66+E   | 0.1167  | 0.0923  | 0.1147  | 0.1219  | 0.1346  | 0.1323  | 0.1458  | 0.1421  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50   | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|---------|--------|
| Np-235+E  | 0.5050 | 0.4453 | 0.4959 | 0.5326 | 0.3836 | 0.3300 | 0.4283  | 0.4998 |
| Np-237+E  | 3.1332 | 2.7664 | 3.1000 | 3.2609 | 2.9445 | 2.7970 | 3.1680  | 3.3279 |
| Os-194+E  | 0.6090 | 0.4955 | 0.5940 | 0.6467 | 0.5436 | 0.4913 | 0.6078  | 0.6655 |
| Pa-231+E  | 4.9452 | 4.2826 | 4.8784 | 5.1678 | 4.6545 | 4.3954 | 5.0447  | 5.3194 |
| Pb-202+E  | 2.7651 | 2.3302 | 2.7249 | 2.8977 | 2.7179 | 2.5895 | 2.9524  | 3.0670 |
| Pb-210+E  | 0.3869 | 0.3246 | 0.3762 | 0.4135 | 0.2822 | 0.2328 | 0.3244  | 0.3902 |
| Pd-103+E  | 0.6592 | 0.6521 | 0.6653 | 0.6709 | 0.5986 | 0.5845 | 0.6132  | 0.6358 |
| Pt-202+E  | 0.2860 | 0.2320 | 0.2819 | 0.2976 | 0.3233 | 0.3179 | 0.3488  | 0.3418 |
| Pu-239+E  | 0.0830 | 0.0714 | 0.0811 | 0.0882 | 0.0614 | 0.0516 | 0.0697  | 0.0828 |
| Pu-244+E  | 1.5369 | 1.3304 | 1.5167 | 1.6052 | 1.4336 | 1.3425 | 1.5581  | 1.6502 |
| Pu-246+E  | 3.6430 | 3.1437 | 3.6034 | 3.7849 | 3.7572 | 3.6575 | 4.0197  | 4.0607 |
| Ra-219+E  | 0.9960 | 0.8492 | 0.9855 | 1.0342 | 1.0530 | 1.0328 | 1.1276  | 1.1273 |
| Ra-221+E  | 0.7188 | 0.6248 | 0.7081 | 0.7522 | 0.6637 | 0.6230 | 0.7202  | 0.7668 |
| Ra-222+E  | 0.0425 | 0.0357 | 0.0421 | 0.0442 | 0.0467 | 0.0460 | 0.0502  | 0.0494 |
| Ra-223+E  | 2.2171 | 1.9075 | 2.1928 | 2.3067 | 2.2684 | 2.2066 | 2.4326  | 2.4689 |
| Ra-224+E  | 1.4036 | 1.1462 | 1.3763 | 1.4488 | 1.5788 | 1.5602 | 1.6907  | 1.6591 |
| Ra-226+E  | 4.2531 | 3.4583 | 4.1717 | 4.4239 | 4.7331 | 4.6336 | 5.1054  | 5.0199 |
| Ra-228+E  | 3.2444 | 2.6625 | 3.1814 | 3.3785 | 3.5059 | 3.4022 | 3.7765  | 3.7711 |
| Rb-81+E   | 2.1444 | 1.8431 | 2.1176 | 2.2347 | 2.1429 | 2.0586 | 2.3131  | 2.3767 |
| Rb-83+E   | 1.9185 | 1.6147 | 1.8866 | 2.0088 | 1.8314 | 1.7135 | 2.0067  | 2.1170 |
| Re-186m+E | 1.4709 | 1.1975 | 1.4274 | 1.5765 | 1.1689 | 1.0029 | 1.3322  | 1.5455 |
| Rn-219+E  | 0.2715 | 0.2293 | 0.2688 | 0.2816 | 0.2948 | 0.2904 | 0.3158  | 0.3130 |
| Rn-220+E  | 1.3349 | 1.0874 | 1.3083 | 1.3776 | 1.5053 | 1.4878 | 1.6121  | 1.5808 |
| Rn-222+E  | 0.0009 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0011  | 0.0011 |
| Ru-103+E  | 1.2757 | 1.0572 | 1.2609 | 1.3235 | 1.4107 | 1.3855 | 1.5160  | 1.4974 |
| Ru-106+E  | 0.4131 | 0.3366 | 0.4077 | 0.4295 | 0.4674 | 0.4602 | 0.5037  | 0.4941 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 |
| Sn-113+E  | 1.5530 | 1.4102 | 1.5528 | 1.5946 | 1.6089 | 1.5926 | 1.6850  | 1.6787 |
| Sn-121m+E | 0.1628 | 0.1542 | 0.1623 | 0.1678 | 0.1464 | 0.1407 | 0.1522  | 0.1611 |
| Sn-126+E  | 4.9662 | 4.1550 | 4.9170 | 5.1615 | 5.5006 | 5.4273 | 5.8938  | 5.8040 |
| Sr-82+E   | 0.8037 | 0.7178 | 0.7936 | 0.8378 | 0.6900 | 0.6306 | 0.7534  | 0.8247 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001  | 0.0001 |
| Te-118+E  | 0.7471 | 0.7305 | 0.7507 | 0.7602 | 0.7193 | 0.7151 | 0.7313  | 0.7410 |
| Te-129m+E | 0.4840 | 0.4436 | 0.4819 | 0.4991 | 0.4726 | 0.4611 | 0.4948  | 0.5069 |
| Th-229+E  | 3.8430 | 3.3714 | 3.7958 | 4.0111 | 3.5748 | 3.3782 | 3.8594  | 4.0835 |
| Th-232+E  | 8.5506 | 7.0209 | 8.3838 | 8.8896 | 9.2971 | 9.0630 | 10.0154 | 9.9599 |
| Th-234+E  | 0.3107 | 0.2759 | 0.3075 | 0.3237 | 0.2883 | 0.2736 | 0.3097  | 0.3269 |
| Ti-44+E   | 3.5981 | 3.1057 | 3.5675 | 3.7242 | 3.9237 | 3.9110 | 4.1535  | 4.0781 |
| U-228+E   | 0.4025 | 0.3528 | 0.3977 | 0.4193 | 0.3834 | 0.3648 | 0.4132  | 0.4320 |
| U-230+E   | 0.3968 | 0.3497 | 0.3914 | 0.4152 | 0.3463 | 0.3184 | 0.3778  | 0.4116 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.7878       | 2.4524       | 2.7599       | 2.8997       | 2.7121       | 2.5998       | 2.8834       | 2.9952       |
| U-238+E        | 1.3040       | 1.1032       | 1.2791       | 1.3483       | 1.4005       | 1.3851       | 1.4909       | 1.4696       |
| W-178+E        | 1.9564       | 1.6950       | 1.9285       | 2.0537       | 1.8038       | 1.7044       | 1.9484       | 2.0705       |
| Xe-122+E       | 1.2578       | 1.1614       | 1.2564       | 1.2901       | 1.2836       | 1.2743       | 1.3329       | 1.3339       |
| Zr-93+E        | 0.1144       | 0.1089       | 0.1143       | 0.1179       | 0.0953       | 0.0883       | 0.1011       | 0.1105       |

Table 59: Composite 1 – 1cm Contamination Thickness for 100x100x10 ft and 200x200x10 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2838  | 0.2796  | 0.2959  | 0.3111  | 0.2345  | 0.2386  | 0.2671  | 0.3111  |
| Ac-225+E  | 1.2168  | 1.2278  | 1.2884  | 1.2785  | 1.1151  | 1.1422  | 1.2748  | 1.2534  |
| Ac-227+E  | 3.9267  | 3.9355  | 4.1441  | 4.1186  | 3.5549  | 3.6244  | 4.0307  | 4.1364  |
| Ag-108m+E | 4.6299  | 4.7037  | 4.9241  | 4.7418  | 4.4652  | 4.5941  | 5.2098  | 4.7215  |
| Ag-110m+E | 4.9064  | 5.0116  | 5.2491  | 5.0809  | 4.8120  | 5.0012  | 5.5800  | 5.0156  |
| Am-242m+E | 0.8169  | 0.7904  | 0.8575  | 0.8910  | 0.6373  | 0.6458  | 0.7196  | 0.8856  |
| Am-243+E  | 3.6456  | 3.6978  | 3.8273  | 3.7324  | 3.3588  | 3.4227  | 3.6294  | 3.7772  |
| Ar-42+E   | 0.2751  | 0.2833  | 0.3017  | 0.2762  | 0.2707  | 0.2881  | 0.3161  | 0.2751  |
| At-211+E  | 0.7524  | 0.7533  | 0.7690  | 0.7898  | 0.6810  | 0.6932  | 0.7241  | 0.8080  |
| Ba-128+E  | 1.5513  | 1.5689  | 1.5807  | 1.5727  | 1.4614  | 1.5094  | 1.5753  | 1.5228  |
| Bi-210m+E | 1.5822  | 1.6024  | 1.7090  | 1.6193  | 1.5241  | 1.5533  | 1.7898  | 1.6625  |
| Bi-212+E  | 0.2574  | 0.2571  | 0.2687  | 0.2764  | 0.2265  | 0.2355  | 0.2624  | 0.2754  |
| Bi-213+E  | 0.4798  | 0.4892  | 0.5142  | 0.4938  | 0.4633  | 0.4785  | 0.5365  | 0.4853  |
| Bi-214+E  | 2.0231  | 2.0738  | 2.1779  | 2.0711  | 1.9829  | 2.0569  | 2.3411  | 2.0890  |
| Bi-215+E  | 1.1605  | 1.1750  | 1.2557  | 1.1955  | 1.1115  | 1.1341  | 1.2872  | 1.2187  |
| Bi-216+E  | 2.2140  | 2.2612  | 2.3915  | 2.2952  | 2.1573  | 2.2181  | 2.5440  | 2.2660  |
| Cd-118+E  | 0.1023  | 0.1043  | 0.1105  | 0.1062  | 0.1003  | 0.1037  | 0.1193  | 0.1074  |
| Ce-134+E  | 1.0316  | 1.0462  | 1.0075  | 1.0327  | 0.9553  | 0.9969  | 0.9576  | 0.9794  |
| Ce-144+E  | 0.3330  | 0.3475  | 0.3433  | 0.3303  | 0.3218  | 0.3327  | 0.3445  | 0.3277  |
| Cl-34m+E  | 1.7206  | 1.7815  | 1.8273  | 1.7164  | 1.6852  | 1.7417  | 1.9610  | 1.7336  |
| Cm-245+E  | 1.9266  | 1.9597  | 2.0406  | 1.9798  | 1.7426  | 1.7697  | 1.8891  | 1.9904  |
| Cm-247+E  | 1.7401  | 1.7712  | 1.8454  | 1.7700  | 1.6628  | 1.7165  | 1.8934  | 1.7563  |
| Cm-250+E  | 22.3916 | 22.9560 | 24.1006 | 22.9014 | 21.8754 | 22.6372 | 25.3993 | 22.7249 |
| Cs-137+E  | 3.0396  | 3.1322  | 3.2070  | 3.0596  | 2.9758  | 3.0937  | 3.4111  | 3.0809  |
| Es-254+E  | 2.5293  | 2.4977  | 2.6956  | 2.7878  | 2.1911  | 2.2579  | 2.4773  | 2.7170  |
| Fe-60+E   | 3.2677  | 3.3155  | 3.5105  | 3.4319  | 3.1308  | 3.2479  | 3.6935  | 3.4742  |
| Fr-220+E  | 0.2643  | 0.2618  | 0.2715  | 0.2837  | 0.2266  | 0.2302  | 0.2488  | 0.2856  |
| Fr-221+E  | 0.2747  | 0.2807  | 0.2895  | 0.2850  | 0.2623  | 0.2663  | 0.2967  | 0.2728  |
| Ge-68+E   | 0.4311  | 0.4071  | 0.4160  | 0.5331  | 0.2668  | 0.2777  | 0.3003  | 0.5620  |
| Hf-172+E  | 2.5230  | 2.5480  | 2.5310  | 2.5719  | 2.2327  | 2.3045  | 2.3018  | 2.5836  |
| Hf-182+E  | 5.2200  | 5.3136  | 5.5063  | 5.3455  | 5.0133  | 5.1465  | 5.6253  | 5.3808  |
| Hg-193+E  | 3.3114  | 3.3525  | 3.4433  | 3.4296  | 3.0866  | 3.1811  | 3.3994  | 3.4251  |
| Hg-194+E  | 3.4792  | 3.5183  | 3.7217  | 3.5878  | 3.2359  | 3.3247  | 3.6867  | 3.6545  |
| In-114m+E | 0.6406  | 0.6468  | 0.6674  | 0.6526  | 0.5974  | 0.6026  | 0.6580  | 0.6290  |
| Ir-192m+E | 3.8662  | 3.9123  | 4.2938  | 4.0070  | 3.6620  | 3.7264  | 4.3773  | 4.0689  |
| Kr-76+E   | 2.6634  | 2.6687  | 2.8686  | 2.7930  | 2.4146  | 2.4603  | 2.8656  | 2.7968  |
| Mg-28+E   | 4.0216  | 4.1249  | 4.2944  | 4.0488  | 3.9244  | 4.1140  | 4.5247  | 4.0228  |
| Nd-140+E  | 1.0471  | 1.0742  | 1.0243  | 1.0274  | 0.9715  | 1.0225  | 0.9515  | 0.9790  |
| Ni-66+E   | 0.1488  | 0.1517  | 0.1620  | 0.1608  | 0.1461  | 0.1516  | 0.1655  | 0.1551  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3601        | 0.3368        | 0.3746        | 0.4188        | 0.2452        | 0.2477        | 0.2942        | 0.4103        |
| Np-237+E       | 2.9886        | 2.9724        | 3.2126        | 3.1528        | 2.6119        | 2.6473        | 2.9778        | 3.1681        |
| Os-194+E       | 0.5524        | 0.5488        | 0.5868        | 0.5972        | 0.4716        | 0.4832        | 0.5510        | 0.6113        |
| Pa-231+E       | 4.7445        | 4.7196        | 5.0011        | 5.0377        | 4.1751        | 4.2524        | 4.7617        | 5.0473        |
| Pb-202+E       | 2.8191        | 2.8439        | 2.9333        | 2.9438        | 2.5889        | 2.6680        | 2.8823        | 2.9490        |
| Pb-210+E       | 0.2637        | 0.2488        | 0.2632        | 0.3093        | 0.1769        | 0.1798        | 0.2101        | 0.3077        |
| Pd-103+E       | 0.5814        | 0.5560        | 0.6002        | 0.5861        | 0.4744        | 0.4759        | 0.5235        | 0.5913        |
| Pt-202+E       | 0.3530        | 0.3604        | 0.3810        | 0.3660        | 0.3447        | 0.3572        | 0.4022        | 0.3598        |
| Pu-239+E       | 0.0573        | 0.0536        | 0.0589        | 0.0673        | 0.0382        | 0.0388        | 0.0452        | 0.0669        |
| Pu-244+E       | 1.4606        | 1.4406        | 1.5549        | 1.5778        | 1.2531        | 1.2807        | 1.4711        | 1.5580        |
| Pu-246+E       | 3.9467        | 4.0079        | 4.1875        | 4.1015        | 3.6832        | 3.7895        | 4.1044        | 4.0203        |
| Ra-219+E       | 1.1161        | 1.1300        | 1.2425        | 1.1437        | 1.0635        | 1.0765        | 1.2443        | 1.1736        |
| Ra-221+E       | 0.6712        | 0.6684        | 0.6955        | 0.7175        | 0.5841        | 0.5920        | 0.6502        | 0.7075        |
| Ra-222+E       | 0.0503        | 0.0510        | 0.0573        | 0.0513        | 0.0487        | 0.0493        | 0.0588        | 0.0525        |
| Ra-223+E       | 2.3724        | 2.4007        | 2.5079        | 2.4482        | 2.2271        | 2.2737        | 2.4972        | 2.4776        |
| Ra-224+E       | 1.7205        | 1.7726        | 1.8132        | 1.6971        | 1.6829        | 1.7662        | 1.8702        | 1.7746        |
| Ra-226+E       | 5.1530        | 5.2807        | 5.5143        | 5.1897        | 5.0098        | 5.2085        | 5.7992        | 5.2842        |
| Ra-228+E       | 3.7811        | 3.8714        | 4.0428        | 3.8644        | 3.6037        | 3.7558        | 4.0768        | 3.8535        |
| Rb-81+E        | 2.2304        | 2.2467        | 2.3717        | 2.3726        | 2.0355        | 2.0620        | 2.3889        | 2.2143        |
| Rb-83+E        | 1.8919        | 1.8755        | 2.0267        | 2.0652        | 1.6571        | 1.6858        | 2.0165        | 2.0173        |
| Re-186m+E      | 1.1336        | 1.1190        | 1.1224        | 1.2522        | 0.8861        | 0.9166        | 0.9441        | 1.2856        |
| Rn-219+E       | 0.3147        | 0.3196        | 0.3361        | 0.3214        | 0.3037        | 0.3117        | 0.3551        | 0.3247        |
| Rn-220+E       | 1.6426        | 1.6935        | 1.7318        | 1.6168        | 1.6080        | 1.6897        | 1.7838        | 1.6944        |
| Rn-222+E       | 0.0011        | 0.0012        | 0.0012        | 0.0012        | 0.0011        | 0.0011        | 0.0013        | 0.0012        |
| Ru-103+E       | 1.5185        | 1.5461        | 1.6599        | 1.5912        | 1.4682        | 1.5072        | 1.7288        | 1.5550        |
| Ru-106+E       | 0.5082        | 0.5192        | 0.5521        | 0.5313        | 0.4973        | 0.5101        | 0.5888        | 0.5257        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.6705        | 1.6818        | 1.7484        | 1.6723        | 1.5622        | 1.5977        | 1.7538        | 1.6663        |
| Sn-121m+E      | 0.1431        | 0.1417        | 0.1407        | 0.1459        | 0.1234        | 0.1254        | 0.1249        | 0.1463        |
| Sn-126+E       | 5.9198        | 6.0445        | 6.2603        | 6.0391        | 5.7609        | 5.9344        | 6.6145        | 6.0388        |
| Sr-82+E        | 0.6832        | 0.6523        | 0.7212        | 0.7645        | 0.5301        | 0.5363        | 0.6679        | 0.7228        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0001        | 0.0000        | 0.0000        | 0.0000        | 0.0001        |
| Te-118+E       | 0.7160        | 0.7117        | 0.7153        | 0.7125        | 0.6452        | 0.6506        | 0.6626        | 0.7147        |
| Te-129m+E      | 0.4804        | 0.4810        | 0.4869        | 0.4913        | 0.4376        | 0.4476        | 0.4684        | 0.4853        |
| Th-229+E       | 3.6159        | 3.6159        | 3.7777        | 3.8322        | 3.1615        | 3.2303        | 3.5134        | 3.7839        |
| Th-232+E       | 10.0351       | 10.2903       | 10.6237       | 10.1511       | 9.6391        | 10.0479       | 10.9058       | 10.2874       |
| Th-234+E       | 0.2906        | 0.2897        | 0.3041        | 0.3052        | 0.2534        | 0.2586        | 0.2754        | 0.3048        |
| Ti-44+E        | 4.1848        | 4.2702        | 4.3602        | 4.2545        | 4.0993        | 4.2174        | 4.4053        | 4.3132        |
| U-228+E        | 0.3913        | 0.3901        | 0.4129        | 0.4175        | 0.3457        | 0.3502        | 0.3919        | 0.4002        |
| U-230+E        | 0.3431        | 0.3357        | 0.3654        | 0.3753        | 0.2790        | 0.2831        | 0.3241        | 0.3711        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.7788        | 2.8187        | 2.8713        | 2.9092        | 2.5062        | 2.5871        | 2.6950        | 2.8921        |
| U-238+E        | 1.4962        | 1.5414        | 1.5363        | 1.4882        | 1.4409        | 1.5121        | 1.5688        | 1.5186        |
| W-178+E        | 1.8190        | 1.8372        | 1.8286        | 1.8435        | 1.6300        | 1.6858        | 1.6710        | 1.8474        |
| Xe-122+E       | 1.3220        | 1.3336        | 1.3522        | 1.3361        | 1.2399        | 1.2692        | 1.3369        | 1.3086        |
| Zr-93+E        | 0.0911        | 0.0857        | 0.1000        | 0.1024        | 0.0669        | 0.0683        | 0.0771        | 0.0969        |

Table 60: Composite 1 – 1cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1945        | 0.2178        | 0.2930        | 0.3589        |
| Ac-225+E       | 1.0142        | 1.0953        | 1.2860        | 1.4318        |
| Ac-227+E       | 3.2037        | 3.4468        | 4.0822        | 4.5708        |
| Ag-108m+E      | 4.1863        | 4.4554        | 4.9097        | 5.5768        |
| Ag-110m+E      | 4.6097        | 4.8688        | 5.3253        | 5.9721        |
| Am-242m+E      | 0.4745        | 0.5717        | 0.7286        | 1.0637        |
| Am-243+E       | 3.0632        | 3.2965        | 3.6568        | 4.1395        |
| Ar-42+E        | 0.2613        | 0.2808        | 0.2917        | 0.3194        |
| At-211+E       | 0.6170        | 0.6585        | 0.7680        | 0.8657        |
| Ba-128+E       | 1.3371        | 1.4247        | 1.5015        | 1.7133        |
| Bi-210m+E      | 1.4480        | 1.5087        | 1.7059        | 1.7210        |
| Bi-212+E       | 0.1999        | 0.2180        | 0.2737        | 0.3286        |
| Bi-213+E       | 0.4398        | 0.4707        | 0.5286        | 0.5483        |
| Bi-214+E       | 1.9032        | 2.0201        | 2.2194        | 2.4447        |
| Bi-215+E       | 1.0503        | 1.1058        | 1.2653        | 1.2977        |
| Bi-216+E       | 2.0571        | 2.1817        | 2.4866        | 2.6056        |
| Cd-118+E       | 0.0966        | 0.1047        | 0.1150        | 0.1199        |
| Ce-134+E       | 0.8584        | 0.9069        | 0.9262        | 1.1894        |
| Ce-144+E       | 0.3052        | 0.3126        | 0.3485        | 0.3674        |
| Cl-34m+E       | 1.6287        | 1.7236        | 1.8901        | 1.8774        |
| Cm-245+E       | 1.5595        | 1.7060        | 1.9308        | 2.2609        |
| Cm-247+E       | 1.5616        | 1.6744        | 1.8394        | 2.0084        |
| Cm-250+E       | 20.9613       | 22.2704       | 24.4835       | 25.7376       |
| Cs-137+E       | 2.8426        | 2.9927        | 3.1857        | 3.5779        |
| Es-254+E       | 1.8662        | 2.1039        | 2.5447        | 3.1837        |
| Fe-60+E        | 2.9689        | 3.2350        | 3.6429        | 3.8868        |
| Fr-220+E       | 0.1950        | 0.2128        | 0.2693        | 0.3206        |
| Fr-221+E       | 0.2472        | 0.2601        | 0.2903        | 0.3026        |
| Ge-68+E        | 0.1613        | 0.2083        | 0.4800        | 0.6185        |
| Hf-172+E       | 2.0011        | 2.1554        | 2.5693        | 2.6766        |
| Hf-182+E       | 4.7684        | 5.0465        | 5.5364        | 5.6789        |
| Hg-193+E       | 2.8700        | 3.0528        | 3.4570        | 3.7243        |
| Hg-194+E       | 3.0014        | 3.1978        | 3.7549        | 3.9523        |
| In-114m+E      | 0.5363        | 0.5857        | 0.6365        | 0.6872        |
| Ir-192m+E      | 3.4290        | 3.6335        | 4.4203        | 4.4095        |
| Kr-76+E        | 2.1793        | 2.3346        | 2.9106        | 3.1615        |
| Mg-28+E        | 3.7490        | 4.0310        | 4.2274        | 4.6290        |
| Nd-140+E       | 0.8792        | 0.9292        | 0.9613        | 1.2591        |
| Ni-66+E        | 0.1406        | 0.1501        | 0.1674        | 0.1773        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1503        | 0.1972        | 0.3223        | 0.5206        |
| Np-237+E       | 2.2531        | 2.4951        | 3.0254        | 3.6373        |
| Os-194+E       | 0.4082        | 0.4457        | 0.6163        | 0.6843        |
| Pa-231+E       | 3.6582        | 3.9855        | 4.8710        | 5.6712        |
| Pb-202+E       | 2.3780        | 2.5523        | 2.9979        | 3.2302        |
| Pb-210+E       | 0.1136        | 0.1410        | 0.2702        | 0.3799        |
| Pd-103+E       | 0.3483        | 0.4395        | 0.4222        | 0.6558        |
| Pt-202+E       | 0.3300        | 0.3544        | 0.3928        | 0.4089        |
| Pu-239+E       | 0.0230        | 0.0304        | 0.0527        | 0.0826        |
| Pu-244+E       | 1.0537        | 1.1814        | 1.4579        | 1.8747        |
| Pu-246+E       | 3.3840        | 3.6588        | 4.0752        | 4.6163        |
| Ra-219+E       | 0.9989        | 1.0565        | 1.2562        | 1.2564        |
| Ra-221+E       | 0.5085        | 0.5518        | 0.6915        | 0.7953        |
| Ra-222+E       | 0.0461        | 0.0486        | 0.0585        | 0.0566        |
| Ra-223+E       | 2.0740        | 2.2013        | 2.5122        | 2.6761        |
| Ra-224+E       | 1.6103        | 1.7045        | 1.7484        | 1.9547        |
| Ra-226+E       | 4.7796        | 5.0983        | 5.5864        | 5.9272        |
| Ra-228+E       | 3.3760        | 3.6446        | 3.9411        | 4.4883        |
| Rb-81+E        | 1.8395        | 1.9798        | 2.4120        | 2.6478        |
| Rb-83+E        | 1.4427        | 1.5831        | 2.0856        | 2.4136        |
| Re-186m+E      | 0.7152        | 0.7969        | 1.1929        | 1.3915        |
| Rn-219+E       | 0.2886        | 0.3031        | 0.3363        | 0.3487        |
| Rn-220+E       | 1.5392        | 1.6305        | 1.6685        | 1.8711        |
| Rn-222+E       | 0.0011        | 0.0011        | 0.0013        | 0.0013        |
| Ru-103+E       | 1.3911        | 1.4989        | 1.7247        | 1.7026        |
| Ru-106+E       | 0.4756        | 0.5029        | 0.5771        | 0.6025        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.4033        | 1.5474        | 1.6530        | 1.8402        |
| Sn-121m+E      | 0.1013        | 0.1147        | 0.1275        | 0.1560        |
| Sn-126+E       | 5.4728        | 5.7683        | 6.3287        | 7.0912        |
| Sr-82+E        | 0.3959        | 0.4616        | 0.6639        | 0.9798        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0001        |
| Te-118+E       | 0.5453        | 0.6152        | 0.6290        | 0.7339        |
| Te-129m+E      | 0.3847        | 0.4211        | 0.4590        | 0.5304        |
| Th-229+E       | 2.7501        | 3.0196        | 3.6600        | 4.4501        |
| Th-232+E       | 9.1056        | 9.7515        | 10.6111       | 11.6793       |
| Th-234+E       | 0.2193        | 0.2429        | 0.2813        | 0.3492        |
| Ti-44+E        | 3.9535        | 4.1596        | 4.3723        | 4.4937        |
| U-228+E        | 0.3024        | 0.3313        | 0.3969        | 0.4636        |
| U-230+E        | 0.2225        | 0.2536        | 0.3354        | 0.4455        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.2281        | 2.4579        | 2.7213        | 3.2475        |
| U-238+E        | 1.3624        | 1.4767        | 1.5841        | 1.6624        |
| W-178+E        | 1.4835        | 1.5958        | 1.8385        | 1.9120        |
| Xe-122+E       | 1.1206        | 1.2037        | 1.2782        | 1.4517        |
| Zr-93+E        | 0.0431        | 0.0571        | 0.0665        | 0.1272        |

Table 61: Composite 1 – 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2750  | 0.2721  | 0.3035  | 0.3547  | 0.2817  | 0.2243  | 0.2559  | 0.3086  |
| Ac-225+E  | 1.1697  | 1.1195  | 1.1530  | 1.2622  | 1.2165  | 1.0419  | 1.1156  | 1.4349  |
| Ac-227+E  | 3.6450  | 3.5462  | 3.6280  | 4.0609  | 3.7799  | 3.1893  | 3.4262  | 4.1161  |
| Ag-108m+E | 4.8822  | 4.3468  | 4.4649  | 4.6207  | 4.9563  | 4.5471  | 5.0395  | 7.0842  |
| Ag-110m+E | 4.7849  | 4.2629  | 4.4185  | 4.2249  | 5.0352  | 4.8078  | 5.2599  | 8.5128  |
| Am-242m+E | 0.8740  | 0.8687  | 0.9835  | 1.2906  | 0.8884  | 0.6535  | 0.7375  | 0.7225  |
| Am-243+E  | 3.1493  | 3.1882  | 3.1356  | 3.6034  | 3.2311  | 2.7189  | 2.9327  | 3.3300  |
| Ar-42+E   | 0.2530  | 0.2161  | 0.2300  | 0.2280  | 0.2799  | 0.2543  | 0.2486  | 0.4886  |
| At-211+E  | 0.5695  | 0.6081  | 0.5772  | 0.6648  | 0.5825  | 0.5255  | 0.6287  | 0.6366  |
| Ba-128+E  | 1.5916  | 1.4643  | 1.4863  | 1.6876  | 1.6347  | 1.3548  | 1.7776  | 1.7112  |
| Bi-210m+E | 1.5758  | 1.4167  | 1.4049  | 1.4475  | 1.6128  | 1.4198  | 1.4485  | 1.8271  |
| Bi-212+E  | 0.2567  | 0.2372  | 0.2677  | 0.2823  | 0.2652  | 0.2337  | 0.2656  | 0.4000  |
| Bi-213+E  | 0.4980  | 0.4517  | 0.4521  | 0.4603  | 0.5056  | 0.4570  | 0.4945  | 0.6663  |
| Bi-214+E  | 1.9451  | 1.7065  | 1.7740  | 1.7334  | 2.0661  | 1.9339  | 2.0788  | 3.4670  |
| Bi-215+E  | 1.1002  | 1.0109  | 0.9977  | 1.0393  | 1.1347  | 1.0063  | 1.0656  | 1.3825  |
| Bi-216+E  | 2.3539  | 2.1027  | 2.1235  | 2.1473  | 2.3959  | 2.2033  | 2.4784  | 3.4237  |
| Cd-118+E  | 0.0954  | 0.0837  | 0.0867  | 0.0826  | 0.1028  | 0.0961  | 0.0998  | 0.1746  |
| Ce-134+E  | 0.9851  | 0.9381  | 0.9489  | 1.1468  | 1.0255  | 0.7832  | 1.2366  | 0.9313  |
| Ce-144+E  | 0.2812  | 0.2804  | 0.2689  | 0.2850  | 0.2990  | 0.2496  | 0.2635  | 0.3156  |
| Cl-34m+E  | 1.5200  | 1.3497  | 1.4049  | 1.3596  | 1.6337  | 1.4593  | 1.3846  | 2.5049  |
| Cm-245+E  | 1.7058  | 1.7687  | 1.8038  | 2.1043  | 1.7821  | 1.3947  | 1.4496  | 1.8654  |
| Cm-247+E  | 1.7485  | 1.6210  | 1.6090  | 1.6901  | 1.7770  | 1.5590  | 1.6333  | 2.1465  |
| Cm-250+E  | 21.5926 | 19.1963 | 19.7181 | 19.4708 | 22.7599 | 20.7414 | 21.7115 | 34.0846 |
| Cs-137+E  | 2.6735  | 2.4344  | 2.5653  | 2.5875  | 2.8116  | 2.7350  | 2.9801  | 3.6663  |
| Es-254+E  | 2.6492  | 2.4296  | 2.7461  | 3.1310  | 2.7174  | 2.3158  | 2.5697  | 3.3360  |
| Fe-60+E   | 3.0527  | 2.6656  | 2.8724  | 2.7715  | 3.2669  | 3.0049  | 3.1238  | 5.5524  |
| Fr-220+E  | 0.2196  | 0.2317  | 0.2398  | 0.2824  | 0.2296  | 0.1914  | 0.2204  | 0.2397  |
| Fr-221+E  | 0.2478  | 0.2316  | 0.2308  | 0.2403  | 0.2598  | 0.2237  | 0.2230  | 0.2840  |
| Ge-68+E   | 0.5370  | 0.4600  | 0.6755  | 0.7365  | 0.4625  | 0.3405  | 0.4714  | 0.6702  |
| Hf-172+E  | 2.1802  | 2.0426  | 2.2252  | 2.3740  | 2.0946  | 1.8522  | 2.0476  | 2.0907  |
| Hf-182+E  | 4.7208  | 4.3214  | 4.3481  | 4.3562  | 4.8391  | 4.4287  | 4.5453  | 6.1757  |
| Hg-193+E  | 2.9225  | 2.7421  | 2.7950  | 2.8998  | 2.9500  | 2.7391  | 2.9701  | 3.7722  |
| Hg-194+E  | 3.2543  | 2.9555  | 3.0571  | 3.2058  | 3.2841  | 2.9565  | 3.1789  | 4.1562  |
| In-114m+E | 0.6655  | 0.6017  | 0.6172  | 0.7038  | 0.6827  | 0.5923  | 0.5880  | 0.6715  |
| Ir-192m+E | 4.0450  | 3.5511  | 3.6626  | 3.8092  | 4.1035  | 3.5383  | 3.7695  | 5.0150  |
| Kr-76+E   | 2.6048  | 2.4529  | 2.5615  | 2.7782  | 2.7541  | 2.3149  | 2.4393  | 3.1205  |
| Mg-28+E   | 3.8292  | 3.3485  | 3.4997  | 3.5263  | 4.1021  | 3.7134  | 3.9788  | 6.4596  |
| Nd-140+E  | 0.9689  | 0.9380  | 0.9139  | 1.1181  | 1.0260  | 0.7738  | 1.1366  | 0.8085  |
| Ni-66+E   | 0.1387  | 0.1221  | 0.1295  | 0.1173  | 0.1487  | 0.1436  | 0.1527  | 0.2484  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|--------|---------|
| Np-235+E  | 0.3898 | 0.4054 | 0.4821 | 0.6509 | 0.4125 | 0.2942 | 0.3490 | 0.3268  |
| Np-237+E  | 2.8699 | 2.8557 | 2.9740 | 3.5851 | 3.0113 | 2.3862 | 2.6255 | 3.0002  |
| Os-194+E  | 0.5832 | 0.5191 | 0.5982 | 0.6439 | 0.5760 | 0.4701 | 0.5350 | 0.7082  |
| Pa-231+E  | 4.4960 | 4.4104 | 4.6119 | 5.3207 | 4.6826 | 3.8731 | 4.2182 | 4.9279  |
| Pb-202+E  | 2.6899 | 2.5193 | 2.5899 | 2.7385 | 2.6568 | 2.4166 | 2.7237 | 3.2799  |
| Pb-210+E  | 0.2533 | 0.2660 | 0.3352 | 0.4090 | 0.2683 | 0.1976 | 0.2463 | 0.2773  |
| Pd-103+E  | 0.7526 | 0.6266 | 0.7403 | 0.9926 | 0.6750 | 0.5013 | 0.5451 | 0.3815  |
| Pt-202+E  | 0.3576 | 0.3169 | 0.3247 | 0.3168 | 0.3714 | 0.3433 | 0.3647 | 0.5566  |
| Pu-239+E  | 0.0649 | 0.0646 | 0.0801 | 0.1047 | 0.0656 | 0.0466 | 0.0570 | 0.0569  |
| Pu-244+E  | 1.5384 | 1.4666 | 1.6002 | 1.9143 | 1.5988 | 1.3224 | 1.5007 | 1.8326  |
| Pu-246+E  | 3.7040 | 3.5079 | 3.6415 | 3.9287 | 3.8882 | 3.3474 | 3.5159 | 4.8574  |
| Ra-219+E  | 1.0645 | 0.9760 | 0.9584 | 1.0292 | 1.0973 | 0.9325 | 0.9867 | 1.2511  |
| Ra-221+E  | 0.5820 | 0.5986 | 0.6297 | 0.7246 | 0.6140 | 0.4956 | 0.5220 | 0.6312  |
| Ra-222+E  | 0.0519 | 0.0452 | 0.0451 | 0.0471 | 0.0535 | 0.0453 | 0.0465 | 0.0623  |
| Ra-223+E  | 2.1472 | 2.0698 | 2.0438 | 2.1907 | 2.2014 | 1.9168 | 2.0491 | 2.5556  |
| Ra-224+E  | 1.4555 | 1.3520 | 1.4496 | 1.4794 | 1.5392 | 1.5367 | 1.5656 | 1.5448  |
| Ra-226+E  | 4.6820 | 4.2012 | 4.3839 | 4.4478 | 4.9470 | 4.6246 | 4.8818 | 6.5986  |
| Ra-228+E  | 3.3702 | 3.1062 | 3.3231 | 3.4700 | 3.5924 | 3.3393 | 3.5167 | 4.4557  |
| Rb-81+E   | 2.0346 | 1.9725 | 2.0483 | 2.2174 | 2.2279 | 1.8805 | 1.9010 | 2.5356  |
| Rb-83+E   | 1.8854 | 1.8510 | 1.9714 | 2.2094 | 2.0341 | 1.7798 | 2.0633 | 2.6607  |
| Re-186m+E | 1.1325 | 1.0412 | 1.2930 | 1.4073 | 1.0415 | 0.8476 | 1.0243 | 1.2252  |
| Rn-219+E  | 0.3209 | 0.2903 | 0.2888 | 0.2947 | 0.3287 | 0.2899 | 0.2939 | 0.3847  |
| Rn-220+E  | 1.3795 | 1.2822 | 1.3800 | 1.4080 | 1.4605 | 1.4675 | 1.4973 | 1.4588  |
| Rn-222+E  | 0.0012 | 0.0011 | 0.0011 | 0.0011 | 0.0013 | 0.0012 | 0.0013 | 0.0018  |
| Ru-103+E  | 1.6772 | 1.4792 | 1.5161 | 1.5681 | 1.6827 | 1.5390 | 1.7655 | 2.3266  |
| Ru-106+E  | 0.5364 | 0.4758 | 0.4840 | 0.4861 | 0.5489 | 0.5123 | 0.5884 | 0.8287  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 1.8957 | 1.7032 | 1.7269 | 1.9568 | 1.9194 | 1.6852 | 1.6910 | 1.9540  |
| Sn-121m+E | 0.1605 | 0.1495 | 0.1581 | 0.1981 | 0.1619 | 0.1349 | 0.1609 | 0.1300  |
| Sn-126+E  | 5.8822 | 5.3609 | 5.3761 | 5.4238 | 6.0351 | 5.6087 | 6.2198 | 8.8744  |
| Sr-82+E   | 0.5592 | 0.6748 | 0.7131 | 0.9231 | 0.7131 | 0.5825 | 0.6334 | 0.7597  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000  |
| Te-118+E  | 0.8010 | 0.7483 | 0.7506 | 0.9514 | 0.8279 | 0.7218 | 0.7982 | 0.6602  |
| Te-129m+E | 0.5199 | 0.4779 | 0.4973 | 0.5811 | 0.5284 | 0.4542 | 0.5500 | 0.5509  |
| Th-229+E  | 3.2921 | 3.3467 | 3.4668 | 4.0952 | 3.4800 | 2.8225 | 3.1458 | 3.6008  |
| Th-232+E  | 8.7742 | 8.0770 | 8.5605 | 8.8920 | 9.3146 | 8.7719 | 9.2264 | 11.2305 |
| Th-234+E  | 0.2537 | 0.2631 | 0.2697 | 0.3256 | 0.2642 | 0.2229 | 0.2472 | 0.2656  |
| Ti-44+E   | 3.2599 | 3.1411 | 2.8633 | 2.8870 | 3.3276 | 3.3202 | 3.6472 | 4.4265  |
| U-228+E   | 0.3671 | 0.3612 | 0.3793 | 0.4436 | 0.3881 | 0.3106 | 0.3187 | 0.3829  |
| U-230+E   | 0.3359 | 0.3466 | 0.3753 | 0.4751 | 0.3601 | 0.2760 | 0.3035 | 0.3282  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.4154       | 2.4214       | 2.5846       | 2.9648       | 2.5375       | 2.3060       | 2.4218       | 2.3389       |
| U-238+E        | 1.3162       | 1.2585       | 1.3398       | 1.4170       | 1.4051       | 1.3699       | 1.3929       | 1.4194       |
| W-178+E        | 1.5115       | 1.4136       | 1.5129       | 1.5876       | 1.4405       | 1.3267       | 1.4844       | 1.4943       |
| Xe-122+E       | 1.3699       | 1.2640       | 1.2772       | 1.4777       | 1.4107       | 1.2022       | 1.4922       | 1.4797       |
| Zr-93+E        | 0.1121       | 0.1137       | 0.1231       | 0.1862       | 0.1183       | 0.0817       | 0.0918       | 0.0594       |

Table 62: Composite 1 – 5cm Contamination Thickness for 100x100x10 ft and 200x200x10 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2671  | 0.2226  | 0.3176  | 0.2880  | 0.2192  | 0.1846  | 0.4644  | 0.3544  |
| Ac-225+E  | 1.2265  | 0.9473  | 1.5106  | 1.4208  | 1.1241  | 0.8321  | 2.7456  | 1.9229  |
| Ac-227+E  | 3.7422  | 3.0229  | 4.5215  | 4.4277  | 3.3696  | 2.7221  | 7.2769  | 4.8668  |
| Ag-108m+E | 5.2338  | 4.1227  | 5.8211  | 6.5836  | 4.9467  | 3.6586  | 13.2270 | 9.1713  |
| Ag-110m+E | 5.3447  | 4.2581  | 5.9535  | 7.4388  | 5.2074  | 3.7497  | 15.4691 | 11.2735 |
| Am-242m+E | 0.8133  | 0.7093  | 0.8344  | 0.7471  | 0.6081  | 0.5646  | 1.0195  | 0.8711  |
| Am-243+E  | 3.2258  | 2.5169  | 4.2294  | 3.8560  | 2.8939  | 2.3538  | 6.1399  | 3.6271  |
| Ar-42+E   | 0.2926  | 0.2373  | 0.2949  | 0.3697  | 0.2882  | 0.2047  | 0.7141  | 0.4831  |
| At-211+E  | 0.5871  | 0.4302  | 0.7129  | 0.7478  | 0.5333  | 0.5108  | 0.7851  | 0.6068  |
| Ba-128+E  | 1.6537  | 1.3609  | 1.5597  | 1.7500  | 1.5844  | 1.1225  | 2.8164  | 2.2002  |
| Bi-210m+E | 1.6361  | 1.3891  | 1.9831  | 2.0143  | 1.5690  | 1.2556  | 3.2590  | 1.9322  |
| Bi-212+E  | 0.2634  | 0.2199  | 0.2815  | 0.3347  | 0.2339  | 0.1837  | 0.6225  | 0.4968  |
| Bi-213+E  | 0.5374  | 0.3997  | 0.6490  | 0.6869  | 0.5181  | 0.3485  | 1.4229  | 1.0605  |
| Bi-214+E  | 2.1937  | 1.7579  | 2.4008  | 2.7940  | 2.1355  | 1.5388  | 6.1924  | 3.9614  |
| Bi-215+E  | 1.1559  | 0.9832  | 1.4157  | 1.5259  | 1.1068  | 0.8607  | 2.4834  | 1.6348  |
| Bi-216+E  | 2.5522  | 2.0124  | 2.9640  | 3.0949  | 2.4512  | 1.7177  | 6.4301  | 4.4274  |
| Cd-118+E  | 0.1107  | 0.0834  | 0.1212  | 0.1515  | 0.1094  | 0.0711  | 0.3323  | 0.2555  |
| Ce-134+E  | 0.9939  | 0.8768  | 0.7602  | 0.9175  | 0.9527  | 0.6700  | 1.1010  | 0.9603  |
| Ce-144+E  | 0.2998  | 0.2308  | 0.3224  | 0.3047  | 0.2810  | 0.1878  | 0.7299  | 0.3771  |
| Cl-34m+E  | 1.6926  | 1.3209  | 1.9000  | 1.9515  | 1.6363  | 1.1040  | 5.7039  | 2.7715  |
| Cm-245+E  | 1.7582  | 1.3473  | 2.4278  | 2.0922  | 1.5032  | 1.0709  | 4.1554  | 2.1430  |
| Cm-247+E  | 1.8741  | 1.3401  | 2.3349  | 2.4503  | 1.7858  | 1.2086  | 5.0456  | 3.6727  |
| Cm-250+E  | 23.8321 | 18.9828 | 27.5780 | 30.3309 | 23.1757 | 16.2164 | 66.0934 | 43.4570 |
| Cs-137+E  | 2.9510  | 2.7154  | 3.1262  | 3.3399  | 2.8658  | 2.5530  | 5.3492  | 3.7903  |
| Es-254+E  | 2.6853  | 2.2254  | 2.6375  | 2.9493  | 2.3292  | 1.8568  | 5.5651  | 5.0945  |
| Fe-60+E   | 3.4743  | 2.6332  | 3.7045  | 4.6433  | 3.3705  | 2.2350  | 9.9366  | 7.8984  |
| Fr-220+E  | 0.2213  | 0.1748  | 0.2578  | 0.2487  | 0.1872  | 0.1697  | 0.3376  | 0.2437  |
| Fr-221+E  | 0.2599  | 0.1924  | 0.3620  | 0.2802  | 0.2504  | 0.1889  | 0.5401  | 0.3215  |
| Ge-68+E   | 0.4111  | 0.3599  | 0.3836  | 0.3544  | 0.2587  | 0.2603  | 0.5028  | 0.7180  |
| Hf-172+E  | 2.0557  | 1.7500  | 2.2690  | 1.9174  | 1.7928  | 1.5958  | 2.6665  | 2.3025  |
| Hf-182+E  | 5.0164  | 3.9651  | 6.0365  | 6.0345  | 4.8296  | 3.6917  | 11.3317 | 7.6904  |
| Hg-193+E  | 3.0121  | 2.4166  | 3.6381  | 3.6296  | 2.8477  | 2.3371  | 6.2507  | 4.7008  |
| Hg-194+E  | 3.3088  | 2.9716  | 4.0452  | 4.1422  | 3.1059  | 2.4673  | 7.0274  | 4.9198  |
| In-114m+E | 0.6857  | 0.5259  | 0.7350  | 0.6700  | 0.6217  | 0.4910  | 1.2035  | 0.8355  |
| Ir-192m+E | 4.1242  | 3.8688  | 5.2118  | 5.4187  | 3.8915  | 2.7943  | 9.5157  | 6.2922  |
| Kr-76+E   | 2.7140  | 2.3838  | 3.2180  | 3.2846  | 2.4668  | 1.8463  | 5.8217  | 3.8964  |
| Mg-28+E   | 4.3094  | 3.3926  | 4.4998  | 5.4418  | 4.2434  | 2.8933  | 11.9728 | 8.1924  |
| Nd-140+E  | 0.9662  | 0.8514  | 0.7079  | 0.8624  | 0.9088  | 0.6665  | 0.8681  | 0.8380  |
| Ni-66+E   | 0.1607  | 0.1221  | 0.1719  | 0.2161  | 0.1593  | 0.1051  | 0.4936  | 0.4085  |

| Element   | avg100 | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.3557 | 0.3361 | 0.3204  | 0.2750  | 0.2408 | 0.2553 | 0.2983  | 0.3803  |
| Np-237+E  | 2.8897 | 2.5525 | 3.5575  | 3.4348  | 2.4761 | 1.9720 | 5.4085  | 3.5677  |
| Os-194+E  | 0.5538 | 0.5129 | 0.6333  | 0.6599  | 0.4758 | 0.3701 | 1.0856  | 0.8511  |
| Pa-231+E  | 4.5554 | 3.7754 | 5.3261  | 5.1794  | 3.9880 | 3.3026 | 8.2604  | 5.8010  |
| Pb-202+E  | 2.7418 | 2.1273 | 3.2820  | 3.2799  | 2.5459 | 2.0017 | 5.7185  | 4.5576  |
| Pb-210+E  | 0.2318 | 0.2138 | 0.2101  | 0.1894  | 0.1543 | 0.1577 | 0.2261  | 0.2818  |
| Pd-103+E  | 0.6502 | 0.5404 | 0.4823  | 0.5546  | 0.4910 | 0.4861 | 0.4235  | 0.5170  |
| Pt-202+E  | 0.3973 | 0.2998 | 0.4590  | 0.5254  | 0.3882 | 0.2547 | 1.1415  | 0.8753  |
| Pu-239+E  | 0.0566 | 0.0531 | 0.0505  | 0.0434  | 0.0376 | 0.0401 | 0.0463  | 0.0647  |
| Pu-244+E  | 1.5527 | 1.3402 | 1.6117  | 1.6211  | 1.3183 | 1.1054 | 2.7864  | 2.1225  |
| Pu-246+E  | 3.9277 | 3.0698 | 4.6182  | 4.7571  | 3.6127 | 2.6189 | 9.5087  | 6.7633  |
| Ra-219+E  | 1.0930 | 1.0423 | 1.4646  | 1.5534  | 1.0358 | 0.7637 | 2.4374  | 1.5091  |
| Ra-221+E  | 0.5914 | 0.4652 | 0.6900  | 0.6154  | 0.4995 | 0.3980 | 1.2056  | 0.6884  |
| Ra-222+E  | 0.0534 | 0.0531 | 0.0712  | 0.0768  | 0.0513 | 0.0352 | 0.1320  | 0.0828  |
| Ra-223+E  | 2.2437 | 1.7462 | 2.8122  | 2.8713  | 2.0936 | 1.6240 | 4.8909  | 3.1459  |
| Ra-224+E  | 1.5929 | 1.5909 | 1.6219  | 1.6183  | 1.5631 | 1.5572 | 1.6919  | 1.5532  |
| Ra-226+E  | 5.1570 | 4.5154 | 5.8133  | 6.2382  | 5.0028 | 4.0681 | 11.0919 | 7.6441  |
| Ra-228+E  | 3.6786 | 3.2968 | 4.0565  | 4.3645  | 3.5083 | 2.9403 | 7.2642  | 5.8827  |
| Rb-81+E   | 2.1920 | 1.7393 | 2.8565  | 2.3320  | 2.0219 | 1.4092 | 5.1962  | 3.3339  |
| Rb-83+E   | 2.0297 | 1.7405 | 2.1953  | 2.2159  | 1.7934 | 1.3936 | 4.0985  | 2.9848  |
| Re-186m+E | 0.9695 | 0.8484 | 1.0430  | 0.8574  | 0.7412 | 0.6883 | 1.3069  | 1.2694  |
| Rn-219+E  | 0.3408 | 0.2602 | 0.4108  | 0.4220  | 0.3279 | 0.2434 | 0.7943  | 0.5235  |
| Rn-220+E  | 1.5128 | 1.5332 | 1.5252  | 1.5333  | 1.4863 | 1.4938 | 1.5435  | 1.4700  |
| Rn-222+E  | 0.0013 | 0.0011 | 0.0015  | 0.0015  | 0.0013 | 0.0009 | 0.0030  | 0.0022  |
| Ru-103+E  | 1.7730 | 1.4564 | 2.0022  | 2.0545  | 1.6865 | 1.1985 | 3.9457  | 2.8925  |
| Ru-106+E  | 0.5839 | 0.4790 | 0.6568  | 0.6921  | 0.5607 | 0.4061 | 1.4084  | 0.9409  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.9982 | 1.4623 | 2.0260  | 2.2665  | 1.8280 | 1.3520 | 4.2518  | 3.3846  |
| Sn-121m+E | 0.1584 | 0.1268 | 0.1095  | 0.1327  | 0.1345 | 0.1195 | 0.1244  | 0.1474  |
| Sn-126+E  | 6.4122 | 4.9530 | 7.4811  | 8.4030  | 6.1532 | 4.5088 | 16.9495 | 11.5052 |
| Sr-82+E   | 0.6455 | 0.5889 | 0.6533  | 0.7342  | 0.5141 | 0.4585 | 1.2225  | 1.0100  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0001  |
| Te-118+E  | 0.8331 | 0.6443 | 0.5805  | 0.7350  | 0.7301 | 0.6417 | 0.7849  | 0.8170  |
| Te-129m+E | 0.5338 | 0.4286 | 0.4623  | 0.5400  | 0.4840 | 0.3831 | 0.7973  | 0.6872  |
| Th-229+E  | 3.3572 | 2.6974 | 3.9904  | 3.6807  | 2.8975 | 2.3452 | 6.0861  | 4.2611  |
| Th-232+E  | 9.5864 | 8.5925 | 10.4957 | 10.8309 | 9.2132 | 8.0970 | 17.1929 | 12.8362 |
| Th-234+E  | 0.2556 | 0.2170 | 0.3197  | 0.2856  | 0.2187 | 0.1930 | 0.4259  | 0.3041  |
| Ti-44+E   | 3.5675 | 2.6883 | 4.2484  | 4.6861  | 3.5853 | 2.9991 | 7.1802  | 5.7317  |
| U-228+E   | 0.3726 | 0.2997 | 0.4556  | 0.3768  | 0.3236 | 0.2494 | 0.7606  | 0.4638  |
| U-230+E   | 0.3313 | 0.2970 | 0.3741  | 0.3323  | 0.2646 | 0.2299 | 0.5288  | 0.3910  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4615        | 2.3607        | 2.4046        | 2.3312        | 2.2023        | 2.2177        | 2.4042        | 2.4499        |
| U-238+E        | 1.4326        | 1.4216        | 1.4860        | 1.4787        | 1.3834        | 1.3779        | 1.6283        | 1.4719        |
| W-178+E        | 1.4256        | 1.2607        | 1.7018        | 1.3968        | 1.2812        | 1.1739        | 1.7707        | 1.5935        |
| Xe-122+E       | 1.4312        | 1.1815        | 1.3039        | 1.4806        | 1.3391        | 1.0071        | 2.3371        | 1.7582        |
| Zr-93+E        | 0.1015        | 0.0997        | 0.0903        | 0.0698        | 0.0731        | 0.0786        | 0.0625        | 0.0930        |

Table 63: Composite 1 – 5cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1835        | 0.1658        | 0.3175        | 0.3229        |
| Ac-225+E       | 1.0380        | 0.7242        | 1.6744        | 1.3760        |
| Ac-227+E       | 3.0425        | 2.4230        | 4.4072        | 3.9415        |
| Ag-108m+E      | 4.8338        | 3.5655        | 6.8147        | 6.3639        |
| Ag-110m+E      | 5.1807        | 3.7651        | 7.2404        | 8.5737        |
| Am-242m+E      | 0.4553        | 0.5226        | 0.7181        | 0.8885        |
| Am-243+E       | 2.6443        | 2.4289        | 3.1748        | 2.9770        |
| Ar-42+E        | 0.2853        | 0.2382        | 0.3143        | 0.3716        |
| At-211+E       | 0.4844        | 0.4667        | 0.5468        | 0.5402        |
| Ba-128+E       | 1.4202        | 1.0862        | 1.8837        | 1.8553        |
| Bi-210m+E      | 1.4730        | 1.0819        | 2.1266        | 1.5324        |
| Bi-212+E       | 0.2146        | 0.1751        | 0.3457        | 0.4348        |
| Bi-213+E       | 0.5009        | 0.2718        | 0.8673        | 0.6704        |
| Bi-214+E       | 2.1255        | 1.5952        | 3.0152        | 2.7899        |
| Bi-215+E       | 1.0474        | 0.7407        | 1.6134        | 1.1889        |
| Bi-216+E       | 2.4306        | 1.5489        | 4.2198        | 2.6293        |
| Cd-118+E       | 0.1077        | 0.0621        | 0.1892        | 0.1407        |
| Ce-134+E       | 0.8221        | 0.8081        | 0.7983        | 1.0589        |
| Ce-144+E       | 0.2696        | 0.2411        | 0.3010        | 0.2823        |
| Cl-34m+E       | 1.6052        | 1.0288        | 2.6908        | 1.9603        |
| Cm-245+E       | 1.3677        | 1.3130        | 1.6673        | 1.7254        |
| Cm-247+E       | 1.6907        | 1.0036        | 2.3724        | 2.5178        |
| Cm-250+E       | 22.6246       | 15.0198       | 35.4378       | 31.2762       |
| Cs-137+E       | 2.8344        | 2.7038        | 3.0596        | 3.1608        |
| Es-254+E       | 2.0172        | 1.5051        | 3.4896        | 4.7555        |
| Fe-60+E        | 3.2679        | 2.0305        | 5.4697        | 4.7985        |
| Fr-220+E       | 0.1613        | 0.1578        | 0.2219        | 0.2285        |
| Fr-221+E       | 0.2338        | 0.1640        | 0.3427        | 0.2282        |
| Ge-68+E        | 0.1584        | 0.2095        | 0.5503        | 0.9144        |
| Hf-172+E       | 1.5668        | 1.3782        | 2.1431        | 2.1658        |
| Hf-182+E       | 4.5893        | 3.2480        | 6.6548        | 5.4987        |
| Hg-193+E       | 2.6526        | 1.9738        | 3.8793        | 3.7569        |
| Hg-194+E       | 2.8869        | 2.0818        | 4.6903        | 3.6964        |
| In-114m+E      | 0.5598        | 0.4177        | 0.8157        | 0.6632        |
| Ir-192m+E      | 3.6773        | 2.2587        | 6.9637        | 4.0243        |
| Kr-76+E        | 2.2470        | 1.5717        | 3.8617        | 2.9786        |
| Mg-28+E        | 4.0811        | 2.8168        | 5.7496        | 6.2213        |
| Nd-140+E       | 0.7922        | 0.8308        | 0.7803        | 1.0647        |
| Ni-66+E        | 0.1552        | 0.0866        | 0.2603        | 0.3423        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1510        | 0.2067        | 0.3278        | 0.4410        |
| Np-237+E       | 2.1466        | 1.8646        | 3.3332        | 2.9075        |
| Os-194+E       | 0.4160        | 0.3142        | 0.8106        | 0.7331        |
| Pa-231+E       | 3.5004        | 2.9095        | 5.2628        | 4.9175        |
| Pb-202+E       | 2.3660        | 1.5953        | 3.8779        | 3.3028        |
| Pb-210+E       | 0.0979        | 0.1321        | 0.2537        | 0.3657        |
| Pd-103+E       | 0.3639        | 0.3809        | 0.5320        | 0.5849        |
| Pt-202+E       | 0.3788        | 0.2060        | 0.6619        | 0.5682        |
| Pu-239+E       | 0.0230        | 0.0321        | 0.0550        | 0.0777        |
| Pu-244+E       | 1.1580        | 1.0243        | 1.9055        | 1.7090        |
| Pu-246+E       | 3.3599        | 2.5242        | 4.9656        | 5.4481        |
| Ra-219+E       | 0.9755        | 0.6446        | 1.6996        | 0.9590        |
| Ra-221+E       | 0.4411        | 0.3845        | 0.6495        | 0.5573        |
| Ra-222+E       | 0.0487        | 0.0280        | 0.0909        | 0.0493        |
| Ra-223+E       | 1.9611        | 1.4716        | 2.7253        | 2.3685        |
| Ra-224+E       | 1.5089        | 1.5268        | 1.6336        | 1.6417        |
| Ra-226+E       | 4.8598        | 3.8906        | 6.6246        | 5.8877        |
| Ra-228+E       | 3.3264        | 2.7028        | 4.6305        | 5.1082        |
| Rb-81+E        | 1.8644        | 1.1435        | 3.4316        | 2.1470        |
| Rb-83+E        | 1.6642        | 1.2063        | 3.5018        | 2.0179        |
| Re-186m+E      | 0.5810        | 0.6176        | 1.1171        | 1.4463        |
| Rn-219+E       | 0.3092        | 0.2041        | 0.4324        | 0.3938        |
| Rn-220+E       | 1.4374        | 1.4703        | 1.5459        | 1.5650        |
| Rn-222+E       | 0.0013        | 0.0007        | 0.0028        | 0.0011        |
| Ru-103+E       | 1.6612        | 0.9449        | 3.6350        | 1.5572        |
| Ru-106+E       | 0.5628        | 0.3858        | 1.0085        | 0.5526        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.6474        | 1.0698        | 2.2117        | 2.6633        |
| Sn-121m+E      | 0.1080        | 0.1108        | 0.1190        | 0.1921        |
| Sn-126+E       | 6.0611        | 4.5612        | 7.7811        | 8.1892        |
| Sr-82+E        | 0.4065        | 0.3858        | 0.7559        | 0.9279        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Te-118+E       | 0.6071        | 0.5707        | 0.6381        | 0.9334        |
| Te-129m+E      | 0.4239        | 0.3551        | 0.5604        | 0.6419        |
| Th-229+E       | 2.5440        | 2.2639        | 3.7534        | 3.6194        |
| Th-232+E       | 8.7974        | 7.5904        | 11.7012       | 11.4432       |
| Th-234+E       | 0.1887        | 0.1827        | 0.2525        | 0.2765        |
| Ti-44+E        | 3.4773        | 2.5453        | 4.5054        | 3.8317        |
| U-228+E        | 0.2860        | 0.2178        | 0.4593        | 0.3345        |
| U-230+E        | 0.2126        | 0.2114        | 0.3488        | 0.3493        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 1.9628        | 2.0689        | 2.2825        | 2.7229        |
| U-238+E        | 1.3180        | 1.3459        | 1.4334        | 1.5210        |
| W-178+E        | 1.1352        | 0.9599        | 1.5650        | 1.4443        |
| Xe-122+E       | 1.2033        | 0.9871        | 1.5276        | 1.5025        |
| Zr-93+E        | 0.0482        | 0.0614        | 0.0742        | 0.0806        |

Table 64: Composite 1 – 15cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2798  | 0.2404  | 0.3119  | 0.3131  | 0.2630  | 0.2201  | 0.2270  | 0.3025  |
| Ac-225+E  | 1.1473  | 1.0597  | 1.1443  | 1.0736  | 1.1738  | 1.0189  | 1.0080  | 1.2157  |
| Ac-227+E  | 3.4995  | 3.1687  | 3.5011  | 3.4846  | 3.5712  | 3.0263  | 3.0180  | 3.6689  |
| Ag-108m+E | 4.6041  | 4.4403  | 4.6725  | 3.8232  | 5.2922  | 4.3308  | 4.2564  | 5.4127  |
| Ag-110m+E | 4.4756  | 4.2433  | 4.1198  | 3.4881  | 5.2427  | 3.9584  | 4.1814  | 6.6446  |
| Am-242m+E | 0.7703  | 0.7228  | 1.0474  | 1.0303  | 0.8306  | 0.6744  | 0.6462  | 0.8097  |
| Am-243+E  | 2.8852  | 2.6617  | 2.8793  | 3.1032  | 3.0095  | 2.4916  | 2.6014  | 2.7770  |
| Ar-42+E   | 0.2371  | 0.2301  | 0.2005  | 0.1918  | 0.2650  | 0.2190  | 0.2259  | 0.3905  |
| At-211+E  | 0.6198  | 0.5326  | 0.5664  | 0.6672  | 0.5781  | 0.4770  | 0.5131  | 0.5427  |
| Ba-128+E  | 1.5948  | 1.5208  | 1.5999  | 1.7630  | 1.7955  | 1.5730  | 1.4558  | 1.3750  |
| Bi-210m+E | 1.4412  | 1.3436  | 1.3070  | 1.2196  | 1.5649  | 1.3438  | 1.3139  | 1.4237  |
| Bi-212+E  | 0.2672  | 0.2329  | 0.2740  | 0.2560  | 0.2703  | 0.2119  | 0.2300  | 0.3505  |
| Bi-213+E  | 0.5028  | 0.4817  | 0.4708  | 0.4006  | 0.5246  | 0.4821  | 0.4632  | 0.4875  |
| Bi-214+E  | 1.8561  | 1.7596  | 1.7059  | 1.4515  | 2.1209  | 1.6804  | 1.7747  | 2.7617  |
| Bi-215+E  | 1.0419  | 0.9689  | 0.9396  | 0.8973  | 1.1190  | 0.9419  | 0.9420  | 1.0592  |
| Bi-216+E  | 2.4242  | 2.3168  | 2.3667  | 1.8492  | 2.6268  | 2.3050  | 2.2699  | 2.5573  |
| Cd-118+E  | 0.0914  | 0.0872  | 0.0789  | 0.0718  | 0.1043  | 0.0821  | 0.0861  | 0.1428  |
| Ce-134+E  | 1.0263  | 0.9296  | 1.0339  | 1.2920  | 1.1511  | 0.9707  | 0.9473  | 0.8381  |
| Ce-144+E  | 0.2703  | 0.2494  | 0.2342  | 0.2635  | 0.2900  | 0.2323  | 0.2374  | 0.2998  |
| Cl-34m+E  | 1.4405  | 1.3466  | 1.2555  | 1.1914  | 1.5891  | 1.3028  | 1.4294  | 2.5219  |
| Cm-245+E  | 1.4766  | 1.3934  | 1.6220  | 1.6728  | 1.5624  | 1.2754  | 1.2392  | 1.6599  |
| Cm-247+E  | 1.6108  | 1.5534  | 1.5071  | 1.3934  | 1.6852  | 1.5541  | 1.4464  | 1.5538  |
| Cm-250+E  | 20.5180 | 19.4335 | 18.5180 | 16.5024 | 22.9637 | 18.8429 | 19.5479 | 27.5836 |
| Cs-137+E  | 3.1890  | 3.1202  | 3.1100  | 2.8271  | 3.5712  | 3.2618  | 3.1693  | 3.6851  |
| Es-254+E  | 2.4549  | 2.2745  | 2.6942  | 2.6588  | 2.7098  | 2.0922  | 2.1668  | 3.1791  |
| Fe-60+E   | 2.9296  | 2.7237  | 2.5604  | 2.4678  | 3.2320  | 2.5164  | 2.6777  | 4.6641  |
| Fr-220+E  | 0.2342  | 0.2004  | 0.2460  | 0.2618  | 0.2182  | 0.1804  | 0.1918  | 0.2453  |
| Fr-221+E  | 0.2216  | 0.2009  | 0.1909  | 0.1972  | 0.2348  | 0.1903  | 0.1871  | 0.2367  |
| Ge-68+E   | 0.6403  | 0.4534  | 0.7288  | 0.8013  | 0.4712  | 0.3686  | 0.4297  | 0.7505  |
| Hf-172+E  | 2.3190  | 1.8982  | 2.2338  | 2.5089  | 2.2459  | 1.7877  | 2.3608  | 2.2181  |
| Hf-182+E  | 4.4386  | 4.0507  | 3.9459  | 3.9804  | 4.7632  | 3.9113  | 4.4007  | 5.4559  |
| Hg-193+E  | 2.9320  | 2.6023  | 2.6935  | 2.8104  | 2.9704  | 2.4542  | 2.9054  | 3.2938  |
| Hg-194+E  | 3.2134  | 2.8951  | 3.0436  | 2.9928  | 3.2939  | 2.7920  | 3.2500  | 3.4181  |
| In-114m+E | 0.6390  | 0.6101  | 0.6342  | 0.6796  | 0.7179  | 0.5963  | 0.5582  | 0.6300  |
| Ir-192m+E | 3.8888  | 3.6299  | 3.7312  | 3.2241  | 4.1437  | 3.5928  | 3.6657  | 3.7380  |
| Kr-76+E   | 2.6134  | 2.3723  | 2.6454  | 2.3399  | 2.6862  | 2.3073  | 2.3319  | 2.6610  |
| Mg-28+E   | 3.6409  | 3.5306  | 3.2311  | 3.2117  | 4.1295  | 3.4513  | 3.4835  | 5.1731  |
| Nd-140+E  | 1.0879  | 0.9114  | 0.9680  | 1.2403  | 1.1095  | 0.9429  | 1.0249  | 0.8187  |
| Ni-66+E   | 0.1315  | 0.1241  | 0.1081  | 0.1026  | 0.1522  | 0.1122  | 0.1222  | 0.2048  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|--------|---------|
| Np-235+E  | 0.3812 | 0.3366 | 0.5482 | 0.5260 | 0.3747 | 0.3089 | 0.3108 | 0.4314  |
| Np-237+E  | 2.6383 | 2.4638 | 2.9779 | 2.9203 | 2.7847 | 2.3545 | 2.3218 | 2.6444  |
| Os-194+E  | 0.6060 | 0.5090 | 0.6153 | 0.6014 | 0.5712 | 0.4759 | 0.5141 | 0.6326  |
| Pa-231+E  | 4.3561 | 3.9269 | 4.5904 | 4.5574 | 4.4143 | 3.7386 | 3.7330 | 4.5776  |
| Pb-202+E  | 2.8404 | 2.5467 | 2.7316 | 2.6615 | 2.7635 | 2.4642 | 2.6929 | 2.6797  |
| Pb-210+E  | 0.3156 | 0.2429 | 0.3973 | 0.3843 | 0.2600 | 0.2101 | 0.2410 | 0.3532  |
| Pd-103+E  | 0.5975 | 0.6276 | 0.8923 | 0.8155 | 0.7918 | 0.6061 | 0.5179 | 0.4462  |
| Pt-202+E  | 0.3518 | 0.3378 | 0.3187 | 0.2733 | 0.3845 | 0.3299 | 0.3302 | 0.4282  |
| Pu-239+E  | 0.0651 | 0.0551 | 0.0900 | 0.0890 | 0.0609 | 0.0497 | 0.0510 | 0.0734  |
| Pu-244+E  | 1.4714 | 1.3763 | 1.7433 | 1.5521 | 1.6041 | 1.3140 | 1.3134 | 1.7143  |
| Pu-246+E  | 3.3807 | 3.1588 | 3.2854 | 3.2625 | 3.7508 | 2.9415 | 3.0155 | 4.2204  |
| Ra-219+E  | 0.9858 | 0.9258 | 0.9113 | 0.8526 | 1.0585 | 0.9046 | 0.9148 | 0.8882  |
| Ra-221+E  | 0.5780 | 0.5084 | 0.6264 | 0.6315 | 0.5616 | 0.4641 | 0.4732 | 0.7715  |
| Ra-222+E  | 0.0465 | 0.0447 | 0.0432 | 0.0368 | 0.0516 | 0.0449 | 0.0447 | 0.0424  |
| Ra-223+E  | 2.0592 | 1.8856 | 1.9096 | 1.9320 | 2.1063 | 1.8042 | 1.7864 | 2.1264  |
| Ra-224+E  | 1.8567 | 1.8604 | 1.7357 | 1.7409 | 1.9812 | 2.0139 | 1.8937 | 1.8587  |
| Ra-226+E  | 4.6968 | 4.4936 | 4.3438 | 4.0336 | 5.1520 | 4.5449 | 4.5590 | 5.5544  |
| Ra-228+E  | 3.2772 | 3.1563 | 3.1415 | 3.0228 | 3.5919 | 3.1722 | 3.1792 | 3.9134  |
| Rb-81+E   | 2.0240 | 1.8511 | 2.0627 | 1.7878 | 2.0988 | 1.7518 | 1.7755 | 2.4539  |
| Rb-83+E   | 2.2035 | 2.0179 | 2.4712 | 1.9420 | 2.2436 | 1.9338 | 1.9897 | 2.3458  |
| Re-186m+E | 1.2742 | 0.9727 | 1.3609 | 1.4970 | 1.0589 | 0.8545 | 1.1028 | 1.3843  |
| Rn-219+E  | 0.2938 | 0.2785 | 0.2666 | 0.2437 | 0.3140 | 0.2809 | 0.2608 | 0.2928  |
| Rn-220+E  | 1.7887 | 1.7978 | 1.6755 | 1.6815 | 1.9078 | 1.9519 | 1.8367 | 1.7856  |
| Rn-222+E  | 0.0014 | 0.0013 | 0.0014 | 0.0011 | 0.0015 | 0.0013 | 0.0013 | 0.0014  |
| Ru-103+E  | 1.8632 | 1.7796 | 1.8527 | 1.4466 | 1.9955 | 1.7717 | 1.7627 | 1.7864  |
| Ru-106+E  | 0.5644 | 0.5363 | 0.5557 | 0.4249 | 0.6245 | 0.5267 | 0.5336 | 0.6352  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 1.8245 | 1.8063 | 1.8310 | 1.8617 | 2.0086 | 1.8440 | 1.6340 | 1.4930  |
| Sn-121m+E | 0.1776 | 0.1637 | 0.1860 | 0.2323 | 0.1884 | 0.1647 | 0.1511 | 0.1261  |
| Sn-126+E  | 5.5396 | 5.2639 | 5.3023 | 4.5883 | 6.2354 | 5.1054 | 5.1351 | 6.6557  |
| Sr-82+E   | 0.6389 | 0.5926 | 0.8736 | 0.6967 | 0.6654 | 0.5402 | 0.5732 | 0.8250  |
| Sr-90+E   | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0001  |
| Te-118+E  | 0.8629 | 0.8441 | 0.8952 | 1.1201 | 0.9788 | 0.8628 | 0.7580 | 0.5902  |
| Te-129m+E | 0.5450 | 0.5169 | 0.5635 | 0.6338 | 0.6026 | 0.5204 | 0.4809 | 0.4640  |
| Th-229+E  | 3.2893 | 2.9163 | 3.4674 | 3.5181 | 3.2381 | 2.7354 | 2.8236 | 3.4511  |
| Th-232+E  | 9.1621 | 8.7477 | 8.6240 | 8.3835 | 9.8624 | 8.9955 | 9.0018 | 10.3463 |
| Th-234+E  | 0.2412 | 0.2193 | 0.2739 | 0.2806 | 0.2474 | 0.2064 | 0.2426 | 0.2545  |
| Ti-44+E   | 3.2549 | 2.9706 | 2.5650 | 2.9896 | 3.4496 | 2.7892 | 3.4071 | 3.5498  |
| U-228+E   | 0.3331 | 0.3051 | 0.3649 | 0.3549 | 0.3473 | 0.2897 | 0.2860 | 0.4430  |
| U-230+E   | 0.3111 | 0.2860 | 0.3868 | 0.3745 | 0.3205 | 0.2681 | 0.2678 | 0.3426  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.3836       | 2.3163       | 2.6319       | 2.6102       | 2.4804       | 2.3483       | 2.2565       | 2.4171       |
| U-238+E        | 1.2951       | 1.2762       | 1.2649       | 1.2658       | 1.3896       | 1.3767       | 1.3009       | 1.3661       |
| W-178+E        | 1.6061       | 1.2995       | 1.5333       | 1.7060       | 1.5447       | 1.2483       | 1.8196       | 1.5816       |
| Xe-122+E       | 1.3871       | 1.3366       | 1.4204       | 1.5673       | 1.5849       | 1.3639       | 1.2648       | 1.2302       |
| Zr-93+E        | 0.0739       | 0.0800       | 0.1220       | 0.1237       | 0.0969       | 0.0819       | 0.0724       | 0.0878       |

Table 65: Composite 1 – 15cm Contamination Thickness for 100x100x10 ft and 200x200x10 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2560  | 0.2382  | 0.2581  | 0.2311  | 0.2122  | 0.1961  | 0.3034  | 0.2400  |
| Ac-225+E  | 1.1697  | 1.1294  | 1.3593  | 1.0640  | 1.1031  | 0.9732  | 1.8240  | 0.8569  |
| Ac-227+E  | 3.5064  | 3.3603  | 3.5195  | 3.0057  | 3.2270  | 2.8865  | 4.2989  | 2.5697  |
| Ag-108m+E | 4.9646  | 4.9841  | 6.5985  | 4.8918  | 4.8689  | 4.2545  | 9.5137  | 4.5354  |
| Ag-110m+E | 4.8646  | 4.5414  | 7.3999  | 5.4672  | 4.8100  | 4.1448  | 9.5208  | 4.9853  |
| Am-242m+E | 0.7453  | 0.7049  | 0.6568  | 0.5383  | 0.5731  | 0.5918  | 0.7484  | 0.7119  |
| Am-243+E  | 2.9571  | 2.7544  | 2.5311  | 2.4236  | 2.7481  | 2.3847  | 3.2979  | 2.0430  |
| Ar-42+E   | 0.2644  | 0.2276  | 0.3731  | 0.3070  | 0.2590  | 0.2169  | 0.5159  | 0.2569  |
| At-211+E  | 0.5799  | 0.5012  | 0.4747  | 0.5039  | 0.5454  | 0.4296  | 0.5308  | 0.4728  |
| Ba-128+E  | 1.7891  | 1.5356  | 1.6777  | 1.5923  | 1.6498  | 1.4802  | 2.1572  | 1.1849  |
| Bi-210m+E | 1.5445  | 1.5551  | 1.5857  | 1.3330  | 1.5001  | 1.3610  | 2.0583  | 0.9599  |
| Bi-212+E  | 0.2549  | 0.2360  | 0.3278  | 0.2741  | 0.2259  | 0.1964  | 0.4307  | 0.2867  |
| Bi-213+E  | 0.5373  | 0.5447  | 0.7085  | 0.5155  | 0.5399  | 0.4636  | 1.0013  | 0.3610  |
| Bi-214+E  | 2.0273  | 1.8080  | 2.8676  | 2.2948  | 1.9957  | 1.7160  | 4.0193  | 1.9928  |
| Bi-215+E  | 1.1003  | 1.0732  | 1.2131  | 1.0214  | 1.0745  | 0.9408  | 1.5107  | 0.7602  |
| Bi-216+E  | 2.5840  | 2.6236  | 3.6006  | 2.6563  | 2.6112  | 2.2068  | 5.4857  | 2.1106  |
| Cd-118+E  | 0.1025  | 0.0874  | 0.1520  | 0.1154  | 0.0993  | 0.0839  | 0.2062  | 0.1077  |
| Ce-134+E  | 1.1389  | 0.8432  | 0.7788  | 1.0139  | 1.0111  | 0.8516  | 0.9545  | 0.7356  |
| Ce-144+E  | 0.2872  | 0.2466  | 0.2794  | 0.2763  | 0.2778  | 0.2235  | 0.4300  | 0.1686  |
| Cl-34m+E  | 1.5773  | 1.2417  | 1.9281  | 1.8144  | 1.5511  | 1.3010  | 3.1787  | 1.2534  |
| Cm-245+E  | 1.5138  | 1.4401  | 1.3690  | 1.2303  | 1.3588  | 1.2102  | 1.8219  | 1.0547  |
| Cm-247+E  | 1.7414  | 1.7668  | 2.0570  | 1.5082  | 1.7154  | 1.5254  | 2.5898  | 1.0133  |
| Cm-250+E  | 22.4134 | 20.3708 | 29.9865 | 24.0130 | 22.1278 | 19.0772 | 41.3487 | 18.4656 |
| Cs-137+E  | 3.4707  | 3.4762  | 3.9391  | 3.4532  | 3.4341  | 3.3501  | 4.8291  | 3.3907  |
| Es-254+E  | 2.5116  | 2.1066  | 3.6632  | 2.5309  | 2.1812  | 2.1914  | 3.0028  | 2.2013  |
| Fe-60+E   | 3.1899  | 2.6399  | 4.7310  | 3.6487  | 2.9913  | 2.5762  | 5.9338  | 3.4515  |
| Fr-220+E  | 0.2140  | 0.1909  | 0.1919  | 0.1859  | 0.1862  | 0.1602  | 0.2165  | 0.1877  |
| Fr-221+E  | 0.2316  | 0.2124  | 0.2419  | 0.1929  | 0.2230  | 0.1968  | 0.3140  | 0.1336  |
| Ge-68+E   | 0.4638  | 0.3760  | 0.5270  | 0.5597  | 0.2786  | 0.2787  | 0.5077  | 0.7155  |
| Hf-172+E  | 2.1819  | 1.8814  | 1.7032  | 1.9979  | 1.8575  | 1.6829  | 2.2923  | 1.8794  |
| Hf-182+E  | 4.7503  | 4.2911  | 5.4366  | 4.5297  | 4.5431  | 4.0599  | 6.8242  | 3.5507  |
| Hg-193+E  | 2.9711  | 2.6503  | 3.2755  | 2.9097  | 2.7961  | 2.4566  | 4.1145  | 2.3991  |
| Hg-194+E  | 3.2926  | 3.0724  | 3.5439  | 3.2966  | 3.0845  | 2.7696  | 4.5447  | 2.5789  |
| In-114m+E | 0.6793  | 0.6083  | 0.7422  | 0.5555  | 0.6184  | 0.5846  | 0.8739  | 0.5432  |
| Ir-192m+E | 4.0788  | 4.1705  | 4.8002  | 4.0149  | 3.9443  | 3.5303  | 6.3513  | 2.8280  |
| Kr-76+E   | 2.6265  | 2.6225  | 2.8563  | 2.3865  | 2.4304  | 2.2114  | 3.5958  | 1.8737  |
| Mg-28+E   | 4.1160  | 3.4292  | 5.3066  | 4.4581  | 3.9742  | 3.4889  | 6.9838  | 3.4023  |
| Nd-140+E  | 1.1087  | 0.8208  | 0.6984  | 0.9526  | 1.0089  | 0.7536  | 0.8087  | 0.6787  |
| Ni-66+E   | 0.1466  | 0.1132  | 0.2757  | 0.1788  | 0.1448  | 0.1373  | 0.2106  | 0.1080  |

| Element   | avg100 | ctr100 | mid100  | cnr100 | avg200 | ctr200 | mid200  | cnr200 |
|-----------|--------|--------|---------|--------|--------|--------|---------|--------|
| Np-235+E  | 0.3353 | 0.3139 | 0.3060  | 0.2547 | 0.2280 | 0.2542 | 0.3124  | 0.3915 |
| Np-237+E  | 2.6703 | 2.5933 | 2.4985  | 2.2133 | 2.3507 | 2.1954 | 2.9226  | 2.0355 |
| Os-194+E  | 0.5591 | 0.5285 | 0.6109  | 0.5691 | 0.4779 | 0.4340 | 0.7018  | 0.5130 |
| Pa-231+E  | 4.2952 | 4.0978 | 4.2601  | 3.6559 | 3.8271 | 3.5040 | 5.0790  | 3.3805 |
| Pb-202+E  | 2.8319 | 2.7122 | 3.2019  | 2.7131 | 2.6864 | 2.3241 | 4.3854  | 2.1962 |
| Pb-210+E  | 0.2439 | 0.2156 | 0.2232  | 0.2296 | 0.1606 | 0.1622 | 0.2236  | 0.3124 |
| Pd-103+E  | 0.6457 | 0.6221 | 0.5238  | 0.3443 | 0.5211 | 0.5577 | 0.6296  | 0.4955 |
| Pt-202+E  | 0.3850 | 0.3653 | 0.5630  | 0.4033 | 0.3833 | 0.3328 | 0.7367  | 0.3042 |
| Pu-239+E  | 0.0551 | 0.0505 | 0.0515  | 0.0457 | 0.0364 | 0.0401 | 0.0526  | 0.0682 |
| Pu-244+E  | 1.4789 | 1.4260 | 1.7560  | 1.3545 | 1.3016 | 1.2140 | 2.3555  | 1.4505 |
| Pu-246+E  | 3.5692 | 3.1918 | 4.4295  | 3.3919 | 3.3367 | 2.9881 | 5.0688  | 2.7701 |
| Ra-219+E  | 1.0409 | 1.0542 | 1.0794  | 0.9735 | 1.0165 | 0.8952 | 1.2877  | 0.6396 |
| Ra-221+E  | 0.5465 | 0.4978 | 0.5800  | 0.4773 | 0.4806 | 0.4304 | 0.6863  | 0.4303 |
| Ra-222+E  | 0.0509 | 0.0535 | 0.0572  | 0.0487 | 0.0502 | 0.0454 | 0.0690  | 0.0291 |
| Ra-223+E  | 2.1086 | 2.0277 | 2.1934  | 1.8617 | 2.0297 | 1.7502 | 2.7174  | 1.4199 |
| Ra-224+E  | 2.0191 | 2.0365 | 1.9763  | 2.0915 | 2.0003 | 2.0078 | 2.0417  | 1.7947 |
| Ra-226+E  | 5.0973 | 4.8920 | 6.0217  | 5.1409 | 5.0109 | 4.5809 | 7.5377  | 4.4303 |
| Ra-228+E  | 3.5277 | 3.3483 | 4.3649  | 3.5004 | 3.4025 | 3.2329 | 4.6584  | 3.1126 |
| Rb-81+E   | 2.0426 | 1.9389 | 2.5466  | 1.8542 | 1.9195 | 1.7326 | 3.3503  | 1.3967 |
| Rb-83+E   | 2.1500 | 2.1438 | 2.8416  | 2.1843 | 2.0104 | 1.7425 | 4.3254  | 2.0613 |
| Re-186m+E | 1.0548 | 0.8986 | 0.9763  | 1.1075 | 0.7860 | 0.7307 | 1.1874  | 1.1964 |
| Rn-219+E  | 0.3179 | 0.3235 | 0.3539  | 0.2698 | 0.3116 | 0.2824 | 0.4578  | 0.1854 |
| Rn-220+E  | 1.9465 | 1.9662 | 1.9038  | 2.0352 | 1.9305 | 1.9443 | 1.9434  | 1.7511 |
| Rn-222+E  | 0.0015 | 0.0015 | 0.0021  | 0.0016 | 0.0015 | 0.0012 | 0.0035  | 0.0012 |
| Ru-103+E  | 1.9577 | 1.9712 | 2.7660  | 2.0460 | 1.9830 | 1.6321 | 4.4963  | 1.6143 |
| Ru-106+E  | 0.5994 | 0.5945 | 0.8714  | 0.6503 | 0.6067 | 0.5066 | 1.3422  | 0.5435 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 |
| Sn-113+E  | 1.9986 | 1.9428 | 2.2186  | 1.5873 | 1.8507 | 1.7850 | 2.4999  | 1.4205 |
| Sn-121m+E | 0.1826 | 0.1479 | 0.1510  | 0.1462 | 0.1504 | 0.1463 | 0.1403  | 0.1712 |
| Sn-126+E  | 5.9655 | 5.8922 | 7.7448  | 5.9596 | 5.8881 | 5.0889 | 10.7649 | 5.3675 |
| Sr-82+E   | 0.5957 | 0.5954 | 0.6532  | 0.4883 | 0.4830 | 0.4789 | 0.8192  | 0.6565 |
| Sr-90+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 |
| Te-118+E  | 0.9429 | 0.7790 | 0.8299  | 0.7234 | 0.8032 | 0.7995 | 0.7870  | 0.8669 |
| Te-129m+E | 0.5851 | 0.5047 | 0.5806  | 0.5144 | 0.5176 | 0.4838 | 0.6933  | 0.5107 |
| Th-229+E  | 3.1698 | 2.9235 | 3.0934  | 2.7124 | 2.8222 | 2.4576 | 3.8071  | 2.5352 |
| Th-232+E  | 9.8022 | 9.3697 | 10.8771 | 9.7903 | 9.5447 | 8.9865 | 12.9746 | 8.6171 |
| Th-234+E  | 0.2404 | 0.2216 | 0.2139  | 0.2008 | 0.2095 | 0.1962 | 0.2550  | 0.1994 |
| Ti-44+E   | 3.5043 | 2.9108 | 3.9043  | 3.4836 | 3.5148 | 2.9163 | 4.5595  | 2.6909 |
| U-228+E   | 0.3336 | 0.3114 | 0.3724  | 0.2753 | 0.2991 | 0.2774 | 0.4463  | 0.2397 |
| U-230+E   | 0.3010 | 0.2895 | 0.2858  | 0.2432 | 0.2454 | 0.2422 | 0.3357  | 0.2688 |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4385        | 2.3523        | 2.3601        | 2.1273        | 2.2059        | 2.2472        | 2.2760        | 2.4717        |
| U-238+E        | 1.4051        | 1.3964        | 1.2997        | 1.3830        | 1.3666        | 1.3729        | 1.3761        | 1.2791        |
| W-178+E        | 1.5293        | 1.3208        | 1.1530        | 1.4150        | 1.3251        | 1.2023        | 1.5870        | 1.2934        |
| Xe-122+E       | 1.5420        | 1.3301        | 1.5026        | 1.3700        | 1.4055        | 1.2896        | 1.8829        | 1.2037        |
| Zr-93+E        | 0.0825        | 0.0804        | 0.0716        | 0.0430        | 0.0611        | 0.0717        | 0.0758        | 0.0792        |

Table 66: Composite 1 – 15cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1754        | 0.1591        | 0.2566        | 0.1926        |
| Ac-225+E       | 1.0167        | 0.8150        | 1.4117        | 0.9889        |
| Ac-227+E       | 2.9220        | 2.5537        | 4.0886        | 3.0447        |
| Ag-108m+E      | 4.7310        | 3.9063        | 5.3075        | 3.6826        |
| Ag-110m+E      | 4.7996        | 3.5977        | 5.2046        | 3.4924        |
| Am-242m+E      | 0.4292        | 0.4485        | 0.5898        | 0.5496        |
| Am-243+E       | 2.4935        | 2.0737        | 2.9778        | 2.1060        |
| Ar-42+E        | 0.2591        | 0.1990        | 0.2389        | 0.2910        |
| At-211+E       | 0.4791        | 0.4368        | 0.8038        | 0.4315        |
| Ba-128+E       | 1.5199        | 1.2966        | 2.7180        | 1.7252        |
| Bi-210m+E      | 1.4511        | 1.2984        | 1.6878        | 1.5323        |
| Bi-212+E       | 0.2072        | 0.1721        | 0.2411        | 0.1993        |
| Bi-213+E       | 0.5235        | 0.4279        | 0.7775        | 0.4592        |
| Bi-214+E       | 1.9787        | 1.4776        | 2.3651        | 1.6101        |
| Bi-215+E       | 1.0292        | 0.8911        | 1.3169        | 0.8787        |
| Bi-216+E       | 2.5544        | 2.0812        | 2.6807        | 1.9158        |
| Cd-118+E       | 0.0988        | 0.0710        | 0.1300        | 0.0718        |
| Ce-134+E       | 0.8973        | 0.7827        | 1.8657        | 1.1542        |
| Ce-144+E       | 0.2647        | 0.1914        | 0.2884        | 0.2135        |
| Cl-34m+E       | 1.5011        | 0.8896        | 2.5000        | 1.2866        |
| Cm-245+E       | 1.2132        | 0.8940        | 1.1756        | 0.8580        |
| Cm-247+E       | 1.6461        | 1.3813        | 3.0597        | 1.6429        |
| Cm-250+E       | 21.6727       | 16.1523       | 28.2650       | 18.0825       |
| Cs-137+E       | 3.3677        | 3.1260        | 3.2189        | 3.1133        |
| Es-254+E       | 1.8960        | 1.5867        | 3.1361        | 1.8017        |
| Fe-60+E        | 2.9313        | 2.1553        | 3.9569        | 2.3246        |
| Fr-220+E       | 0.1556        | 0.1414        | 0.2435        | 0.1689        |
| Fr-221+E       | 0.2074        | 0.1388        | 0.2623        | 0.2040        |
| Ge-68+E        | 0.1717        | 0.2149        | 0.3210        | 0.2069        |
| Hf-172+E       | 1.6100        | 1.5659        | 1.6435        | 1.5610        |
| Hf-182+E       | 4.3549        | 3.4628        | 5.3515        | 4.0611        |
| Hg-193+E       | 2.5972        | 2.1073        | 3.7304        | 2.4145        |
| Hg-194+E       | 2.8797        | 2.5066        | 4.0043        | 2.4056        |
| In-114m+E      | 0.5452        | 0.4022        | 0.6346        | 0.4688        |
| Ir-192m+E      | 3.7561        | 3.3031        | 4.5232        | 2.5533        |
| Kr-76+E        | 2.2396        | 2.0219        | 2.9428        | 2.2976        |
| Mg-28+E        | 3.8815        | 2.8242        | 6.3759        | 4.0232        |
| Nd-140+E       | 0.8891        | 0.8055        | 1.5341        | 1.1997        |
| Ni-66+E        | 0.1418        | 0.0976        | 0.2356        | 0.1009        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1434        | 0.1872        | 0.2700        | 0.3037        |
| Np-237+E       | 2.0429        | 1.8611        | 2.8203        | 1.8841        |
| Os-194+E       | 0.4186        | 0.4003        | 0.5773        | 0.3588        |
| Pa-231+E       | 3.3724        | 3.0464        | 4.8301        | 3.7373        |
| Pb-202+E       | 2.4901        | 2.1684        | 3.7677        | 2.3077        |
| Pb-210+E       | 0.1013        | 0.1337        | 0.1810        | 0.2244        |
| Pd-103+E       | 0.3974        | 0.4471        | 0.5340        | 0.4248        |
| Pt-202+E       | 0.3767        | 0.2894        | 0.5354        | 0.3074        |
| Pu-239+E       | 0.0225        | 0.0299        | 0.0423        | 0.0445        |
| Pu-244+E       | 1.1409        | 1.0357        | 1.2390        | 1.1512        |
| Pu-246+E       | 3.1089        | 2.3211        | 3.8335        | 2.6264        |
| Ra-219+E       | 0.9609        | 0.8544        | 1.2777        | 0.5638        |
| Ra-221+E       | 0.4048        | 0.3060        | 0.5580        | 0.4065        |
| Ra-222+E       | 0.0482        | 0.0431        | 0.0654        | 0.0275        |
| Ra-223+E       | 1.8969        | 1.5894        | 2.7361        | 1.7136        |
| Ra-224+E       | 1.9399        | 1.8800        | 1.9140        | 2.0161        |
| Ra-226+E       | 4.8843        | 4.2528        | 5.9034        | 4.4292        |
| Ra-228+E       | 3.2570        | 2.8285        | 3.9737        | 3.0703        |
| Rb-81+E        | 1.7248        | 1.1525        | 2.3224        | 1.6595        |
| Rb-83+E        | 1.8368        | 1.5880        | 1.6167        | 1.7109        |
| Re-186m+E      | 0.6111        | 0.6180        | 0.7560        | 0.6484        |
| Rn-219+E       | 0.3030        | 0.2627        | 0.4447        | 0.3470        |
| Rn-220+E       | 1.8726        | 1.8253        | 1.8413        | 1.9232        |
| Rn-222+E       | 0.0015        | 0.0012        | 0.0011        | 0.0010        |
| Ru-103+E       | 1.9168        | 1.5400        | 1.4849        | 1.2914        |
| Ru-106+E       | 0.5951        | 0.4769        | 0.4690        | 0.3922        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.6947        | 1.5017        | 2.9189        | 1.8333        |
| Sn-121m+E      | 0.1237        | 0.1182        | 0.1925        | 0.1518        |
| Sn-126+E       | 5.7731        | 4.6770        | 7.0564        | 4.5106        |
| Sr-82+E        | 0.3843        | 0.3729        | 0.5981        | 0.7282        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0001        |
| Te-118+E       | 0.6808        | 0.6256        | 0.9930        | 0.7830        |
| Te-129m+E      | 0.4600        | 0.4024        | 0.6896        | 0.4815        |
| Th-229+E       | 2.4424        | 2.0802        | 3.3714        | 2.6294        |
| Th-232+E       | 9.1735        | 8.1273        | 10.7078       | 9.1025        |
| Th-234+E       | 0.1798        | 0.1612        | 0.2379        | 0.1876        |
| Ti-44+E        | 3.3770        | 2.7382        | 5.1309        | 2.5902        |
| U-228+E        | 0.2551        | 0.1819        | 0.3572        | 0.2592        |
| U-230+E        | 0.1977        | 0.1915        | 0.2770        | 0.2457        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 1.9772        | 2.0306        | 2.2570        | 2.2816        |
| U-238+E        | 1.3072        | 1.3236        | 1.3384        | 1.3530        |
| W-178+E        | 1.1643        | 1.1326        | 1.2543        | 1.1607        |
| Xe-122+E       | 1.2763        | 1.0850        | 1.9853        | 1.2822        |
| Zr-93+E        | 0.0409        | 0.0506        | 0.0715        | 0.0735        |

Table 67: Composite 1 – Infinite Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.1664  | 0.1465  | 0.2884  | 0.1938  | 0.2027  | 0.1795  | 0.2143  | 0.2572  |
| Ac-225+E  | 0.6214  | 0.6294  | 0.9849  | 0.9099  | 0.9163  | 0.8604  | 1.0769  | 1.2538  |
| Ac-227+E  | 2.6882  | 2.5955  | 3.5961  | 3.3004  | 3.8494  | 3.5477  | 4.1081  | 4.4398  |
| Ag-108m+E | 2.5370  | 2.5388  | 3.1233  | 4.0344  | 4.0258  | 3.7081  | 5.0153  | 5.8651  |
| Ag-110m+E | 2.6580  | 2.7904  | 2.8779  | 4.5202  | 4.5665  | 4.0104  | 5.5982  | 6.1858  |
| Am-242m+E | 0.5254  | 0.4643  | 0.7525  | 0.5145  | 0.6014  | 0.5580  | 0.5403  | 0.6657  |
| Am-243+E  | 1.8030  | 1.7199  | 2.3536  | 2.1505  | 2.5706  | 2.1951  | 2.6086  | 2.6938  |
| Ar-42+E   | 0.1768  | 0.1801  | 0.1750  | 0.2525  | 0.2743  | 0.2538  | 0.3903  | 0.3598  |
| At-211+E  | 0.4150  | 0.3443  | 0.5182  | 0.4378  | 0.5111  | 0.4090  | 0.5542  | 0.5497  |
| Ba-128+E  | 0.8518  | 0.8398  | 1.1833  | 1.0011  | 1.3622  | 1.1802  | 1.4231  | 1.6275  |
| Bi-210m+E | 0.7541  | 0.7961  | 1.1718  | 1.2523  | 1.3192  | 1.2475  | 1.5981  | 1.4256  |
| Bi-212+E  | 0.1583  | 0.1461  | 0.2359  | 0.2190  | 0.2209  | 0.1913  | 0.2533  | 0.2933  |
| Bi-213+E  | 0.2272  | 0.2541  | 0.3989  | 0.4143  | 0.3813  | 0.3699  | 0.5227  | 0.6161  |
| Bi-214+E  | 1.1692  | 1.1882  | 1.2770  | 1.8373  | 1.8816  | 1.6873  | 2.4899  | 2.6010  |
| Bi-215+E  | 0.5636  | 0.5750  | 0.7971  | 0.8895  | 0.9406  | 0.8446  | 1.1722  | 1.0785  |
| Bi-216+E  | 1.1189  | 1.2115  | 1.8327  | 2.0028  | 1.8578  | 1.7806  | 2.5817  | 3.0826  |
| Cd-118+E  | 0.0491  | 0.0542  | 0.0582  | 0.0895  | 0.0887  | 0.0773  | 0.1130  | 0.1224  |
| Ce-134+E  | 0.5591  | 0.5424  | 0.7259  | 0.5000  | 0.9042  | 0.6831  | 0.7882  | 0.9864  |
| Ce-144+E  | 0.1294  | 0.1428  | 0.1734  | 0.1741  | 0.2228  | 0.1837  | 0.2308  | 0.2862  |
| Cl-34m+E  | 0.9098  | 0.9580  | 1.0120  | 1.3955  | 1.4246  | 1.2779  | 1.6691  | 1.7612  |
| Cm-245+E  | 0.9488  | 0.9260  | 1.2614  | 1.1079  | 1.3212  | 1.1481  | 1.2507  | 1.5235  |
| Cm-247+E  | 0.8168  | 0.8867  | 1.2890  | 1.3789  | 1.3336  | 1.2717  | 1.7205  | 2.0011  |
| Cm-250+E  | 11.5751 | 12.4052 | 14.6570 | 19.2088 | 19.5451 | 17.7269 | 24.3400 | 25.6692 |
| Cs-137+E  | 0.7683  | 0.7340  | 0.7851  | 1.1884  | 1.2263  | 1.0606  | 1.5234  | 1.8150  |
| Es-254+E  | 1.4419  | 1.4802  | 2.1006  | 1.9767  | 2.1213  | 1.9412  | 2.4216  | 2.6821  |
| Fe-60+E   | 1.6348  | 1.7446  | 2.0907  | 2.7906  | 2.8066  | 2.4267  | 3.5907  | 3.8489  |
| Fr-220+E  | 0.1529  | 0.1302  | 0.2179  | 0.1638  | 0.1829  | 0.1528  | 0.1869  | 0.2178  |
| Fr-221+E  | 0.1195  | 0.1258  | 0.1782  | 0.1814  | 0.1952  | 0.1884  | 0.1990  | 0.2041  |
| Ge-68+E   | 0.2942  | 0.1999  | 0.8957  | 0.2850  | 0.2431  | 0.1877  | 0.2698  | 0.4044  |
| Hf-172+E  | 1.1733  | 1.0759  | 2.1235  | 1.3178  | 1.7011  | 1.1770  | 1.5143  | 1.7728  |
| Hf-182+E  | 2.3686  | 2.5354  | 3.4033  | 3.7565  | 4.0647  | 3.5334  | 4.5601  | 4.6425  |
| Hg-193+E  | 1.6656  | 1.6264  | 2.3812  | 2.3007  | 2.4859  | 2.1008  | 2.8183  | 2.8529  |
| Hg-194+E  | 1.7754  | 1.7341  | 2.6322  | 2.5225  | 2.7140  | 2.2827  | 3.4247  | 3.1546  |
| In-114m+E | 0.3903  | 0.3194  | 0.3887  | 0.3801  | 0.5076  | 0.4756  | 0.4743  | 0.4956  |
| Ir-192m+E | 1.8074  | 1.9020  | 3.0827  | 3.1001  | 3.1134  | 2.7936  | 4.2885  | 4.0201  |
| Kr-76+E   | 1.4025  | 1.3994  | 2.2063  | 2.0975  | 2.1617  | 1.9587  | 2.6066  | 2.7749  |
| Mg-28+E   | 2.3791  | 2.4742  | 2.6013  | 3.4660  | 3.8105  | 3.4631  | 4.9499  | 4.8902  |
| Nd-140+E  | 0.5363  | 0.5215  | 0.7076  | 0.4647  | 0.8814  | 0.6413  | 0.7124  | 0.8972  |
| Ni-66+E   | 0.0695  | 0.0863  | 0.0871  | 0.1334  | 0.1361  | 0.1220  | 0.1781  | 0.1887  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Np-235+E  | 0.2720 | 0.2263 | 0.4320 | 0.2532 | 0.2733 | 0.2542 | 0.2445 | 0.3352 |
| Np-237+E  | 1.6719 | 1.5633 | 2.3019 | 2.0043 | 2.2907 | 2.0135 | 2.4832 | 2.5969 |
| Os-194+E  | 0.2961 | 0.2690 | 0.5944 | 0.4053 | 0.4150 | 0.3485 | 0.5164 | 0.5422 |
| Pa-231+E  | 3.2617 | 3.0766 | 4.4833 | 3.8732 | 4.4931 | 4.1282 | 4.7440 | 5.2020 |
| Pb-202+E  | 1.4236 | 1.3900 | 2.4866 | 2.0582 | 2.0452 | 1.8070 | 2.5488 | 2.8783 |
| Pb-210+E  | 0.2000 | 0.1529 | 0.3764 | 0.1865 | 0.1916 | 0.1569 | 0.1740 | 0.2713 |
| Pd-103+E  | 0.3824 | 0.3319 | 0.3712 | 0.3343 | 0.4399 | 0.4551 | 0.3619 | 0.3722 |
| Pt-202+E  | 0.1679 | 0.1932 | 0.2576 | 0.3169 | 0.3000 | 0.2806 | 0.4009 | 0.4561 |
| Pu-239+E  | 0.0423 | 0.0342 | 0.0779 | 0.0393 | 0.0412 | 0.0376 | 0.0375 | 0.0522 |
| Pu-244+E  | 0.9016 | 0.8525 | 1.2762 | 1.1583 | 1.2077 | 1.1215 | 1.3632 | 1.6204 |
| Pu-246+E  | 1.9346 | 2.0506 | 2.5289 | 2.8340 | 3.1366 | 2.7867 | 3.3397 | 3.7346 |
| Ra-219+E  | 0.5171 | 0.5204 | 0.7253 | 0.8045 | 0.8711 | 0.7426 | 1.1596 | 0.9767 |
| Ra-221+E  | 0.3534 | 0.3278 | 0.5185 | 0.4233 | 0.4495 | 0.3937 | 0.4418 | 0.5995 |
| Ra-222+E  | 0.0220 | 0.0238 | 0.0331 | 0.0397 | 0.0411 | 0.0359 | 0.0587 | 0.0492 |
| Ra-223+E  | 1.8047 | 1.7635 | 2.2094 | 2.1910 | 2.6427 | 2.4492 | 2.8733 | 3.0618 |
| Ra-224+E  | 0.0382 | 0.0412 | 0.0613 | 0.0623 | 0.0653 | 0.0666 | 0.0681 | 0.0677 |
| Ra-226+E  | 1.9418 | 1.9807 | 2.4477 | 3.0627 | 3.1522 | 2.8337 | 4.0913 | 4.1362 |
| Ra-228+E  | 1.2687 | 1.3381 | 1.7357 | 1.9393 | 2.0085 | 1.8226 | 2.3628 | 2.5485 |
| Rb-81+E   | 1.1158 | 1.1459 | 1.6024 | 1.6561 | 1.6358 | 1.5689 | 1.7772 | 2.2536 |
| Rb-83+E   | 1.2047 | 1.1466 | 1.8777 | 1.7058 | 1.6084 | 1.5218 | 2.0312 | 2.5750 |
| Re-186m+E | 0.6146 | 0.4977 | 1.4783 | 0.6391 | 0.6833 | 0.5005 | 0.6643 | 0.8784 |
| Rn-219+E  | 0.7900 | 0.7830 | 0.7763 | 0.7892 | 1.1354 | 1.1311 | 1.1344 | 1.2477 |
| Rn-220+E  | 0.0009 | 0.0010 | 0.0014 | 0.0016 | 0.0015 | 0.0014 | 0.0021 | 0.0024 |
| Rn-222+E  | 0.0006 | 0.0006 | 0.0011 | 0.0011 | 0.0010 | 0.0009 | 0.0014 | 0.0016 |
| Ru-103+E  | 0.7612 | 0.8512 | 1.4476 | 1.3886 | 1.2669 | 1.2503 | 1.7806 | 2.0883 |
| Ru-106+E  | 0.2665 | 0.2841 | 0.4118 | 0.4667 | 0.4419 | 0.4161 | 0.6110 | 0.7155 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 1.0671 | 0.9153 | 1.2088 | 1.1969 | 1.4383 | 1.3910 | 1.6259 | 1.7569 |
| Sn-121m+E | 0.1173 | 0.0783 | 0.1208 | 0.0638 | 0.1290 | 0.1090 | 0.1041 | 0.1045 |
| Sn-126+E  | 3.1705 | 3.1387 | 3.7826 | 4.9599 | 5.0737 | 4.5158 | 6.2250 | 7.1794 |
| Sr-82+E   | 0.5485 | 0.4806 | 0.5327 | 0.6159 | 0.6370 | 0.5778 | 0.6040 | 0.8162 |
| Sr-90+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Te-118+E  | 0.6191 | 0.4070 | 0.4672 | 0.3314 | 0.6894 | 0.6034 | 0.5700 | 0.5185 |
| Te-129m+E | 0.3311 | 0.2651 | 0.3798 | 0.2936 | 0.4317 | 0.3761 | 0.4228 | 0.4612 |
| Th-229+E  | 2.1197 | 2.1351 | 2.5112 | 2.4106 | 3.1300 | 3.1051 | 3.3445 | 3.4686 |
| Th-232+E  | 3.0687 | 3.0701 | 4.1798 | 4.4997 | 4.7200 | 4.2698 | 5.4556 | 5.6961 |
| Th-234+E  | 0.1644 | 0.1521 | 0.2129 | 0.1818 | 0.2147 | 0.1789 | 0.2087 | 0.2271 |
| Ti-44+E   | 1.9216 | 1.9170 | 2.0677 | 2.6952 | 3.0921 | 2.4570 | 3.6281 | 3.3376 |
| U-228+E   | 0.1984 | 0.1977 | 0.2887 | 0.2614 | 0.2746 | 0.2562 | 0.2698 | 0.3479 |
| U-230+E   | 0.2071 | 0.1904 | 0.3049 | 0.2335 | 0.2572 | 0.2333 | 0.2609 | 0.3060 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.5949       | 3.5947       | 3.9465       | 3.9353       | 5.2667       | 5.1363       | 5.5124       | 5.6130       |
| U-238+E        | 0.2323       | 0.2122       | 0.3118       | 0.2516       | 0.2903       | 0.2491       | 0.2793       | 0.3194       |
| W-178+E        | 0.8274       | 0.7875       | 1.4782       | 0.9849       | 1.2474       | 0.8333       | 1.1212       | 1.2378       |
| Xe-122+E       | 0.8271       | 0.7162       | 0.9141       | 0.8142       | 1.1775       | 1.0110       | 1.1998       | 1.3220       |
| Zr-93+E        | 0.0586       | 0.0591       | 0.0757       | 0.0590       | 0.0726       | 0.0727       | 0.0614       | 0.0682       |

Table 68: Composite 1 – Infinite Contamination Thickness for 100x100x10 ft and 200x200x10 ft rooms

| Element   | avg100 | ctr100 | mid100 | cnr100 | avg200  | ctr200  | mid200  | cnr200  |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Ac-223+E  | 0.0362 | 0.0297 | 0.0316 | 0.0455 | 0.1896  | 0.1679  | 0.2310  | 0.2075  |
| Ac-225+E  | 0.1722 | 0.1372 | 0.1209 | 0.1833 | 0.9998  | 0.8375  | 1.1624  | 1.0277  |
| Ac-227+E  | 1.7133 | 1.6111 | 1.5543 | 1.7814 | 4.0034  | 3.5123  | 5.0032  | 3.9179  |
| Ag-108m+E | 0.7311 | 0.6065 | 0.4736 | 0.6940 | 4.5740  | 3.5882  | 3.7718  | 4.1262  |
| Ag-110m+E | 0.7949 | 0.6616 | 0.5926 | 0.8858 | 5.0042  | 3.5674  | 3.7833  | 4.9049  |
| Am-242m+E | 0.1029 | 0.0956 | 0.0953 | 0.1189 | 0.5097  | 0.4915  | 0.4577  | 0.5890  |
| Am-243+E  | 0.4538 | 0.3676 | 0.3411 | 0.4740 | 2.5539  | 2.2551  | 3.4078  | 2.2774  |
| Ar-42+E   | 0.0498 | 0.0418 | 0.0461 | 0.0744 | 0.3078  | 0.2026  | 0.2847  | 0.3953  |
| At-211+E  | 0.0944 | 0.0755 | 0.0732 | 0.1140 | 0.5015  | 0.4936  | 1.2168  | 0.4580  |
| Ba-128+E  | 0.2354 | 0.2139 | 0.1784 | 0.1621 | 1.4241  | 1.3041  | 1.7303  | 1.1882  |
| Bi-210m+E | 0.2348 | 0.1899 | 0.1531 | 0.1894 | 1.4341  | 0.9980  | 1.7905  | 1.2019  |
| Bi-212+E  | 0.0383 | 0.0321 | 0.0340 | 0.0480 | 0.2218  | 0.1694  | 0.1789  | 0.2320  |
| Bi-213+E  | 0.0757 | 0.0586 | 0.0450 | 0.0722 | 0.4686  | 0.3836  | 0.5286  | 0.4783  |
| Bi-214+E  | 0.3341 | 0.2778 | 0.2709 | 0.3987 | 2.0872  | 1.4825  | 1.8316  | 2.2458  |
| Bi-215+E  | 0.1673 | 0.1357 | 0.1137 | 0.1575 | 1.0096  | 0.7496  | 1.4092  | 0.9639  |
| Bi-216+E  | 0.3636 | 0.2873 | 0.2137 | 0.3430 | 2.2694  | 1.8508  | 2.1574  | 2.3579  |
| Cd-118+E  | 0.0153 | 0.0128 | 0.0135 | 0.0194 | 0.0953  | 0.0664  | 0.1015  | 0.1187  |
| Ce-134+E  | 0.1442 | 0.1416 | 0.1309 | 0.0892 | 0.8477  | 0.8881  | 1.0841  | 0.5877  |
| Ce-144+E  | 0.0378 | 0.0307 | 0.0300 | 0.0383 | 0.2258  | 0.1813  | 0.2223  | 0.1593  |
| Cl-34m+E  | 0.2523 | 0.2020 | 0.2245 | 0.3189 | 1.5638  | 1.0459  | 1.6221  | 1.6262  |
| Cm-245+E  | 0.2288 | 0.1819 | 0.1773 | 0.2776 | 1.2746  | 1.1166  | 1.0242  | 1.2918  |
| Cm-247+E  | 0.2564 | 0.1986 | 0.1577 | 0.2498 | 1.5766  | 1.2691  | 1.8372  | 1.4090  |
| Cm-250+E  | 3.5088 | 2.8644 | 2.6137 | 3.7615 | 21.8199 | 15.8336 | 21.1725 | 22.4649 |
| Cs-137+E  | 0.2124 | 0.1771 | 0.1409 | 0.2135 | 1.3475  | 1.0194  | 0.8957  | 1.0848  |
| Es-254+E  | 0.3688 | 0.3327 | 0.3232 | 0.4337 | 2.0832  | 1.5797  | 1.9555  | 2.4380  |
| Fe-60+E   | 0.4817 | 0.4052 | 0.4507 | 0.6582 | 2.9472  | 1.9951  | 3.0804  | 3.7113  |
| Fr-220+E  | 0.0328 | 0.0268 | 0.0277 | 0.0431 | 0.1697  | 0.1595  | 0.3096  | 0.1795  |
| Fr-221+E  | 0.0358 | 0.0282 | 0.0236 | 0.0310 | 0.2119  | 0.1724  | 0.2690  | 0.1710  |
| Ge-68+E   | 0.0414 | 0.0328 | 0.0664 | 0.0819 | 0.1726  | 0.1410  | 0.0784  | 0.1520  |
| Hf-172+E  | 0.2706 | 0.2238 | 0.2542 | 0.2323 | 1.5112  | 1.2902  | 1.1869  | 0.9424  |
| Hf-182+E  | 0.7102 | 0.5783 | 0.5483 | 0.7198 | 4.2965  | 3.1324  | 4.7243  | 3.9597  |
| Hg-193+E  | 0.4457 | 0.3640 | 0.3576 | 0.4789 | 2.6099  | 2.0985  | 3.3672  | 2.3865  |
| Hg-194+E  | 0.4768 | 0.3933 | 0.3813 | 0.5008 | 2.8393  | 2.1435  | 3.4206  | 2.8628  |
| In-114m+E | 0.0873 | 0.0802 | 0.0633 | 0.0674 | 0.5226  | 0.4496  | 0.5857  | 0.4413  |
| Ir-192m+E | 0.5548 | 0.4487 | 0.3560 | 0.4936 | 3.4241  | 2.4868  | 3.8247  | 3.6108  |
| Kr-76+E   | 0.3797 | 0.3116 | 0.2719 | 0.3817 | 2.2175  | 1.6690  | 2.4009  | 2.3921  |
| Mg-28+E   | 0.6794 | 0.5775 | 0.6087 | 0.8259 | 4.2119  | 3.0412  | 4.1449  | 4.7839  |
| Nd-140+E  | 0.1375 | 0.1358 | 0.1342 | 0.0862 | 0.7941  | 0.8393  | 0.9985  | 0.4909  |
| Ni-66+E   | 0.0239 | 0.0204 | 0.0190 | 0.0295 | 0.1487  | 0.0966  | 0.1430  | 0.1819  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.0469        | 0.0446        | 0.0491        | 0.0640        | 0.2060        | 0.2096        | 0.2060        | 0.2998        |
| Np-237+E       | 0.3957        | 0.3364        | 0.3068        | 0.4285        | 2.1836        | 1.8722        | 2.5880        | 2.4268        |
| Os-194+E       | 0.0706        | 0.0582        | 0.0621        | 0.0798        | 0.4019        | 0.2986        | 0.4080        | 0.4073        |
| Pa-231+E       | 1.8232        | 1.7116        | 1.6583        | 1.9142        | 4.5441        | 4.0089        | 5.6218        | 4.5951        |
| Pb-202+E       | 0.3917        | 0.3092        | 0.2804        | 0.4022        | 2.2904        | 1.9760        | 3.0800        | 2.1599        |
| Pb-210+E       | 0.0318        | 0.0281        | 0.0375        | 0.0517        | 0.1355        | 0.1321        | 0.1275        | 0.2085        |
| Pd-103+E       | 0.0737        | 0.0807        | 0.0617        | 0.0490        | 0.3977        | 0.3874        | 0.3808        | 0.3832        |
| Pt-202+E       | 0.0562        | 0.0452        | 0.0392        | 0.0599        | 0.3516        | 0.2642        | 0.3475        | 0.3895        |
| Pu-239+E       | 0.0070        | 0.0066        | 0.0079        | 0.0100        | 0.0306        | 0.0307        | 0.0278        | 0.0410        |
| Pu-244+E       | 0.2161        | 0.1889        | 0.1713        | 0.2377        | 1.2039        | 1.0229        | 1.0883        | 1.3497        |
| Pu-246+E       | 0.5421        | 0.4548        | 0.4275        | 0.5850        | 3.1979        | 2.4805        | 2.8524        | 3.2201        |
| Ra-219+E       | 0.1507        | 0.1222        | 0.0969        | 0.1401        | 0.9138        | 0.6813        | 1.3228        | 0.9668        |
| Ra-221+E       | 0.0808        | 0.0643        | 0.0653        | 0.1149        | 0.4314        | 0.3669        | 0.5735        | 0.4690        |
| Ra-222+E       | 0.0070        | 0.0057        | 0.0042        | 0.0059        | 0.0445        | 0.0304        | 0.0539        | 0.0478        |
| Ra-223+E       | 1.5028        | 1.4338        | 1.3842        | 1.5605        | 2.8656        | 2.5728        | 3.6892        | 2.7633        |
| Ra-224+E       | 0.0120        | 0.0096        | 0.0080        | 0.0095        | 0.0721        | 0.0521        | 0.0845        | 0.0518        |
| Ra-226+E       | 0.5628        | 0.4608        | 0.4207        | 0.6115        | 3.4666        | 2.5271        | 3.7032        | 3.5517        |
| Ra-228+E       | 0.3544        | 0.2999        | 0.2793        | 0.4015        | 2.0806        | 1.5659        | 1.9470        | 2.3234        |
| Rb-81+E        | 0.3040        | 0.2442        | 0.2055        | 0.3409        | 1.7457        | 1.4623        | 1.8085        | 2.0443        |
| Rb-83+E        | 0.3070        | 0.2548        | 0.2161        | 0.3503        | 1.7287        | 1.5179        | 1.7752        | 2.3558        |
| Re-186m+E      | 0.1142        | 0.0921        | 0.1351        | 0.1557        | 0.5715        | 0.4868        | 0.3902        | 0.4134        |
| Rn-219+E       | 1.2289        | 1.2180        | 1.1917        | 1.2609        | 1.2751        | 1.2655        | 1.2767        | 1.2828        |
| Rn-220+E       | 0.0003        | 0.0002        | 0.0002        | 0.0003        | 0.0018        | 0.0015        | 0.0017        | 0.0019        |
| Rn-222+E       | 0.0002        | 0.0002        | 0.0001        | 0.0002        | 0.0012        | 0.0010        | 0.0013        | 0.0015        |
| Ru-103+E       | 0.2572        | 0.2053        | 0.1512        | 0.2286        | 1.5771        | 1.3598        | 1.6277        | 1.8936        |
| Ru-106+E       | 0.0850        | 0.0686        | 0.0521        | 0.0819        | 0.5295        | 0.4287        | 0.4811        | 0.5766        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 0.2578        | 0.2307        | 0.1743        | 0.1938        | 1.5912        | 1.3084        | 1.7524        | 1.3494        |
| Sn-121m+E      | 0.0203        | 0.0215        | 0.0193        | 0.0121        | 0.1157        | 0.1151        | 0.1613        | 0.0821        |
| Sn-126+E       | 0.9114        | 0.7418        | 0.6006        | 0.8967        | 5.7116        | 4.4562        | 5.0728        | 4.8880        |
| Sr-82+E        | 0.1089        | 0.0989        | 0.0937        | 0.1521        | 0.5385        | 0.4873        | 0.5653        | 0.8956        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Te-118+E       | 0.1090        | 0.1165        | 0.0948        | 0.0581        | 0.6419        | 0.6157        | 0.9214        | 0.4977        |
| Te-129m+E      | 0.0726        | 0.0695        | 0.0587        | 0.0513        | 0.4322        | 0.3977        | 0.5187        | 0.3588        |
| Th-229+E       | 2.5956        | 2.5304        | 2.3406        | 2.5419        | 3.5208        | 3.3127        | 3.5653        | 3.2669        |
| Th-232+E       | 0.8388        | 0.6990        | 0.6371        | 0.8655        | 4.9557        | 3.8200        | 5.5522        | 4.9568        |
| Th-234+E       | 0.0374        | 0.0319        | 0.0313        | 0.0426        | 0.2007        | 0.1831        | 0.2274        | 0.2128        |
| Ti-44+E        | 0.5541        | 0.4560        | 0.4290        | 0.5910        | 3.2834        | 2.7262        | 5.9302        | 3.0333        |
| U-228+E        | 0.0499        | 0.0407        | 0.0372        | 0.0606        | 0.2755        | 0.2336        | 0.3092        | 0.2917        |
| U-230+E        | 0.0447        | 0.0389        | 0.0383        | 0.0530        | 0.2284        | 0.2031        | 0.2458        | 0.2720        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 4.4956        | 4.2881        | 4.4918        | 4.3735        | 5.7742        | 5.3470        | 5.4463        | 5.2819        |
| U-238+E        | 0.0504        | 0.0440        | 0.0438        | 0.0594        | 0.2621        | 0.2421        | 0.2882        | 0.2976        |
| W-178+E        | 0.2005        | 0.1648        | 0.1866        | 0.1733        | 1.1325        | 0.9711        | 0.8846        | 0.7574        |
| Xe-122+E       | 0.1987        | 0.1864        | 0.1520        | 0.1405        | 1.2026        | 1.0967        | 1.4421        | 1.0107        |
| Zr-93+E        | 0.0127        | 0.0128        | 0.0112        | 0.0110        | 0.0595        | 0.0623        | 0.0567        | 0.0632        |

Table 69: Composite 1 – Infinite Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1628        | 0.1525        | 0.1177        | 0.2955        |
| Ac-225+E       | 0.9292        | 0.7043        | 0.8243        | 0.8002        |
| Ac-227+E       | 3.7901        | 3.2159        | 3.0312        | 3.7409        |
| Ag-108m+E      | 4.3749        | 3.1460        | 4.1202        | 3.7094        |
| Ag-110m+E      | 4.9474        | 3.3003        | 3.7062        | 3.9832        |
| Am-242m+E      | 0.3856        | 0.4515        | 0.3054        | 0.9384        |
| Am-243+E       | 2.3864        | 2.0191        | 1.6517        | 2.1737        |
| Ar-42+E        | 0.3071        | 0.1714        | 0.2087        | 0.3449        |
| At-211+E       | 0.4564        | 0.4382        | 0.3828        | 0.6013        |
| Ba-128+E       | 1.3410        | 1.0894        | 1.2783        | 0.8407        |
| Bi-210m+E      | 1.4235        | 0.8774        | 0.8085        | 0.6034        |
| Bi-212+E       | 0.2056        | 0.1513        | 0.1438        | 0.2922        |
| Bi-213+E       | 0.4483        | 0.2873        | 0.5035        | 0.2129        |
| Bi-214+E       | 2.0648        | 1.3585        | 1.7754        | 2.0014        |
| Bi-215+E       | 0.9915        | 0.6537        | 0.6535        | 0.5662        |
| Bi-216+E       | 2.1930        | 1.4865        | 2.8803        | 1.3722        |
| Cd-118+E       | 0.0950        | 0.0538        | 0.0771        | 0.0620        |
| Ce-134+E       | 0.7940        | 0.7919        | 0.7329        | 0.7108        |
| Ce-144+E       | 0.2207        | 0.1942        | 0.1697        | 0.1558        |
| Cl-34m+E       | 1.5522        | 1.0434        | 1.2744        | 1.3055        |
| Cm-245+E       | 1.1695        | 1.0422        | 0.6567        | 1.1910        |
| Cm-247+E       | 1.4941        | 1.0000        | 1.1024        | 0.8275        |
| Cm-250+E       | 21.5691       | 13.9622       | 18.1753       | 14.6635       |
| Cs-137+E       | 1.3179        | 1.0286        | 1.0808        | 1.4613        |
| Es-254+E       | 1.9025        | 1.6249        | 1.8174        | 2.2477        |
| Fe-60+E        | 2.9304        | 1.6986        | 2.1376        | 2.5009        |
| Fr-220+E       | 0.1474        | 0.1495        | 0.1103        | 0.2452        |
| Fr-221+E       | 0.2065        | 0.1578        | 0.1131        | 0.1298        |
| Ge-68+E        | 0.1169        | 0.1678        | 0.1306        | 0.9750        |
| Hf-172+E       | 1.3846        | 1.3261        | 1.5498        | 2.0914        |
| Hf-182+E       | 4.2644        | 2.8742        | 3.1872        | 2.4931        |
| Hg-193+E       | 2.5031        | 1.8811        | 2.1251        | 2.3637        |
| Hg-194+E       | 2.7421        | 1.9015        | 2.2149        | 2.6244        |
| In-114m+E      | 0.4765        | 0.4259        | 0.3864        | 0.4422        |
| Ir-192m+E      | 3.3514        | 2.1155        | 2.7352        | 2.0683        |
| Kr-76+E        | 2.0815        | 1.4786        | 1.3822        | 1.6661        |
| Mg-28+E        | 4.1237        | 2.5892        | 3.1463        | 3.7209        |
| Nd-140+E       | 0.7552        | 0.7597        | 0.6693        | 0.6394        |
| Ni-66+E        | 0.1516        | 0.1039        | 0.1398        | 0.0671        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1294        | 0.1968        | 0.1040        | 0.5618        |
| Np-237+E       | 1.9462        | 1.6564        | 1.1805        | 2.2651        |
| Os-194+E       | 0.3727        | 0.2823        | 0.2536        | 0.5631        |
| Pa-231+E       | 4.2029        | 3.6734        | 3.3115        | 4.7666        |
| Pb-202+E       | 2.1409        | 1.5944        | 2.4226        | 1.9567        |
| Pb-210+E       | 0.0880        | 0.1352        | 0.0650        | 0.4480        |
| Pd-103+E       | 0.2991        | 0.3500        | 0.3707        | 0.6003        |
| Pt-202+E       | 0.3442        | 0.2102        | 0.3461        | 0.1725        |
| Pu-239+E       | 0.0190        | 0.0296        | 0.0169        | 0.0974        |
| Pu-244+E       | 1.0552        | 0.9200        | 1.0987        | 1.5331        |
| Pu-246+E       | 3.0594        | 2.3296        | 2.1777        | 2.3330        |
| Ra-219+E       | 0.8968        | 0.5951        | 0.5240        | 0.5336        |
| Ra-221+E       | 0.3810        | 0.3849        | 0.2649        | 0.5552        |
| Ra-222+E       | 0.0443        | 0.0264        | 0.0248        | 0.0205        |
| Ra-223+E       | 2.7859        | 2.3543        | 2.4162        | 2.4449        |
| Ra-224+E       | 0.0711        | 0.0459        | 0.0383        | 0.0274        |
| Ra-226+E       | 3.4013        | 2.2580        | 2.6263        | 2.8077        |
| Ra-228+E       | 1.9604        | 1.4235        | 1.4865        | 1.7202        |
| Rb-81+E        | 1.6073        | 1.3420        | 1.2875        | 1.4367        |
| Rb-83+E        | 1.5466        | 1.2312        | 2.2825        | 1.6838        |
| Re-186m+E      | 0.4818        | 0.5243        | 0.5215        | 1.5375        |
| Rn-219+E       | 1.2694        | 1.1912        | 1.3846        | 1.2442        |
| Rn-220+E       | 0.0017        | 0.0012        | 0.0026        | 0.0012        |
| Rn-222+E       | 0.0012        | 0.0007        | 0.0020        | 0.0005        |
| Ru-103+E       | 1.5159        | 0.9852        | 2.6305        | 0.7104        |
| Ru-106+E       | 0.5168        | 0.3594        | 0.7383        | 0.3555        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.4393        | 1.0708        | 1.1140        | 0.9692        |
| Sn-121m+E      | 0.0973        | 0.1047        | 0.0913        | 0.1397        |
| Sn-126+E       | 5.5303        | 3.9737        | 4.4865        | 4.5462        |
| Sr-82+E        | 0.4110        | 0.4164        | 0.1843        | 0.7509        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0000        | 0.0001        |
| Te-118+E       | 0.5478        | 0.5474        | 0.5039        | 0.5756        |
| Te-129m+E      | 0.3893        | 0.3440        | 0.3887        | 0.3800        |
| Th-229+E       | 3.4577        | 3.1103        | 3.2164        | 2.8773        |
| Th-232+E       | 4.7514        | 3.3560        | 3.8791        | 3.9588        |
| Th-234+E       | 0.1773        | 0.1635        | 0.1461        | 0.2324        |
| Ti-44+E        | 3.2536        | 2.4239        | 3.0743        | 2.1268        |
| U-228+E        | 0.2463        | 0.2305        | 0.1703        | 0.2923        |
| U-230+E        | 0.1863        | 0.1878        | 0.1182        | 0.3407        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 5.7002        | 5.3665        | 4.9859        | 4.8102        |
| U-238+E        | 0.2210        | 0.2182        | 0.1790        | 0.3597        |
| W-178+E        | 1.0622        | 0.9506        | 1.2294        | 1.4325        |
| Xe-122+E       | 1.1117        | 0.9666        | 1.0822        | 0.9148        |
| Zr-93+E        | 0.0391        | 0.0547        | 0.0385        | 0.1112        |

## Appendix G

These are appendices to augment Finklea 2014 Room Radiation Dose Coefficients for External Exposure as utilized in <http://epa-bprg.ornl.gov/> and <http://epa-bdcc.ornl.gov/> .”

Table 70: Composite 2 Surface Contamination for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.5393  | 0.3279  | 0.4853  | 0.5642  | 0.4415  | 0.3223  | 0.5208  | 0.5938  |
| Ac-225+E  | 1.4245  | 0.9489  | 1.3005  | 1.4722  | 1.3534  | 1.1081  | 1.5240  | 1.6396  |
| Ac-227+E  | 5.0250  | 3.3189  | 4.5827  | 5.2064  | 4.6623  | 3.7658  | 5.2859  | 5.7369  |
| Ag-108m+E | 3.5763  | 2.5759  | 3.2995  | 3.6214  | 4.0934  | 3.7066  | 4.3759  | 4.3730  |
| Ag-110m+E | 2.9637  | 2.1399  | 2.7316  | 2.9892  | 3.5552  | 3.2538  | 3.7702  | 3.7263  |
| Am-242m+E | 1.8676  | 1.1739  | 1.6897  | 1.9381  | 1.6063  | 1.2334  | 1.8560  | 2.0492  |
| Am-243+E  | 4.4513  | 3.0534  | 4.0873  | 4.5967  | 4.3214  | 3.6200  | 4.8290  | 5.1412  |
| Ar-42+E   | 0.1679  | 0.1194  | 0.1541  | 0.1689  | 0.2036  | 0.1860  | 0.2155  | 0.2113  |
| At-211+E  | 1.0511  | 0.6926  | 0.9593  | 1.0937  | 0.9513  | 0.7581  | 1.0873  | 1.1943  |
| Ba-128+E  | 1.8706  | 1.2993  | 1.7146  | 1.9084  | 2.0137  | 1.7737  | 2.1796  | 2.2240  |
| Bi-210m+E | 1.2110  | 0.8765  | 1.1203  | 1.2390  | 1.3212  | 1.1729  | 1.4342  | 1.4726  |
| Bi-212+E  | 0.3706  | 0.2240  | 0.3327  | 0.3866  | 0.3175  | 0.2373  | 0.3699  | 0.4159  |
| Bi-213+E  | 0.3622  | 0.2604  | 0.3344  | 0.3694  | 0.4019  | 0.3582  | 0.4342  | 0.4428  |
| Bi-214+E  | 1.2574  | 0.9018  | 1.1571  | 1.2687  | 1.4992  | 1.3665  | 1.5918  | 1.5758  |
| Bi-215+E  | 0.9639  | 0.6846  | 0.8891  | 0.9882  | 1.0232  | 0.8947  | 1.1187  | 1.1583  |
| Bi-216+E  | 1.4709  | 1.0720  | 1.3598  | 1.4912  | 1.7099  | 1.5536  | 1.8254  | 1.8297  |
| Cd-118+E  | 0.0620  | 0.0443  | 0.0570  | 0.0624  | 0.0748  | 0.0685  | 0.0792  | 0.0780  |
| Ce-134+E  | 1.5428  | 1.0453  | 1.4085  | 1.5802  | 1.6044  | 1.3864  | 1.7527  | 1.8096  |
| Ce-144+E  | 0.3044  | 0.2213  | 0.2819  | 0.3116  | 0.3331  | 0.2978  | 0.3605  | 0.3681  |
| Cl-34m+E  | 1.1171  | 0.8224  | 1.0335  | 1.1302  | 1.3222  | 1.2109  | 1.4051  | 1.3961  |
| Cm-245+E  | 2.5540  | 1.7327  | 2.3410  | 2.6391  | 2.4236  | 2.0028  | 2.7242  | 2.9191  |
| Cm-247+E  | 1.5006  | 1.0733  | 1.3853  | 1.5346  | 1.6137  | 1.4235  | 1.7554  | 1.8049  |
| Cm-250+E  | 14.8352 | 10.8140 | 13.7067 | 15.0124 | 17.4303 | 15.8973 | 18.5570 | 18.4723 |
| Cs-137+E  | 1.9878  | 1.4375  | 1.8343  | 2.0035  | 2.3647  | 2.1625  | 2.4989  | 2.4752  |
| Es-254+E  | 3.9500  | 2.4905  | 3.5698  | 4.0854  | 3.5886  | 2.8357  | 4.0867  | 4.4422  |
| Fe-60+E   | 2.5998  | 1.7055  | 2.3566  | 2.6629  | 2.7326  | 2.3227  | 3.0014  | 3.1251  |
| Fr-220+E  | 0.4562  | 0.2883  | 0.4134  | 0.4760  | 0.3891  | 0.2956  | 0.4529  | 0.5074  |
| Fr-221+E  | 0.2387  | 0.1708  | 0.2206  | 0.2451  | 0.2491  | 0.2170  | 0.2733  | 0.2850  |
| Ge-68+E   | 1.5218  | 0.7823  | 1.3344  | 1.6240  | 1.0044  | 0.5592  | 1.2840  | 1.6175  |
| Hf-172+E  | 4.1360  | 2.5654  | 3.7303  | 4.3292  | 3.5954  | 2.7490  | 4.1620  | 4.6790  |
| Hf-182+E  | 4.4767  | 3.1203  | 4.1127  | 4.6027  | 4.7027  | 4.0752  | 5.1573  | 5.3803  |
| Hg-193+E  | 3.6880  | 2.4259  | 3.3580  | 3.8258  | 3.5038  | 2.8547  | 3.9537  | 4.2837  |
| Hg-194+E  | 3.8144  | 2.4888  | 3.4669  | 3.9562  | 3.6170  | 2.9353  | 4.0856  | 4.4309  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50  |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| In-114m+E | 0.7968 | 0.5592 | 0.7322 | 0.8119 | 0.8521 | 0.7529 | 0.9234 | 0.9398 |
| Ir-192m+E | 3.3651 | 2.2871 | 3.0769 | 3.4648 | 3.4250 | 2.9045 | 3.7925 | 4.0055 |
| Kr-76+E   | 3.2892 | 2.1589 | 2.9955 | 3.4034 | 3.0580 | 2.4634 | 3.4682 | 3.7576 |
| Mg-28+E   | 2.9243 | 2.0957 | 2.6895 | 2.9481 | 3.4745 | 3.1735 | 3.6823 | 3.6290 |
| Nd-140+E  | 1.5858 | 1.0729 | 1.4482 | 1.6276 | 1.6344 | 1.4064 | 1.7937 | 1.8562 |
| Ni-66+E   | 0.0907 | 0.0650 | 0.0834 | 0.0914 | 0.1094 | 0.1001 | 0.1159 | 0.1142 |
| Np-235+E  | 1.0864 | 0.6518 | 0.9762 | 1.1343 | 0.8615 | 0.6151 | 1.0231 | 1.1670 |
| Np-237+E  | 4.5848 | 3.0068 | 4.1774 | 4.7439 | 4.1873 | 3.3577 | 4.7598 | 5.1606 |
| Os-194+E  | 0.9207 | 0.5409 | 0.8230 | 0.9670 | 0.7478 | 0.5341 | 0.8872 | 1.0242 |
| Pa-231+E  | 7.0272 | 4.5364 | 6.3849 | 7.2946 | 6.2972 | 4.9611 | 7.2105 | 7.9142 |
| Pb-202+E  | 3.4215 | 2.2049 | 3.1050 | 3.5597 | 3.1442 | 2.5022 | 3.5834 | 3.9375 |
| Pb-210+E  | 0.8384 | 0.4794 | 0.7478 | 0.8828 | 0.6198 | 0.4084 | 0.7568 | 0.8960 |
| Pd-103+E  | 1.2482 | 0.8472 | 1.1415 | 1.2725 | 1.2523 | 1.0776 | 1.3749 | 1.4103 |
| Pt-202+E  | 0.2286 | 0.1655 | 0.2109 | 0.2313 | 0.2689 | 0.2449 | 0.2865 | 0.2855 |
| Pu-239+E  | 0.1800 | 0.1050 | 0.1610 | 0.1887 | 0.1384 | 0.0954 | 0.1663 | 0.1930 |
| Pu-244+E  | 2.3520 | 1.5041 | 2.1326 | 2.4318 | 2.1218 | 1.6773 | 2.4198 | 2.6305 |
| Pu-246+E  | 4.1882 | 2.8734 | 3.8392 | 4.2972 | 4.2563 | 3.6361 | 4.6958 | 4.9023 |
| Ra-219+E  | 0.9623 | 0.6834 | 0.8879 | 0.9876 | 1.0089 | 0.8786 | 1.1067 | 1.1501 |
| Ra-221+E  | 1.0554 | 0.6775 | 0.9586 | 1.0986 | 0.9217 | 0.7138 | 1.0642 | 1.1810 |
| Ra-222+E  | 0.0349 | 0.0257 | 0.0324 | 0.0355 | 0.0395 | 0.0358 | 0.0425 | 0.0430 |
| Ra-223+E  | 2.4315 | 1.6718 | 2.2321 | 2.5105 | 2.4037 | 2.0237 | 2.6784 | 2.8488 |
| Ra-224+E  | 1.1866 | 0.8666 | 1.0956 | 1.1958 | 1.4099 | 1.2916 | 1.4851 | 1.4650 |
| Ra-226+E  | 3.6622 | 2.6007 | 3.3686 | 3.7208 | 4.1388 | 3.6998 | 4.4461 | 4.4828 |
| Ra-228+E  | 3.2515 | 2.2415 | 2.9792 | 3.3157 | 3.4705 | 3.0330 | 3.7764 | 3.8751 |
| Rb-81+E   | 2.6216 | 1.7725 | 2.4010 | 2.7020 | 2.4941 | 2.0511 | 2.8055 | 3.0012 |
| Rb-83+E   | 2.7546 | 1.7611 | 2.4991 | 2.8517 | 2.4528 | 1.9137 | 2.8149 | 3.0836 |
| Re-186m+E | 2.6689 | 1.4954 | 2.3701 | 2.8260 | 1.9861 | 1.3021 | 2.4273 | 2.9093 |
| Rn-219+E  | 0.2357 | 0.1719 | 0.2183 | 0.2406 | 0.2612 | 0.2336 | 0.2822 | 0.2879 |
| Rn-220+E  | 1.1252 | 0.8218 | 1.0387 | 1.1330 | 1.3433 | 1.2325 | 1.4128 | 1.3907 |
| Rn-222+E  | 0.0007 | 0.0005 | 0.0007 | 0.0008 | 0.0009 | 0.0008 | 0.0009 | 0.0009 |
| Ru-103+E  | 1.1001 | 0.7909 | 1.0144 | 1.1162 | 1.2564 | 1.1332 | 1.3457 | 1.3535 |
| Ru-106+E  | 0.3172 | 0.2319 | 0.2933 | 0.3205 | 0.3778 | 0.3462 | 0.4009 | 0.3981 |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sn-113+E  | 2.0318 | 1.4333 | 1.8678 | 2.0640 | 2.2183 | 1.9783 | 2.3909 | 2.4107 |
| Sn-121m+E | 0.3034 | 0.1965 | 0.2749 | 0.3123 | 0.2933 | 0.2430 | 0.3269 | 0.3462 |
| Sn-126+E  | 4.2929 | 3.1060 | 3.9652 | 4.3605 | 4.9134 | 4.4425 | 5.2621 | 5.2932 |
| Sr-82+E   | 1.5358 | 0.9845 | 1.3970 | 1.5880 | 1.3016 | 0.9912 | 1.5118 | 1.6618 |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| Te-118+E  | 1.3221 | 0.9065 | 1.2090 | 1.3461 | 1.3976 | 1.2267 | 1.5151 | 1.5393 |
| Te-129m+E | 0.7352 | 0.4909 | 0.6694 | 0.7535 | 0.7479 | 0.6381 | 0.8218 | 0.8552 |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Th-229+E       | 5.6649       | 3.6609       | 5.1496       | 5.8807       | 5.0614       | 3.9852       | 5.7998       | 6.3617       |
| Th-232+E       | 8.1962       | 5.7059       | 7.5202       | 8.3570       | 8.8627       | 7.7803       | 9.6130       | 9.8393       |
| Th-234+E       | 0.4691       | 0.3060       | 0.4272       | 0.4865       | 0.4219       | 0.3349       | 0.4820       | 0.5263       |
| Ti-44+E        | 3.2950       | 2.4196       | 3.0586       | 3.3715       | 3.6812       | 3.3157       | 3.9697       | 4.0383       |
| U-228+E        | 0.5558       | 0.3670       | 0.5070       | 0.5752       | 0.5097       | 0.4101       | 0.5789       | 0.6278       |
| U-230+E        | 0.6782       | 0.4278       | 0.6143       | 0.7047       | 0.5783       | 0.4406       | 0.6711       | 0.7455       |
| U-235+E        | 3.7158       | 2.4944       | 3.3942       | 3.8283       | 3.5356       | 2.9138       | 3.9429       | 4.2508       |
| U-238+E        | 1.4301       | 1.0148       | 1.3150       | 1.4523       | 1.5646       | 1.3963       | 1.6765       | 1.7206       |
| W-178+E        | 2.8138       | 1.7533       | 2.5405       | 2.9470       | 2.4558       | 1.8825       | 2.8413       | 3.1942       |
| Xe-122+E       | 1.6962       | 1.1804       | 1.5553       | 1.7276       | 1.8320       | 1.6197       | 1.9794       | 2.0104       |
| Zr-93+E        | 0.2276       | 0.1481       | 0.2072       | 0.2342       | 0.2044       | 0.1635       | 0.2320       | 0.2484       |

Table 71: Composite 2 Surface Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4414  | 0.3508  | 0.5400  | 0.6029  | 0.3191  | 0.3070  | 0.5322  | 0.6081  |
| Ac-225+E  | 1.4371  | 1.2805  | 1.6334  | 1.6946  | 1.2000  | 1.2187  | 1.6674  | 1.7578  |
| Ac-227+E  | 4.8968  | 4.2997  | 5.6234  | 5.9053  | 4.0107  | 4.0464  | 5.7030  | 6.0763  |
| Ag-108m+E | 4.6371  | 4.5339  | 4.8748  | 4.6351  | 4.3132  | 4.5446  | 5.1484  | 4.9327  |
| Ag-110m+E | 4.1459  | 4.1135  | 4.2968  | 4.0137  | 4.0375  | 4.3115  | 4.6712  | 4.3448  |
| Am-242m+E | 1.6078  | 1.3257  | 1.9081  | 2.0684  | 1.1439  | 1.1033  | 1.8489  | 2.0721  |
| Am-243+E  | 4.5905  | 4.1582  | 5.1601  | 5.2990  | 3.8781  | 3.9609  | 5.2523  | 5.4804  |
| Ar-42+E   | 0.2395  | 0.2377  | 0.2462  | 0.2282  | 0.2346  | 0.2515  | 0.2712  | 0.2496  |
| At-211+E  | 0.9904  | 0.8587  | 1.1509  | 1.2231  | 0.8055  | 0.8124  | 1.1660  | 1.2594  |
| Ba-128+E  | 2.2306  | 2.1353  | 2.3773  | 2.3198  | 1.9994  | 2.0994  | 2.4710  | 2.4185  |
| Bi-210m+E | 1.4792  | 1.4212  | 1.5907  | 1.5585  | 1.3823  | 1.4495  | 1.6843  | 1.6519  |
| Bi-212+E  | 0.3286  | 0.2711  | 0.3916  | 0.4275  | 0.2551  | 0.2528  | 0.3958  | 0.4365  |
| Bi-213+E  | 0.4537  | 0.4386  | 0.4851  | 0.4697  | 0.4259  | 0.4482  | 0.5162  | 0.5050  |
| Bi-214+E  | 1.7474  | 1.7285  | 1.8136  | 1.6954  | 1.6985  | 1.8138  | 1.9754  | 1.8414  |
| Bi-215+E  | 1.1353  | 1.0766  | 1.2324  | 1.2195  | 1.0406  | 1.0869  | 1.2980  | 1.2893  |
| Bi-216+E  | 1.9637  | 1.9322  | 2.0662  | 1.9584  | 1.8865  | 1.9996  | 2.2200  | 2.1309  |
| Cd-118+E  | 0.0877  | 0.0870  | 0.0905  | 0.0842  | 0.0857  | 0.0918  | 0.0991  | 0.0920  |
| Ce-134+E  | 1.7589  | 1.6579  | 1.8944  | 1.8722  | 1.5475  | 1.6223  | 1.9563  | 1.9345  |
| Ce-144+E  | 0.3717  | 0.3594  | 0.3973  | 0.3869  | 0.3467  | 0.3647  | 0.4177  | 0.4090  |
| Cl-34m+E  | 1.5300  | 1.5145  | 1.5938  | 1.4969  | 1.4914  | 1.5883  | 1.7284  | 1.6254  |
| Cm-245+E  | 2.5428  | 2.2673  | 2.8889  | 2.9979  | 2.0846  | 2.1019  | 2.9074  | 3.0789  |
| Cm-247+E  | 1.7910  | 1.7095  | 1.9334  | 1.8967  | 1.6365  | 1.7082  | 2.0296  | 2.0036  |
| Cm-250+E  | 20.1019 | 19.8426 | 20.9802 | 19.7761 | 19.3971 | 20.6344 | 22.6551 | 21.3756 |
| Cs-137+E  | 2.7437  | 2.7170  | 2.8606  | 2.6690  | 2.6579  | 2.8259  | 3.0839  | 2.8878  |
| Es-254+E  | 3.7313  | 3.2083  | 4.3048  | 4.5468  | 2.8969  | 2.8933  | 4.3043  | 4.6353  |
| Fe-60+E   | 3.0839  | 2.8850  | 3.3451  | 3.3140  | 2.8287  | 2.9749  | 3.5845  | 3.5320  |
| Fr-220+E  | 0.3946  | 0.3259  | 0.4722  | 0.5161  | 0.2984  | 0.2929  | 0.4693  | 0.5243  |
| Fr-221+E  | 0.2735  | 0.2583  | 0.2993  | 0.2980  | 0.2477  | 0.2573  | 0.3122  | 0.3136  |
| Ge-68+E   | 0.9282  | 0.5633  | 1.2991  | 1.6246  | 0.5258  | 0.4418  | 1.2466  | 1.5981  |
| Hf-172+E  | 3.7301  | 3.1474  | 4.4097  | 4.7969  | 2.9977  | 3.0227  | 4.4688  | 4.8922  |
| Hf-182+E  | 5.2296  | 4.9398  | 5.6949  | 5.6614  | 4.8189  | 5.0609  | 6.0220  | 5.9946  |
| Hg-193+E  | 3.7609  | 3.3620  | 4.2720  | 4.4440  | 3.2361  | 3.3311  | 4.4208  | 4.6303  |
| Hg-194+E  | 3.8876  | 3.4655  | 4.4194  | 4.6065  | 3.3414  | 3.4340  | 4.5789  | 4.7946  |
| In-114m+E | 0.9317  | 0.8902  | 0.9966  | 0.9792  | 0.8127  | 0.8426  | 1.0199  | 1.0124  |
| Ir-192m+E | 3.7718  | 3.4955  | 4.1697  | 4.2168  | 3.3904  | 3.5121  | 4.3732  | 4.4375  |
| Kr-76+E   | 3.2261  | 2.8325  | 3.6991  | 3.8828  | 2.6496  | 2.6755  | 3.7655  | 4.0021  |
| Mg-28+E   | 4.0223  | 3.9824  | 4.1533  | 3.8783  | 3.8581  | 4.1222  | 4.4919  | 4.1772  |
| Nd-140+E  | 1.7880  | 1.6791  | 1.9345  | 1.9210  | 1.5764  | 1.6532  | 2.0021  | 1.9869  |
| Ni-66+E   | 0.1281  | 0.1272  | 0.1322  | 0.1231  | 0.1251  | 0.1342  | 0.1446  | 0.1344  |

| Element   | avg100 | ctr100 | mid100  | cnr100  | avg200 | ctr200 | mid200  | cnr200  |
|-----------|--------|--------|---------|---------|--------|--------|---------|---------|
| Np-235+E  | 0.8338 | 0.6366 | 1.0358  | 1.1698  | 0.5373 | 0.4962 | 0.9886  | 1.1604  |
| Np-237+E  | 4.3313 | 3.7533 | 4.9988  | 5.2754  | 3.3941 | 3.3816 | 4.9862  | 5.3748  |
| Os-194+E  | 0.7586 | 0.6001 | 0.9315  | 1.0483  | 0.5690 | 0.5536 | 0.9336  | 1.0608  |
| Pa-231+E  | 6.5104 | 5.5725 | 7.5941  | 8.1024  | 5.1181 | 5.0964 | 7.6136  | 8.2710  |
| Pb-202+E  | 3.3345 | 2.9165 | 3.8511  | 4.0721  | 2.7967 | 2.8482 | 3.9554  | 4.2296  |
| Pb-210+E  | 0.5904 | 0.4195 | 0.7656  | 0.8994  | 0.3674 | 0.3314 | 0.7350  | 0.8914  |
| Pd-103+E  | 1.3098 | 1.2004 | 1.4314  | 1.4302  | 1.0168 | 1.0229 | 1.3905  | 1.4427  |
| Pt-202+E  | 0.3111 | 0.3069 | 0.3250  | 0.3064  | 0.3008 | 0.3203 | 0.3519  | 0.3332  |
| Pu-239+E  | 0.1330 | 0.0984 | 0.1683  | 0.1935  | 0.0841 | 0.0767 | 0.1607  | 0.1915  |
| Pu-244+E  | 2.1868 | 1.8709 | 2.5364  | 2.6849  | 1.6716 | 1.6563 | 2.5172  | 2.7336  |
| Pu-246+E  | 4.6187 | 4.2762 | 5.0794  | 5.0969  | 4.0047 | 4.1337 | 5.2336  | 5.3103  |
| Ra-219+E  | 1.1119 | 1.0487 | 1.2130  | 1.2084  | 1.0086 | 1.0482 | 1.2708  | 1.2708  |
| Ra-221+E  | 0.9421 | 0.7921 | 1.1151  | 1.2050  | 0.7262 | 0.7158 | 1.1107  | 1.2280  |
| Ra-222+E  | 0.0448 | 0.0438 | 0.0475  | 0.0458  | 0.0426 | 0.0448 | 0.0506  | 0.0487  |
| Ra-223+E  | 2.5946 | 2.3741 | 2.9006  | 2.9625  | 2.2674 | 2.3322 | 3.0004  | 3.0924  |
| Ra-224+E  | 1.6334 | 1.6182 | 1.7081  | 1.5959  | 1.5840 | 1.6913 | 1.8271  | 1.7219  |
| Ra-226+E  | 4.7287 | 4.5907 | 5.0059  | 4.7689  | 4.4837 | 4.7456 | 5.3519  | 5.1188  |
| Ra-228+E  | 3.8719 | 3.6794 | 4.1811  | 4.0817  | 3.5046 | 3.6645 | 4.3726  | 4.3454  |
| Rb-81+E   | 2.6350 | 2.3512 | 2.9928  | 3.0959  | 2.1724 | 2.1967 | 3.0366  | 3.2088  |
| Rb-83+E   | 2.5344 | 2.1505 | 2.9661  | 3.1627  | 1.9570 | 1.9425 | 2.9716  | 3.2617  |
| Re-186m+E | 1.9389 | 1.4056 | 2.5059  | 2.9468  | 1.3282 | 1.2460 | 2.4646  | 2.9479  |
| Rn-219+E  | 0.2936 | 0.2840 | 0.3141  | 0.3051  | 0.2758 | 0.2896 | 0.3333  | 0.3245  |
| Rn-220+E  | 1.5593 | 1.5471 | 1.6282  | 1.5176  | 1.5153 | 1.6195 | 1.7430  | 1.6390  |
| Rn-222+E  | 0.0010 | 0.0010 | 0.0011  | 0.0010  | 0.0010 | 0.0010 | 0.0011  | 0.0011  |
| Ru-103+E  | 1.4306 | 1.3965 | 1.5130  | 1.4427  | 1.3493 | 1.4264 | 1.6112  | 1.5761  |
| Ru-106+E  | 0.4379 | 0.4343 | 0.4569  | 0.4281  | 0.4253 | 0.4528 | 0.4937  | 0.4696  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 2.4440 | 2.3536 | 2.5904  | 2.5215  | 2.1515 | 2.2392 | 2.6658  | 2.6117  |
| Sn-121m+E | 0.3113 | 0.2817 | 0.3456  | 0.3563  | 0.2534 | 0.2584 | 0.3476  | 0.3609  |
| Sn-126+E  | 5.6015 | 5.4870 | 5.9015  | 5.6324  | 5.3177 | 5.6260 | 6.3014  | 6.0136  |
| Sr-82+E   | 1.2881 | 1.0456 | 1.5405  | 1.6747  | 0.8827 | 0.8423 | 1.4890  | 1.6834  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001  | 0.0002  | 0.0001 | 0.0001 | 0.0001  | 0.0002  |
| Te-118+E  | 1.5179 | 1.4433 | 1.6170  | 1.5962  | 1.2899 | 1.3372 | 1.6410  | 1.6291  |
| Te-129m+E | 0.8104 | 0.7541 | 0.8822  | 0.8869  | 0.6907 | 0.7140 | 0.9013  | 0.9111  |
| Th-229+E  | 5.2174 | 4.4588 | 6.0914  | 6.4987  | 4.0768 | 4.0569 | 6.0921  | 6.6335  |
| Th-232+E  | 9.9487 | 9.4944 | 10.6877 | 10.4108 | 9.1506 | 9.6081 | 11.3066 | 11.0856 |
| Th-234+E  | 0.4342 | 0.3729 | 0.5049  | 0.5365  | 0.3385 | 0.3380 | 0.5036  | 0.5474  |
| Ti-44+E   | 4.1613 | 4.0574 | 4.4192  | 4.2611  | 3.9742 | 4.2374 | 4.7327  | 4.5781  |
| U-228+E   | 0.5284 | 0.4597 | 0.6100  | 0.6422  | 0.4179 | 0.4166 | 0.6096  | 0.6568  |
| U-230+E   | 0.5796 | 0.4752 | 0.6926  | 0.7547  | 0.4176 | 0.4034 | 0.6767  | 0.7597  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.7281        | 3.3250        | 4.2270        | 4.3402        | 3.0567        | 3.0869        | 4.2266        | 4.4884        |
| U-238+E        | 1.7499        | 1.6889        | 1.8337        | 1.7700        | 1.6196        | 1.7134        | 1.9604        | 1.9028        |
| W-178+E        | 2.5585        | 2.1672        | 3.0207        | 3.2775        | 2.0858        | 2.1180        | 3.0789        | 3.3572        |
| Xe-122+E       | 2.0230        | 1.9405        | 2.1496        | 2.0970        | 1.7941        | 1.8785        | 2.2217        | 2.1760        |
| Zr-93+E        | 0.2042        | 0.1730        | 0.2366        | 0.2491        | 0.1424        | 0.1374        | 0.2262        | 0.2481        |

Table 72: Composite 2 Surface Contamination 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2319        | 0.2973        | 0.5432        | 0.6043        |
| Ac-225+E       | 1.0049        | 1.2092        | 1.7284        | 1.7745        |
| Ac-227+E       | 3.2982        | 3.9944        | 5.8841        | 6.1416        |
| Ag-108m+E      | 3.8854        | 4.5452        | 5.4111        | 5.1056        |
| Ag-110m+E      | 3.8382        | 4.4960        | 5.0304        | 4.6100        |
| Am-242m+E      | 0.7680        | 1.0003        | 1.8625        | 2.0407        |
| Am-243+E       | 3.2516        | 3.8672        | 5.4254        | 5.5419        |
| Ar-42+E        | 0.2253        | 0.2654        | 0.2930        | 0.2668        |
| At-211+E       | 0.6648        | 0.8009        | 1.2010        | 1.2732        |
| Ba-128+E       | 1.7240        | 2.0328        | 2.5291        | 2.4772        |
| Bi-210m+E      | 1.2721        | 1.4756        | 1.7654        | 1.7192        |
| Bi-212+E       | 0.2032        | 0.2550        | 0.4103        | 0.4410        |
| Bi-213+E       | 0.3933        | 0.4565        | 0.5436        | 0.5200        |
| Bi-214+E       | 1.6163        | 1.8946        | 2.1262        | 1.9531        |
| Bi-215+E       | 0.9448        | 1.1052        | 1.3605        | 1.3363        |
| Bi-216+E       | 1.7706        | 2.0518        | 2.3597        | 2.2025        |
| Cd-118+E       | 0.0819        | 0.0960        | 0.1066        | 0.0977        |
| Ce-134+E       | 1.3127        | 1.5613        | 1.9915        | 1.9822        |
| Ce-144+E       | 0.3157        | 0.3636        | 0.4377        | 0.4226        |
| Cl-34m+E       | 1.4235        | 1.6539        | 1.8543        | 1.7160        |
| Cm-245+E       | 1.6899        | 2.0320        | 2.9962        | 3.0863        |
| Cm-247+E       | 1.4706        | 1.7133        | 2.1197        | 2.0637        |
| Cm-250+E       | 18.2872       | 21.3112       | 24.1721       | 22.4489       |
| Cs-137+E       | 2.5087        | 2.9181        | 3.2234        | 3.1525        |
| Es-254+E       | 2.2091        | 2.7755        | 4.4178        | 4.6511        |
| Fe-60+E        | 2.6040        | 3.1023        | 3.8168        | 3.7019        |
| Fr-220+E       | 0.2279        | 0.2848        | 0.4805        | 0.5237        |
| Fr-221+E       | 0.2223        | 0.2581        | 0.3259        | 0.3210        |
| Ge-68+E        | 0.2911        | 0.4362        | 1.2571        | 1.5750        |
| Hf-172+E       | 2.4624        | 2.9812        | 4.5944        | 4.9315        |
| Hf-182+E       | 4.4192        | 5.1540        | 6.3371        | 6.2038        |
| Hg-193+E       | 2.8240        | 3.3599        | 4.6133        | 4.7274        |
| Hg-194+E       | 2.9147        | 3.4824        | 4.7797        | 4.9061        |
| In-114m+E      | 0.6737        | 0.7931        | 1.0365        | 1.0202        |
| Ir-192m+E      | 3.0450        | 3.5915        | 4.5795        | 4.5703        |
| Kr-76+E        | 2.1910        | 2.6683        | 3.8912        | 4.0451        |
| Mg-28+E        | 3.5935        | 4.2229        | 4.7653        | 4.4074        |
| Nd-140+E       | 1.3480        | 1.6011        | 2.0393        | 2.0370        |
| Ni-66+E        | 0.1194        | 0.1402        | 0.1560        | 0.1423        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3171        | 0.4461        | 0.9931        | 1.1349        |
| Np-237+E       | 2.6209        | 3.2464        | 5.1024        | 5.3787        |
| Os-194+E       | 0.4415        | 0.5561        | 0.9581        | 1.0673        |
| Pa-231+E       | 4.0265        | 4.9692        | 7.8143        | 8.3050        |
| Pb-202+E       | 2.3904        | 2.8583        | 4.1052        | 4.2836        |
| Pb-210+E       | 0.2191        | 0.3127        | 0.7411        | 0.8737        |
| Pd-103+E       | 0.7092        | 0.8729        | 1.3697        | 1.4172        |
| Pt-202+E       | 0.2844        | 0.3310        | 0.3751        | 0.3483        |
| Pu-239+E       | 0.0490        | 0.0695        | 0.1614        | 0.1876        |
| Pu-244+E       | 1.2500        | 1.5783        | 2.5778        | 2.7256        |
| Pu-246+E       | 3.4237        | 4.0853        | 5.4464        | 5.4122        |
| Ra-219+E       | 0.9065        | 1.0636        | 1.3278        | 1.3137        |
| Ra-221+E       | 0.5631        | 0.6973        | 1.1399        | 1.2260        |
| Ra-222+E       | 0.0396        | 0.0460        | 0.0534        | 0.0510        |
| Ra-223+E       | 1.9839        | 2.3397        | 3.1205        | 3.1620        |
| Ra-224+E       | 1.4963        | 1.7375        | 1.8537        | 1.9718        |
| Ra-226+E       | 4.1868        | 4.9013        | 5.7070        | 5.5205        |
| Ra-228+E       | 3.1401        | 3.7441        | 4.5994        | 4.6623        |
| Rb-81+E        | 1.7906        | 2.1711        | 3.1451        | 3.2129        |
| Rb-83+E        | 1.5171        | 1.9104        | 3.0674        | 3.2335        |
| Re-186m+E      | 0.9465        | 1.2313        | 2.5124        | 2.9307        |
| Rn-219+E       | 0.2543        | 0.2944        | 0.3496        | 0.3373        |
| Rn-220+E       | 1.4337        | 1.6651        | 1.7658        | 1.8862        |
| Rn-222+E       | 0.0009        | 0.0011        | 0.0012        | 0.0011        |
| Ru-103+E       | 1.2414        | 1.4443        | 1.6997        | 1.6014        |
| Ru-106+E       | 0.4024        | 0.4669        | 0.5279        | 0.4864        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.7949        | 2.1122        | 2.7077        | 2.6452        |
| Sn-121m+E      | 0.1958        | 0.2373        | 0.3478        | 0.3612        |
| Sn-126+E       | 4.9254        | 5.7263        | 6.6715        | 6.2807        |
| Sr-82+E        | 0.5729        | 0.7846        | 1.5143        | 1.6475        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0002        |
| Te-118+E       | 1.0217        | 1.2186        | 1.6403        | 1.6342        |
| Te-129m+E      | 0.5638        | 0.6740        | 0.9133        | 0.9204        |
| Th-229+E       | 3.1822        | 3.9360        | 6.2482        | 6.6373        |
| Th-232+E       | 8.3301        | 9.8518        | 11.8640       | 11.9982       |
| Th-234+E       | 0.2621        | 0.3248        | 0.5170        | 0.5464        |
| Ti-44+E        | 3.7388        | 4.3083        | 5.0041        | 4.7850        |
| U-228+E        | 0.3275        | 0.4029        | 0.6260        | 0.6567        |
| U-230+E        | 0.2925        | 0.3793        | 0.6890        | 0.7520        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.4820        | 3.0113        | 4.2933        | 4.6480        |
| U-238+E        | 1.4799        | 1.7831        | 2.1267        | 2.1662        |
| W-178+E        | 1.7513        | 2.1127        | 3.1807        | 3.3926        |
| Xe-122+E       | 1.5181        | 1.7931        | 2.2650        | 2.2170        |
| Zr-93+E        | 0.0885        | 0.1194        | 0.2273        | 0.2439        |

Table 73: Composite 2 – 1cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.4027  | 0.3324  | 0.3970  | 0.4423  | 0.3087  | 0.2631  | 0.3688  | 0.4210  |
| Ac-225+E  | 1.3218  | 1.1161  | 1.3141  | 1.4173  | 1.2226  | 1.1348  | 1.3649  | 1.4567  |
| Ac-227+E  | 4.5039  | 3.8326  | 4.4864  | 4.8365  | 4.0189  | 3.6972  | 4.5344  | 4.8924  |
| Ag-108m+E | 4.1168  | 3.4936  | 4.0864  | 4.3378  | 4.3992  | 4.2695  | 4.7327  | 4.7980  |
| Ag-110m+E | 3.9377  | 3.1717  | 3.8361  | 4.1307  | 4.4968  | 4.3688  | 4.8656  | 4.7559  |
| Am-242m+E | 1.2925  | 1.1351  | 1.2934  | 1.4144  | 0.9401  | 0.7951  | 1.1128  | 1.2897  |
| Am-243+E  | 4.1597  | 3.6467  | 4.1792  | 4.4389  | 3.7652  | 3.5259  | 4.1609  | 4.4356  |
| Ar-42+E   | 0.2160  | 0.1660  | 0.2061  | 0.2222  | 0.2551  | 0.2409  | 0.2780  | 0.2684  |
| At-211+E  | 0.9203  | 0.7907  | 0.9231  | 0.9923  | 0.7910  | 0.7207  | 0.8912  | 0.9749  |
| Ba-128+E  | 1.7237  | 1.5590  | 1.7472  | 1.8191  | 1.6062  | 1.5334  | 1.7513  | 1.8408  |
| Bi-210m+E | 1.4481  | 1.2251  | 1.4388  | 1.5196  | 1.5175  | 1.4764  | 1.6609  | 1.6907  |
| Bi-212+E  | 0.3050  | 0.2421  | 0.2970  | 0.3332  | 0.2612  | 0.2293  | 0.3073  | 0.3355  |
| Bi-213+E  | 0.4266  | 0.3566  | 0.4250  | 0.4510  | 0.4552  | 0.4422  | 0.4903  | 0.5039  |
| Bi-214+E  | 1.6250  | 1.2948  | 1.5764  | 1.6942  | 1.8572  | 1.7936  | 2.0120  | 1.9702  |
| Bi-215+E  | 1.0924  | 0.9218  | 1.0856  | 1.1503  | 1.1209  | 1.0779  | 1.2323  | 1.2659  |
| Bi-216+E  | 1.8629  | 1.5426  | 1.8442  | 1.9576  | 2.0657  | 2.0191  | 2.2258  | 2.2360  |
| Cd-118+E  | 0.0812  | 0.0632  | 0.0783  | 0.0838  | 0.0934  | 0.0902  | 0.0994  | 0.0975  |
| Ce-134+E  | 1.3142  | 1.2156  | 1.3411  | 1.3932  | 1.1280  | 1.0574  | 1.2435  | 1.3322  |
| Ce-144+E  | 0.3359  | 0.2974  | 0.3392  | 0.3531  | 0.3327  | 0.3219  | 0.3581  | 0.3694  |
| Cl-34m+E  | 1.4172  | 1.1530  | 1.3942  | 1.4746  | 1.5853  | 1.5371  | 1.7177  | 1.7028  |
| Cm-245+E  | 2.2752  | 1.9957  | 2.2812  | 2.4332  | 2.0083  | 1.8628  | 2.2248  | 2.4031  |
| Cm-247+E  | 1.6516  | 1.4105  | 1.6533  | 1.7515  | 1.6890  | 1.6295  | 1.8140  | 1.8982  |
| Cm-250+E  | 18.7060 | 15.3513 | 18.3874 | 19.5671 | 20.8327 | 20.2368 | 22.5694 | 22.3559 |
| Cs-137+E  | 2.4863  | 2.0597  | 2.2755  | 2.4643  | 2.7986  | 2.7391  | 3.0017  | 2.9635  |
| Es-254+E  | 3.1164  | 2.6209  | 3.0768  | 3.3999  | 2.6251  | 2.3263  | 3.0526  | 3.3188  |
| Fe-60+E   | 2.8785  | 2.2042  | 2.7591  | 3.0215  | 3.0575  | 2.8625  | 3.3482  | 3.3810  |
| Fr-220+E  | 0.3573  | 0.3029  | 0.3560  | 0.3893  | 0.2852  | 0.2502  | 0.3312  | 0.3728  |
| Fr-221+E  | 0.2679  | 0.2297  | 0.2669  | 0.2826  | 0.2690  | 0.2595  | 0.2920  | 0.2977  |
| Ge-68+E   | 0.9357  | 0.6756  | 0.8894  | 1.0756  | 0.5341  | 0.3557  | 0.7544  | 0.9561  |
| Hf-172+E  | 3.4058  | 2.8599  | 3.3818  | 3.7198  | 2.7376  | 2.4378  | 3.2125  | 3.5409  |
| Hf-182+E  | 5.0019  | 4.1735  | 4.9460  | 5.2888  | 5.0687  | 4.8569  | 5.5426  | 5.6575  |
| Hg-193+E  | 3.5621  | 2.9601  | 3.5265  | 3.8307  | 3.3173  | 3.0785  | 3.7300  | 3.9350  |
| Hg-194+E  | 3.6905  | 3.0346  | 3.6380  | 3.9603  | 3.4632  | 3.2027  | 3.9409  | 4.1691  |
| In-114m+E | 0.7102  | 0.6443  | 0.7184  | 0.7510  | 0.6617  | 0.6289  | 0.7194  | 0.7462  |
| Ir-192m+E | 3.6810  | 3.0318  | 3.6309  | 3.9008  | 3.7224  | 3.5341  | 4.1907  | 4.3624  |
| Kr-76+E   | 2.9434  | 2.4707  | 2.9188  | 3.1619  | 2.6798  | 2.4710  | 3.0463  | 3.2868  |
| Mg-28+E   | 3.4107  | 2.7974  | 3.3414  | 3.5478  | 3.7785  | 3.6356  | 4.0811  | 4.0386  |
| Nd-140+E  | 1.3623  | 1.2620  | 1.3957  | 1.4497  | 1.1536  | 1.0790  | 1.2742  | 1.3541  |
| Ni-66+E   | 0.1171  | 0.0932  | 0.1136  | 0.1242  | 0.1349  | 0.1313  | 0.1467  | 0.1420  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50   | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|---------|---------|
| Np-235+E  | 0.6774 | 0.5771 | 0.6718 | 0.7530 | 0.4378 | 0.3396 | 0.5495  | 0.6646  |
| Np-237+E  | 3.7460 | 3.2542 | 3.7446 | 4.0326 | 3.1589 | 2.8493 | 3.6098  | 3.9707  |
| Os-194+E  | 0.7279 | 0.5758 | 0.7094 | 0.8005 | 0.5808 | 0.4978 | 0.7049  | 0.7953  |
| Pa-231+E  | 5.8414 | 4.9676 | 5.8124 | 6.3111 | 4.9600 | 4.4661 | 5.6862  | 6.2409  |
| Pb-202+E  | 3.1537 | 2.6087 | 3.1280 | 3.4136 | 2.8529 | 2.6223 | 3.2292  | 3.4878  |
| Pb-210+E  | 0.5166 | 0.4157 | 0.5054 | 0.5819 | 0.3210 | 0.2395 | 0.4177  | 0.5157  |
| Pd-103+E  | 0.8798 | 0.8468 | 0.9053 | 0.9492 | 0.6810 | 0.6194 | 0.7500  | 0.8703  |
| Pt-202+E  | 0.2908 | 0.2358 | 0.2857 | 0.3051 | 0.3266 | 0.3180 | 0.3506  | 0.3503  |
| Pu-239+E  | 0.1118 | 0.0928 | 0.1101 | 0.1251 | 0.0703 | 0.0532 | 0.0903  | 0.1103  |
| Pu-244+E  | 1.8433 | 1.5750 | 1.8301 | 1.9967 | 1.5363 | 1.3621 | 1.7742  | 1.9506  |
| Pu-246+E  | 4.0914 | 3.5089 | 4.0719 | 4.3551 | 3.9225 | 3.7011 | 4.3223  | 4.4865  |
| Ra-219+E  | 1.0732 | 0.9127 | 1.0691 | 1.1289 | 1.0858 | 1.0392 | 1.2078  | 1.2550  |
| Ra-221+E  | 0.8586 | 0.7291 | 0.8551 | 0.9305 | 0.7103 | 0.6314 | 0.8143  | 0.9075  |
| Ra-222+E  | 0.0440 | 0.0370 | 0.0436 | 0.0458 | 0.0475 | 0.0461 | 0.0527  | 0.0540  |
| Ra-223+E  | 2.4655 | 2.0990 | 2.4613 | 2.6240 | 2.3621 | 2.2321 | 2.6058  | 2.7523  |
| Ra-224+E  | 1.4078 | 1.1774 | 1.2260 | 1.3308 | 1.5809 | 1.5622 | 1.6930  | 1.6651  |
| Ra-226+E  | 4.3910 | 3.5957 | 4.1458 | 4.4794 | 4.8011 | 4.6388 | 5.2291  | 5.2148  |
| Ra-228+E  | 3.4317 | 2.8455 | 3.2184 | 3.5071 | 3.5731 | 3.4081 | 3.9293  | 3.9704  |
| Rb-81+E   | 2.3946 | 2.0385 | 2.3822 | 2.5627 | 2.2287 | 2.0732 | 2.4769  | 2.6358  |
| Rb-83+E   | 2.2065 | 1.8364 | 2.1830 | 2.3928 | 1.9220 | 1.7265 | 2.2125  | 2.4213  |
| Re-186m+E | 1.8826 | 1.4693 | 1.8299 | 2.1115 | 1.2945 | 1.0301 | 1.6453  | 1.9444  |
| Rn-219+E  | 0.2830 | 0.2391 | 0.2817 | 0.2976 | 0.3003 | 0.2932 | 0.3239  | 0.3313  |
| Rn-220+E  | 1.3354 | 1.1155 | 1.1539 | 1.2548 | 1.5057 | 1.4887 | 1.6121  | 1.5835  |
| Rn-222+E  | 0.0010 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0010 | 0.0012  | 0.0011  |
| Ru-103+E  | 1.3148 | 1.0963 | 1.3075 | 1.3814 | 1.4289 | 1.3930 | 1.5563  | 1.5634  |
| Ru-106+E  | 0.4159 | 0.3416 | 0.4097 | 0.4355 | 0.4699 | 0.4599 | 0.5085  | 0.5022  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  |
| Sn-113+E  | 1.7960 | 1.6285 | 1.8228 | 1.9046 | 1.7085 | 1.6343 | 1.8379  | 1.9356  |
| Sn-121m+E | 0.2140 | 0.1961 | 0.2174 | 0.2307 | 0.1654 | 0.1477 | 0.1890  | 0.2084  |
| Sn-126+E  | 5.1929 | 4.3636 | 5.1432 | 5.4678 | 5.6010 | 5.4462 | 6.0202  | 6.0646  |
| Sr-82+E   | 1.0072 | 0.8814 | 1.0076 | 1.1026 | 0.7540 | 0.6371 | 0.8864  | 1.0252  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001  | 0.0001  |
| Te-118+E  | 0.9656 | 0.9216 | 0.9916 | 1.0237 | 0.8061 | 0.7502 | 0.8839  | 0.9394  |
| Te-129m+E | 0.5921 | 0.5339 | 0.5985 | 0.6317 | 0.5139 | 0.4766 | 0.5725  | 0.6113  |
| Th-229+E  | 4.6113 | 3.9608 | 4.6043 | 4.9897 | 3.8363 | 3.4368 | 4.3843  | 4.8264  |
| Th-232+E  | 8.9779 | 7.4478 | 8.3746 | 9.0867 | 9.4594 | 9.0891 | 10.3563 | 10.4180 |
| Th-234+E  | 0.3775 | 0.3280 | 0.3777 | 0.4089 | 0.3115 | 0.2793 | 0.3561  | 0.3912  |
| Ti-44+E   | 3.9280 | 3.3596 | 3.9275 | 4.1309 | 4.0735 | 3.9449 | 4.3736  | 4.4106  |
| U-228+E   | 0.4723 | 0.4077 | 0.4716 | 0.5077 | 0.4076 | 0.3693 | 0.4602  | 0.5007  |
| U-230+E   | 0.4940 | 0.4256 | 0.4920 | 0.5385 | 0.3782 | 0.3244 | 0.4467  | 0.5072  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 3.1690       | 2.7763       | 3.0069       | 3.2414       | 2.8341       | 2.6246       | 3.1426       | 3.3516       |
| U-238+E        | 1.3724       | 1.1816       | 1.2488       | 1.3573       | 1.4233       | 1.3894       | 1.5351       | 1.5405       |
| W-178+E        | 2.3887       | 1.9980       | 2.3695       | 2.6078       | 1.9548       | 1.7523       | 2.2859       | 2.4958       |
| Xe-122+E       | 1.4958       | 1.3670       | 1.5182       | 1.5778       | 1.3802       | 1.3124       | 1.5057       | 1.5766       |
| Zr-93+E        | 0.1531       | 0.1422       | 0.1552       | 0.1656       | 0.1085       | 0.0906       | 0.1285       | 0.1455       |

Table 74: Composite 2 – 1cm Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2998  | 0.2745  | 0.3655  | 0.4100  | 0.2442  | 0.2507  | 0.3675  | 0.3900  |
| Ac-225+E  | 1.2514  | 1.2315  | 1.4097  | 1.4498  | 1.1392  | 1.1802  | 1.4183  | 1.4362  |
| Ac-227+E  | 4.0609  | 3.9460  | 4.6216  | 4.8397  | 3.6499  | 3.7574  | 4.6417  | 4.7517  |
| Ag-108m+E | 4.6896  | 4.8083  | 5.0523  | 4.8673  | 4.5112  | 4.7113  | 5.0479  | 4.9498  |
| Ag-110m+E | 4.9199  | 5.1282  | 5.2240  | 4.9376  | 4.8201  | 5.0905  | 5.2803  | 5.0890  |
| Am-242m+E | 0.8797  | 0.7815  | 1.0896  | 1.2561  | 0.6788  | 0.6840  | 1.0732  | 1.1623  |
| Am-243+E  | 3.7869  | 3.6975  | 4.2552  | 4.4463  | 3.4637  | 3.5442  | 4.2683  | 4.3577  |
| Ar-42+E   | 0.2755  | 0.2879  | 0.2930  | 0.2724  | 0.2707  | 0.2904  | 0.3012  | 0.2830  |
| At-211+E  | 0.7873  | 0.7557  | 0.9057  | 0.9694  | 0.7049  | 0.7199  | 0.9105  | 0.9451  |
| Ba-128+E  | 1.6179  | 1.5972  | 1.7766  | 1.8407  | 1.5162  | 1.5466  | 1.7858  | 1.8090  |
| Bi-210m+E | 1.5997  | 1.6286  | 1.7244  | 1.6811  | 1.5414  | 1.6000  | 1.7400  | 1.7163  |
| Bi-212+E  | 0.2665  | 0.2558  | 0.3120  | 0.3331  | 0.2314  | 0.2427  | 0.3152  | 0.3240  |
| Bi-213+E  | 0.4847  | 0.4967  | 0.5221  | 0.5037  | 0.4678  | 0.4898  | 0.5280  | 0.5164  |
| Bi-214+E  | 2.0287  | 2.1142  | 2.1614  | 2.0266  | 1.9868  | 2.1065  | 2.1963  | 2.1042  |
| Bi-215+E  | 1.1772  | 1.1929  | 1.2779  | 1.2592  | 1.1258  | 1.1697  | 1.2895  | 1.2774  |
| Bi-216+E  | 2.2276  | 2.3067  | 2.3857  | 2.2525  | 2.1692  | 2.2802  | 2.4035  | 2.3384  |
| Cd-118+E  | 0.1022  | 0.1068  | 0.1080  | 0.1017  | 0.1004  | 0.1066  | 0.1105  | 0.1058  |
| Ce-134+E  | 1.0998  | 1.0553  | 1.2314  | 1.3347  | 1.0103  | 1.0181  | 1.2349  | 1.2798  |
| Ce-144+E  | 0.3430  | 0.3444  | 0.3716  | 0.3738  | 0.3302  | 0.3388  | 0.3722  | 0.3767  |
| Cl-34m+E  | 1.7293  | 1.7927  | 1.8395  | 1.7423  | 1.6975  | 1.7927  | 1.8770  | 1.8021  |
| Cm-245+E  | 2.0061  | 1.9413  | 2.2774  | 2.4040  | 1.8002  | 1.8408  | 2.2794  | 2.3381  |
| Cm-247+E  | 1.7693  | 1.7904  | 1.9213  | 1.8923  | 1.6882  | 1.7532  | 1.9385  | 1.9102  |
| Cm-250+E  | 22.5265 | 23.3275 | 23.9930 | 22.8249 | 22.0080 | 23.1777 | 24.3678 | 23.5269 |
| Cs-137+E  | 3.0497  | 3.1638  | 3.2369  | 3.0419  | 2.9818  | 3.1292  | 3.3408  | 3.1068  |
| Es-254+E  | 2.6379  | 2.5167  | 3.0772  | 3.3143  | 2.2607  | 2.3431  | 3.0930  | 3.1928  |
| Fe-60+E   | 3.2897  | 3.3699  | 3.5680  | 3.4756  | 3.1422  | 3.3382  | 3.6627  | 3.5557  |
| Fr-220+E  | 0.2786  | 0.2597  | 0.3319  | 0.3662  | 0.2359  | 0.2409  | 0.3328  | 0.3512  |
| Fr-221+E  | 0.2800  | 0.2821  | 0.3046  | 0.3035  | 0.2664  | 0.2746  | 0.3068  | 0.3053  |
| Ge-68+E   | 0.4808  | 0.3654  | 0.6977  | 0.8981  | 0.2900  | 0.3006  | 0.7198  | 0.8146  |
| Hf-172+E  | 2.6749  | 2.5002  | 3.1557  | 3.4964  | 2.3368  | 2.3796  | 3.1927  | 3.3571  |
| Hf-182+E  | 5.3150  | 5.3753  | 5.7803  | 5.7438  | 5.0897  | 5.2934  | 5.8712  | 5.7987  |
| Hg-193+E  | 3.4108  | 3.3663  | 3.8271  | 3.9503  | 3.1550  | 3.2719  | 3.8800  | 3.9103  |
| Hg-194+E  | 3.5699  | 3.5282  | 4.0094  | 4.1108  | 3.2985  | 3.4339  | 4.0684  | 4.0858  |
| In-114m+E | 0.6668  | 0.6591  | 0.7364  | 0.7597  | 0.6168  | 0.6265  | 0.7300  | 0.7372  |
| Ir-192m+E | 3.9130  | 3.9477  | 4.2941  | 4.2413  | 3.6997  | 3.8615  | 4.3364  | 4.3001  |
| Kr-76+E   | 2.7358  | 2.6771  | 3.1047  | 3.2089  | 2.4667  | 2.5580  | 3.1174  | 3.1758  |
| Mg-28+E   | 4.0604  | 4.1987  | 4.3239  | 4.1328  | 3.9613  | 4.1881  | 4.4194  | 4.2350  |
| Nd-140+E  | 1.1205  | 1.0716  | 1.2610  | 1.3744  | 1.0310  | 1.0425  | 1.2605  | 1.3069  |
| Ni-66+E   | 0.1489  | 0.1558  | 0.1573  | 0.1489  | 0.1462  | 0.1550  | 0.1616  | 0.1545  |

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200 | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|--------|---------|---------|---------|
| Np-235+E  | 0.3952  | 0.3279  | 0.5250  | 0.6372  | 0.2665 | 0.2676  | 0.5171  | 0.5787  |
| Np-237+E  | 3.1213  | 2.9704  | 3.6230  | 3.8918  | 2.7051 | 2.7691  | 3.6153  | 3.7517  |
| Os-194+E  | 0.5772  | 0.5376  | 0.6945  | 0.7648  | 0.4860 | 0.5048  | 0.7045  | 0.7369  |
| Pa-231+E  | 4.9410  | 4.7173  | 5.7371  | 6.1408  | 4.3088 | 4.4255  | 5.7493  | 5.9591  |
| Pb-202+E  | 2.9123  | 2.8467  | 3.3118  | 3.4489  | 2.6512 | 2.7493  | 3.3544  | 3.4088  |
| Pb-210+E  | 0.2905  | 0.2358  | 0.3970  | 0.4901  | 0.1920 | 0.1953  | 0.3977  | 0.4475  |
| Pd-103+E  | 0.6315  | 0.5715  | 0.7458  | 0.8428  | 0.5128 | 0.5075  | 0.7119  | 0.7652  |
| Pt-202+E  | 0.3542  | 0.3677  | 0.3767  | 0.3572  | 0.3461 | 0.3653  | 0.3832  | 0.3695  |
| Pu-239+E  | 0.0632  | 0.0515  | 0.0855  | 0.1053  | 0.0416 | 0.0419  | 0.0849  | 0.0954  |
| Pu-244+E  | 1.5261  | 1.4480  | 1.7931  | 1.9252  | 1.2954 | 1.3370  | 1.7812  | 1.8552  |
| Pu-246+E  | 4.0529  | 4.0356  | 4.4785  | 4.5626  | 3.7629 | 3.8994  | 4.5042  | 4.5210  |
| Ra-219+E  | 1.1325  | 1.1423  | 1.2343  | 1.2223  | 1.0780 | 1.1174  | 1.2428  | 1.2343  |
| Ra-221+E  | 0.7018  | 0.6634  | 0.8243  | 0.8923  | 0.6046 | 0.6186  | 0.8240  | 0.8603  |
| Ra-222+E  | 0.0505  | 0.0518  | 0.0541  | 0.0520  | 0.0490 | 0.0511  | 0.0545  | 0.0533  |
| Ra-223+E  | 2.4324  | 2.4178  | 2.6956  | 2.7387  | 2.2726 | 2.3463  | 2.7164  | 2.7315  |
| Ra-224+E  | 1.7223  | 1.7756  | 1.8177  | 1.7013  | 1.6838 | 1.7612  | 1.8583  | 1.7405  |
| Ra-226+E  | 5.1842  | 5.3457  | 5.5363  | 5.2860  | 5.0350 | 5.3013  | 5.6779  | 5.4074  |
| Ra-228+E  | 3.8242  | 3.8944  | 4.1669  | 4.0241  | 3.6321 | 3.8124  | 4.2185  | 4.0706  |
| Rb-81+E   | 2.2864  | 2.2560  | 2.5717  | 2.6289  | 2.0744 | 2.1470  | 2.5711  | 2.6025  |
| Rb-83+E   | 1.9540  | 1.8920  | 2.2748  | 2.3767  | 1.6950 | 1.7725  | 2.2707  | 2.3451  |
| Re-186m+E | 1.2241  | 1.0601  | 1.5779  | 1.8719  | 0.9369 | 0.9609  | 1.6093  | 1.7492  |
| Rn-219+E  | 0.3178  | 0.3245  | 0.3416  | 0.3310  | 0.3069 | 0.3192  | 0.3451  | 0.3385  |
| Rn-220+E  | 1.6433  | 1.6953  | 1.7326  | 1.6179  | 1.6079 | 1.6827  | 1.7724  | 1.6556  |
| Rn-222+E  | 0.0011  | 0.0012  | 0.0012  | 0.0012  | 0.0011 | 0.0012  | 0.0012  | 0.0012  |
| Ru-103+E  | 1.5322  | 1.5805  | 1.6474  | 1.5702  | 1.4803 | 1.5592  | 1.6593  | 1.6256  |
| Ru-106+E  | 0.5104  | 0.5314  | 0.5450  | 0.5102  | 0.4991 | 0.5262  | 0.5488  | 0.5328  |
| Si-32+E   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000 | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 1.7320  | 1.7215  | 1.9031  | 1.9404  | 1.6108 | 1.6454  | 1.8938  | 1.8951  |
| Sn-121m+E | 0.1557  | 0.1436  | 0.1834  | 0.2086  | 0.1323 | 0.1311  | 0.1820  | 0.1932  |
| Sn-126+E  | 5.9899  | 6.1595  | 6.4304  | 6.1865  | 5.8140 | 6.0688  | 6.4620  | 6.3127  |
| Sr-82+E   | 0.7230  | 0.6576  | 0.8916  | 1.0026  | 0.5557 | 0.5712  | 0.8719  | 0.9418  |
| Sr-90+E   | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0000 | 0.0000  | 0.0001  | 0.0001  |
| Te-118+E  | 0.7715  | 0.7365  | 0.8729  | 0.9569  | 0.6864 | 0.6797  | 0.8601  | 0.8946  |
| Te-129m+E | 0.5075  | 0.4903  | 0.5734  | 0.6139  | 0.4575 | 0.4632  | 0.5725  | 0.5895  |
| Th-229+E  | 3.7896  | 3.5936  | 4.4271  | 4.7869  | 3.2797 | 3.3631  | 4.4300  | 4.6103  |
| Th-232+E  | 10.1430 | 10.3462 | 10.9725 | 10.5717 | 9.7110 | 10.1865 | 11.2088 | 10.7478 |
| Th-234+E  | 0.3057  | 0.2891  | 0.3577  | 0.3891  | 0.2637 | 0.2697  | 0.3581  | 0.3725  |
| Ti-44+E   | 4.2732  | 4.3548  | 4.5901  | 4.5327  | 4.1720 | 4.3237  | 4.6624  | 4.5957  |
| U-228+E   | 0.4065  | 0.3903  | 0.4684  | 0.4968  | 0.3563 | 0.3651  | 0.4670  | 0.4808  |
| U-230+E   | 0.3633  | 0.3322  | 0.4413  | 0.4946  | 0.2922 | 0.2977  | 0.4380  | 0.4678  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.8583        | 2.8099        | 3.1886        | 3.3611        | 2.5556        | 2.6340        | 3.1620        | 3.2356        |
| U-238+E        | 1.5127        | 1.5423        | 1.5898        | 1.5714        | 1.4510        | 1.5154        | 1.6393        | 1.5807        |
| W-178+E        | 1.9218        | 1.8107        | 2.2517        | 2.4739        | 1.7012        | 1.7395        | 2.2872        | 2.3808        |
| Xe-122+E       | 1.3836        | 1.3639        | 1.5253        | 1.5849        | 1.2884        | 1.3085        | 1.5228        | 1.5462        |
| Zr-93+E        | 0.0988        | 0.0864        | 0.1230        | 0.1434        | 0.0723        | 0.0716        | 0.1188        | 0.1303        |

Table 75: Composite 2 – 1cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.2008        | 0.2337        | 0.3824        | 0.3579        |
| Ac-225+E       | 1.0315        | 1.1277        | 1.4411        | 1.3968        |
| Ac-227+E       | 3.2720        | 3.5872        | 4.7480        | 4.5463        |
| Ag-108m+E      | 4.2367        | 4.5689        | 5.0060        | 5.1559        |
| Ag-110m+E      | 4.6309        | 5.0295        | 5.2123        | 5.4954        |
| Am-242m+E      | 0.5028        | 0.6110        | 1.1315        | 1.0595        |
| Am-243+E       | 3.1426        | 3.3873        | 4.3634        | 4.1847        |
| Ar-42+E        | 0.2616        | 0.2857        | 0.2986        | 0.3099        |
| At-211+E       | 0.6356        | 0.6943        | 0.9264        | 0.8929        |
| Ba-128+E       | 1.3834        | 1.4580        | 1.7841        | 1.7713        |
| Bi-210m+E      | 1.4612        | 1.5496        | 1.7569        | 1.7098        |
| Bi-212+E       | 0.2035        | 0.2333        | 0.3222        | 0.3177        |
| Bi-213+E       | 0.4439        | 0.4739        | 0.5259        | 0.5228        |
| Bi-214+E       | 1.9112        | 2.0786        | 2.1737        | 2.2735        |
| Bi-215+E       | 1.0625        | 1.1366        | 1.2956        | 1.2740        |
| Bi-216+E       | 2.0707        | 2.2152        | 2.3710        | 2.4530        |
| Cd-118+E       | 0.0967        | 0.1058        | 0.1104        | 0.1150        |
| Ce-134+E       | 0.9058        | 0.9477        | 1.2384        | 1.2248        |
| Ce-144+E       | 0.3127        | 0.3280        | 0.3765        | 0.3643        |
| Cl-34m+E       | 1.6394        | 1.7723        | 1.8971        | 1.8892        |
| Cm-245+E       | 1.6001        | 1.7414        | 2.3290        | 2.2268        |
| Cm-247+E       | 1.5837        | 1.6880        | 1.9463        | 1.8726        |
| Cm-250+E       | 21.0973       | 22.7374       | 24.2917       | 24.7312       |
| Cs-137+E       | 2.8544        | 3.0608        | 3.1646        | 3.3913        |
| Es-254+E       | 1.9144        | 2.2198        | 3.1810        | 3.1304        |
| Fe-60+E        | 2.9792        | 3.3000        | 3.6899        | 3.7693        |
| Fr-220+E       | 0.2016        | 0.2280        | 0.3435        | 0.3258        |
| Fr-221+E       | 0.2501        | 0.2649        | 0.3103        | 0.2995        |
| Ge-68+E        | 0.1734        | 0.2667        | 0.7816        | 0.6784        |
| Hf-172+E       | 2.0802        | 2.2857        | 3.4015        | 3.1265        |
| Hf-182+E       | 4.8292        | 5.1701        | 6.0086        | 5.8606        |
| Hg-193+E       | 2.9247        | 3.1783        | 3.9925        | 3.8476        |
| Hg-194+E       | 3.0535        | 3.3275        | 4.1838        | 4.0091        |
| In-114m+E      | 0.5521        | 0.5936        | 0.7342        | 0.7242        |
| Ir-192m+E      | 3.4637        | 3.7293        | 4.3741        | 4.2514        |
| Kr-76+E        | 2.2174        | 2.4418        | 3.1770        | 3.0645        |
| Mg-28+E        | 3.7843        | 4.0967        | 4.3941        | 4.4986        |
| Nd-140+E       | 0.9309        | 0.9760        | 1.2701        | 1.2456        |
| Ni-66+E        | 0.1408        | 0.1543        | 0.1593        | 0.1683        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1639        | 0.2297        | 0.5544        | 0.5103        |
| Np-237+E       | 2.3206        | 2.5953        | 3.7121        | 3.5422        |
| Os-194+E       | 0.4182        | 0.4787        | 0.7311        | 0.6812        |
| Pa-231+E       | 3.7519        | 4.1868        | 5.9150        | 5.6341        |
| Pb-202+E       | 2.4267        | 2.6456        | 3.4399        | 3.2928        |
| Pb-210+E       | 0.1228        | 0.1728        | 0.4259        | 0.3887        |
| Pd-103+E       | 0.3781        | 0.4417        | 0.7466        | 0.7220        |
| Pt-202+E       | 0.3316        | 0.3577        | 0.3810        | 0.3888        |
| Pu-239+E       | 0.0251        | 0.0360        | 0.0914        | 0.0829        |
| Pu-244+E       | 1.0841        | 1.2497        | 1.8317        | 1.8017        |
| Pu-246+E       | 3.4447        | 3.7582        | 4.5656        | 4.5198        |
| Ra-219+E       | 1.0125        | 1.0814        | 1.2484        | 1.2076        |
| Ra-221+E       | 0.5227        | 0.5858        | 0.8526        | 0.8048        |
| Ra-222+E       | 0.0466        | 0.0495        | 0.0546        | 0.0527        |
| Ra-223+E       | 2.1094        | 2.2653        | 2.7476        | 2.6534        |
| Ra-224+E       | 1.6111        | 1.7084        | 1.7628        | 1.9531        |
| Ra-226+E       | 4.8064        | 5.1959        | 5.6007        | 5.7046        |
| Ra-228+E       | 3.3981        | 3.7072        | 4.1196        | 4.3262        |
| Rb-81+E        | 1.8665        | 2.0476        | 2.6123        | 2.5458        |
| Rb-83+E        | 1.4680        | 1.6776        | 2.2934        | 2.3400        |
| Re-186m+E      | 0.7483        | 0.8980        | 1.7306        | 1.5432        |
| Rn-219+E       | 0.2910        | 0.3085        | 0.3470        | 0.3366        |
| Rn-220+E       | 1.5395        | 1.6327        | 1.6759        | 1.8683        |
| Rn-222+E       | 0.0011        | 0.0011        | 0.0012        | 0.0013        |
| Ru-103+E       | 1.4009        | 1.5058        | 1.6395        | 1.7265        |
| Ru-106+E       | 0.4780        | 0.5135        | 0.5387        | 0.5731        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.4445        | 1.5530        | 1.8939        | 1.8459        |
| Sn-121m+E      | 0.1084        | 0.1198        | 0.1842        | 0.1793        |
| Sn-126+E       | 5.5337        | 5.9244        | 6.4037        | 6.5381        |
| Sr-82+E        | 0.4128        | 0.5214        | 0.9017        | 0.8988        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.5790        | 0.6270        | 0.8560        | 0.8595        |
| Te-129m+E      | 0.4009        | 0.4339        | 0.5734        | 0.5715        |
| Th-229+E       | 2.8348        | 3.1696        | 4.5511        | 4.3529        |
| Th-232+E       | 9.1618        | 9.9277        | 11.0287       | 11.4293       |
| Th-234+E       | 0.2269        | 0.2542        | 0.3732        | 0.3549        |
| Ti-44+E        | 4.0230        | 4.2718        | 4.7312        | 4.6896        |
| U-228+E        | 0.3098        | 0.3441        | 0.4822        | 0.4574        |
| U-230+E        | 0.2314        | 0.2731        | 0.4582        | 0.4305        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.2626        | 2.5276        | 3.1643        | 3.2947        |
| U-238+E        | 1.3706        | 1.4854        | 1.6738        | 1.6575        |
| W-178+E        | 1.5385        | 1.6800        | 2.4512        | 2.2515        |
| Xe-122+E       | 1.1624        | 1.2345        | 1.5163        | 1.5225        |
| Zr-93+E        | 0.0469        | 0.0607        | 0.1282        | 0.1185        |

Table 76: Composite 2 – 5cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3194  | 0.3171  | 0.4140  | 0.5209  | 0.3095  | 0.2321  | 0.3044  | 0.3767  |
| Ac-225+E  | 1.2960  | 1.2463  | 1.3825  | 1.6196  | 1.2832  | 1.0653  | 1.2279  | 1.5814  |
| Ac-227+E  | 4.1501  | 4.0651  | 4.5301  | 5.3566  | 4.0275  | 3.2667  | 3.8857  | 4.6905  |
| Ag-108m+E | 5.1508  | 4.6760  | 4.7471  | 4.8585  | 5.0949  | 4.6598  | 5.3355  | 7.4991  |
| Ag-110m+E | 4.8965  | 4.3638  | 4.4568  | 4.2747  | 5.0904  | 4.8625  | 5.2308  | 8.7674  |
| Am-242m+E | 1.0960  | 1.0881  | 1.3852  | 1.8305  | 1.0074  | 0.6969  | 0.9134  | 0.9842  |
| Am-243+E  | 3.7078  | 3.7879  | 4.0275  | 4.7887  | 3.5124  | 2.8315  | 3.3577  | 3.8458  |
| Ar-42+E   | 0.2583  | 0.2178  | 0.2319  | 0.2287  | 0.2825  | 0.2557  | 0.2507  | 0.4979  |
| At-211+E  | 0.7153  | 0.7632  | 0.8251  | 0.9906  | 0.6415  | 0.5459  | 0.7985  | 0.7930  |
| Ba-128+E  | 2.1114  | 1.6648  | 1.7048  | 1.9225  | 1.7364  | 1.4152  | 2.0906  | 1.9165  |
| Bi-210m+E | 1.6298  | 1.5151  | 1.5154  | 1.6040  | 1.6493  | 1.4326  | 1.5138  | 1.9301  |
| Bi-212+E  | 0.2782  | 0.2577  | 0.3259  | 0.3691  | 0.2799  | 0.2387  | 0.2933  | 0.4482  |
| Bi-213+E  | 0.5216  | 0.4791  | 0.4871  | 0.5009  | 0.5172  | 0.4632  | 0.5239  | 0.6931  |
| Bi-214+E  | 1.9887  | 1.7459  | 1.8004  | 1.7676  | 2.0901  | 1.9570  | 2.0904  | 3.5604  |
| Bi-215+E  | 1.1737  | 1.1061  | 1.1166  | 1.1965  | 1.1674  | 1.0196  | 1.1454  | 1.4788  |
| Bi-216+E  | 2.4156  | 2.1833  | 2.2008  | 2.2210  | 2.4366  | 2.2338  | 2.5549  | 3.5385  |
| Cd-118+E  | 0.0971  | 0.0846  | 0.0874  | 0.0841  | 0.1036  | 0.0968  | 0.0993  | 0.1779  |
| Ce-134+E  | 1.5171  | 1.1256  | 1.1557  | 1.3526  | 1.1217  | 0.8447  | 1.5425  | 1.1214  |
| Ce-144+E  | 0.3414  | 0.3166  | 0.3061  | 0.3308  | 0.3142  | 0.2563  | 0.3004  | 0.3571  |
| Cl-34m+E  | 1.5672  | 1.3972  | 1.4634  | 1.4302  | 1.6653  | 1.4720  | 1.4257  | 2.5867  |
| Cm-245+E  | 2.0097  | 2.0736  | 2.2941  | 2.7587  | 1.9479  | 1.4521  | 1.5879  | 2.0933  |
| Cm-247+E  | 1.8898  | 1.7780  | 1.8170  | 1.9337  | 1.8391  | 1.5906  | 1.7801  | 2.2620  |
| Cm-250+E  | 22.3898 | 19.9404 | 20.3646 | 20.5523 | 23.1663 | 20.9834 | 22.0199 | 35.1466 |
| Cs-137+E  | 2.7319  | 2.5052  | 2.4704  | 2.5006  | 2.8349  | 2.7942  | 2.9588  | 3.6811  |
| Es-254+E  | 3.0218  | 2.7768  | 3.4210  | 4.1255  | 2.9309  | 2.3953  | 2.7703  | 3.8756  |
| Fe-60+E   | 3.1118  | 2.7123  | 3.0622  | 3.0809  | 3.3288  | 3.0325  | 3.1740  | 5.7687  |
| Fr-220+E  | 0.2722  | 0.2832  | 0.3370  | 0.4205  | 0.2542  | 0.1989  | 0.2733  | 0.3011  |
| Fr-221+E  | 0.2644  | 0.2533  | 0.2627  | 0.3160  | 0.2711  | 0.2282  | 0.2406  | 0.3054  |
| Ge-68+E   | 0.5453  | 0.5103  | 1.0343  | 1.2713  | 0.5391  | 0.3554  | 0.6409  | 0.9189  |
| Hf-172+E  | 2.5472  | 2.4610  | 3.0322  | 3.6267  | 2.3808  | 1.9699  | 2.6005  | 2.8392  |
| Hf-182+E  | 4.9688  | 4.6878  | 4.8969  | 5.1943  | 5.0655  | 4.5414  | 4.7973  | 6.6601  |
| Hg-193+E  | 3.1824  | 3.0903  | 3.4351  | 3.8531  | 3.1465  | 2.8369  | 3.3535  | 4.2864  |
| Hg-194+E  | 3.4568  | 3.2669  | 3.6590  | 4.0669  | 3.4633  | 3.0532  | 3.5360  | 4.6588  |
| In-114m+E | 0.8108  | 0.7068  | 0.7402  | 0.9142  | 0.7272  | 0.6223  | 0.6946  | 0.7917  |
| Ir-192m+E | 4.1362  | 3.7532  | 4.0066  | 4.3023  | 4.2008  | 3.5939  | 3.9913  | 5.3452  |
| Kr-76+E   | 2.8739  | 2.7087  | 2.9681  | 3.4333  | 2.8771  | 2.3574  | 2.6483  | 3.4624  |
| Mg-28+E   | 4.2324  | 3.4914  | 3.6127  | 3.6464  | 4.1836  | 3.7706  | 4.1560  | 6.6547  |
| Nd-140+E  | 1.5084  | 1.1615  | 1.1466  | 1.3679  | 1.1186  | 0.8434  | 1.4169  | 1.0261  |
| Ni-66+E   | 0.1420  | 0.1232  | 0.1264  | 0.1204  | 0.1507  | 0.1445  | 0.1389  | 0.2537  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50  | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|--------|--------|--------|---------|
| Np-235+E  | 0.5104 | 0.5103 | 0.7190 | 0.9989 | 0.4734 | 0.3119 | 0.4452 | 0.4789  |
| Np-237+E  | 3.4402 | 3.3647 | 3.8403 | 4.7805 | 3.2600 | 2.4768 | 2.9928 | 3.5021  |
| Os-194+E  | 0.6228 | 0.5711 | 0.7632 | 0.8893 | 0.6154 | 0.4833 | 0.6225 | 0.8356  |
| Pa-231+E  | 5.2374 | 5.1134 | 5.9258 | 7.2327 | 5.0339 | 3.9816 | 4.8562 | 5.7687  |
| Pb-202+E  | 2.9250 | 2.8329 | 3.2197 | 3.6007 | 2.8313 | 2.4960 | 3.1337 | 3.7443  |
| Pb-210+E  | 0.3228 | 0.3261 | 0.5017 | 0.6730 | 0.3099 | 0.2076 | 0.3229 | 0.3971  |
| Pd-103+E  | 0.9067 | 0.8643 | 0.9631 | 1.1706 | 0.7827 | 0.5659 | 0.7576 | 0.6378  |
| Pt-202+E  | 0.3662 | 0.3255 | 0.3325 | 0.3275 | 0.3764 | 0.3467 | 0.3676 | 0.5701  |
| Pu-239+E  | 0.0812 | 0.0801 | 0.1204 | 0.1635 | 0.0757 | 0.0495 | 0.0744 | 0.0834  |
| Pu-244+E  | 1.7839 | 1.6946 | 2.0213 | 2.5031 | 1.7228 | 1.3699 | 1.6831 | 2.1385  |
| Pu-246+E  | 4.1642 | 3.9204 | 4.2178 | 4.8045 | 4.1071 | 3.4370 | 3.7030 | 5.3031  |
| Ra-219+E  | 1.1423 | 1.0795 | 1.0875 | 1.1940 | 1.1301 | 0.9500 | 1.0735 | 1.3417  |
| Ra-221+E  | 0.6910 | 0.7046 | 0.8387 | 1.0219 | 0.6714 | 0.5126 | 0.6209 | 0.7591  |
| Ra-222+E  | 0.0532 | 0.0479 | 0.0473 | 0.0497 | 0.0540 | 0.0459 | 0.0484 | 0.0647  |
| Ra-223+E  | 2.3866 | 2.3449 | 2.4655 | 2.7380 | 2.3160 | 1.9578 | 2.3012 | 2.8133  |
| Ra-224+E  | 1.4523 | 1.3775 | 1.3281 | 1.3749 | 1.5403 | 1.5695 | 1.4849 | 1.4612  |
| Ra-226+E  | 4.8238 | 4.3958 | 4.4713 | 4.6380 | 5.0184 | 4.7077 | 4.9460 | 6.7717  |
| Ra-228+E  | 3.5509 | 3.2860 | 3.4613 | 3.7858 | 3.6752 | 3.3984 | 3.4881 | 4.5907  |
| Rb-81+E   | 2.2550 | 2.1712 | 2.3594 | 2.9189 | 2.3394 | 1.9260 | 2.0421 | 2.7734  |
| Rb-83+E   | 2.1279 | 2.0479 | 2.3207 | 2.7750 | 2.1414 | 1.8150 | 2.2140 | 2.9638  |
| Re-186m+E | 1.2306 | 1.2008 | 1.8806 | 2.2829 | 1.1942 | 0.8975 | 1.3271 | 1.6655  |
| Rn-219+E  | 0.3331 | 0.3082 | 0.3090 | 0.3221 | 0.3353 | 0.2920 | 0.3069 | 0.3999  |
| Rn-220+E  | 1.3732 | 1.3030 | 1.2526 | 1.2912 | 1.4593 | 1.5000 | 1.4146 | 1.3709  |
| Rn-222+E  | 0.0013 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0014 | 0.0018  |
| Ru-103+E  | 1.7228 | 1.5453 | 1.5827 | 1.6267 | 1.7224 | 1.5605 | 1.8277 | 2.4382  |
| Ru-106+E  | 0.5464 | 0.4895 | 0.4923 | 0.4924 | 0.5572 | 0.5191 | 0.5961 | 0.8566  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 2.2898 | 1.9732 | 2.0167 | 2.3308 | 2.0155 | 1.7563 | 1.9675 | 2.2254  |
| Sn-121m+E | 0.2376 | 0.1887 | 0.2154 | 0.2770 | 0.1791 | 0.1454 | 0.2125 | 0.1802  |
| Sn-126+E  | 6.2631 | 5.7297 | 5.7598 | 5.8369 | 6.1863 | 5.7311 | 6.5523 | 9.2904  |
| Sr-82+E   | 0.7857 | 0.8273 | 0.9392 | 1.3118 | 0.7767 | 0.5996 | 0.7030 | 0.9205  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001  |
| Te-118+E  | 1.2047 | 0.9498 | 0.9820 | 1.2715 | 0.9024 | 0.7744 | 1.0341 | 0.8809  |
| Te-129m+E | 0.6989 | 0.5634 | 0.6132 | 0.7340 | 0.5679 | 0.4782 | 0.6680 | 0.6577  |
| Th-229+E  | 4.0100 | 3.9589 | 4.5717 | 5.7112 | 3.7825 | 2.9323 | 3.6494 | 4.2663  |
| Th-232+E  | 9.1627 | 8.5435 | 8.8468 | 9.5853 | 9.5155 | 8.9363 | 9.2786 | 11.5280 |
| Th-234+E  | 0.3092 | 0.3185 | 0.3660 | 0.4612 | 0.2941 | 0.2356 | 0.2840 | 0.3234  |
| Ti-44+E   | 3.6766 | 3.6548 | 3.4652 | 3.6414 | 3.5214 | 3.4415 | 4.1344 | 4.9363  |
| U-228+E   | 0.4263 | 0.4171 | 0.4855 | 0.6080 | 0.4191 | 0.3214 | 0.3625 | 0.4435  |
| U-230+E   | 0.4156 | 0.4150 | 0.5140 | 0.6804 | 0.3965 | 0.2866 | 0.3545 | 0.4110  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.7384       | 2.7035       | 3.0022       | 3.6315       | 2.6654       | 2.3738       | 2.6115       | 2.6073       |
| U-238+E        | 1.3804       | 1.3358       | 1.3512       | 1.4682       | 1.4328       | 1.4035       | 1.3630       | 1.3988       |
| W-178+E        | 1.7250       | 1.6976       | 2.0669       | 2.4468       | 1.6481       | 1.4234       | 1.8394       | 1.9926       |
| Xe-122+E       | 1.8384       | 1.4703       | 1.5041       | 1.7505       | 1.5034       | 1.2633       | 1.7788       | 1.7023       |
| Zr-93+E        | 0.1527       | 0.1458       | 0.1844       | 0.2689       | 0.1341       | 0.0870       | 0.1123       | 0.0914       |

Table 77: Composite 2 – 5cm Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2807  | 0.2361  | 0.3660  | 0.3451  | 0.2279  | 0.1859  | 0.4989  | 0.4159  |
| Ac-225+E  | 1.2595  | 0.9960  | 1.6259  | 1.5254  | 1.1491  | 0.8356  | 2.8217  | 2.0251  |
| Ac-227+E  | 3.8661  | 3.2466  | 4.9036  | 4.7413  | 3.4545  | 2.7571  | 7.6180  | 5.2513  |
| Ag-108m+E | 5.2861  | 4.1380  | 5.9097  | 6.9870  | 4.9855  | 3.6356  | 13.6804 | 9.4086  |
| Ag-110m+E | 5.3883  | 4.2949  | 6.0414  | 7.5348  | 5.2217  | 3.7456  | 15.6552 | 11.3059 |
| Am-242m+E | 0.8529  | 0.6926  | 0.9817  | 1.1038  | 0.6433  | 0.5687  | 1.1463  | 1.1641  |
| Am-243+E  | 3.3249  | 2.7223  | 4.7112  | 4.3270  | 2.9850  | 2.3711  | 6.0156  | 3.9852  |
| Ar-42+E   | 0.2939  | 0.2378  | 0.2966  | 0.3698  | 0.2909  | 0.2039  | 0.7189  | 0.4843  |
| At-211+E  | 0.6245  | 0.5739  | 0.8269  | 0.7219  | 0.5589  | 0.5172  | 0.8905  | 0.6010  |
| Ba-128+E  | 1.6962  | 1.3971  | 1.6816  | 2.2223  | 1.6181  | 1.1216  | 3.1373  | 2.5137  |
| Bi-210m+E | 1.6576  | 1.4282  | 1.9590  | 1.9926  | 1.5846  | 1.2732  | 3.3668  | 2.0116  |
| Bi-212+E  | 0.2715  | 0.2242  | 0.3067  | 0.3707  | 0.2385  | 0.1843  | 0.6583  | 0.5359  |
| Bi-213+E  | 0.5424  | 0.4182  | 0.6667  | 0.6971  | 0.5208  | 0.3485  | 1.4456  | 1.0610  |
| Bi-214+E  | 2.2138  | 1.7799  | 2.4365  | 2.8145  | 2.1440  | 1.5360  | 6.2649  | 3.9684  |
| Bi-215+E  | 1.1743  | 1.0473  | 1.4250  | 1.4882  | 1.1180  | 0.8686  | 2.5616  | 1.6558  |
| Bi-216+E  | 2.5807  | 2.0533  | 3.0163  | 3.1406  | 2.4627  | 1.7043  | 6.5206  | 4.4425  |
| Cd-118+E  | 0.1112  | 0.0841  | 0.1225  | 0.1526  | 0.1096  | 0.0716  | 0.3343  | 0.2558  |
| Ce-134+E  | 1.0409  | 0.9115  | 0.9061  | 1.3920  | 0.9885  | 0.6787  | 1.3337  | 1.2323  |
| Ce-144+E  | 0.3047  | 0.2383  | 0.3467  | 0.3391  | 0.2873  | 0.1929  | 0.7457  | 0.4044  |
| Cl-34m+E  | 1.6968  | 1.3253  | 1.9393  | 1.9613  | 1.6449  | 1.1302  | 5.8121  | 2.7854  |
| Cm-245+E  | 1.7895  | 1.3458  | 2.7578  | 2.5553  | 1.5375  | 1.0753  | 3.8075  | 2.4478  |
| Cm-247+E  | 1.8922  | 1.4192  | 2.4367  | 2.5495  | 1.7981  | 1.2168  | 5.1082  | 3.7068  |
| Cm-250+E  | 24.0079 | 19.1760 | 27.9956 | 30.8420 | 23.3197 | 16.2696 | 66.7938 | 43.9577 |
| Cs-137+E  | 2.9768  | 2.7379  | 3.1680  | 3.3761  | 2.8714  | 2.5435  | 5.4408  | 3.8205  |
| Es-254+E  | 2.7683  | 2.2190  | 2.8607  | 3.5575  | 2.3986  | 1.8767  | 6.0193  | 5.6299  |
| Fe-60+E   | 3.5066  | 2.6605  | 3.8031  | 4.7805  | 3.3895  | 2.2535  | 10.0850 | 8.0321  |
| Fr-220+E  | 0.2347  | 0.2050  | 0.3036  | 0.2748  | 0.1962  | 0.1724  | 0.3768  | 0.2733  |
| Fr-221+E  | 0.2676  | 0.2048  | 0.3794  | 0.2826  | 0.2590  | 0.1898  | 0.5550  | 0.3352  |
| Ge-68+E   | 0.4494  | 0.3759  | 0.5059  | 0.5584  | 0.2793  | 0.2627  | 0.6820  | 0.9680  |
| Hf-172+E  | 2.1915  | 1.8100  | 2.6831  | 2.5071  | 1.9074  | 1.6110  | 3.3796  | 2.9584  |
| Hf-182+E  | 5.1211  | 4.0685  | 6.3040  | 6.3457  | 4.9257  | 3.7479  | 11.6905 | 8.0182  |
| Hg-193+E  | 3.1202  | 2.6214  | 3.9101  | 3.8015  | 2.9362  | 2.3591  | 6.7287  | 4.9061  |
| Hg-194+E  | 3.3939  | 3.0932  | 4.1855  | 4.3040  | 3.1662  | 2.4790  | 7.4810  | 5.1967  |
| In-114m+E | 0.6985  | 0.5276  | 0.7684  | 0.8056  | 0.6458  | 0.4780  | 1.4581  | 0.9998  |
| Ir-192m+E | 4.1592  | 3.8903  | 5.1058  | 5.4166  | 3.9009  | 2.7909  | 9.8204  | 6.5319  |
| Kr-76+E   | 2.7723  | 2.4045  | 3.3392  | 3.5044  | 2.5013  | 1.8642  | 6.1017  | 4.2138  |
| Mg-28+E   | 4.3364  | 3.4259  | 4.6068  | 5.7697  | 4.2716  | 2.8976  | 12.2307 | 8.3614  |
| Nd-140+E  | 1.0156  | 0.8832  | 0.8708  | 1.2951  | 0.9555  | 0.6851  | 1.1164  | 1.1167  |
| Ni-66+E   | 0.1614  | 0.1238  | 0.1734  | 0.2193  | 0.1599  | 0.1066  | 0.4963  | 0.4086  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3848        | 0.3365        | 0.4087        | 0.4419        | 0.2601        | 0.2585        | 0.4177        | 0.5433        |
| Np-237+E       | 2.9779        | 2.6186        | 3.9138        | 4.0073        | 2.5368        | 1.9787        | 5.5069        | 4.0928        |
| Os-194+E       | 0.5726        | 0.5210        | 0.6746        | 0.7429        | 0.4860        | 0.3727        | 1.1906        | 0.9704        |
| Pa-231+E       | 4.7306        | 4.0146        | 5.8631        | 5.7651        | 4.1053        | 3.3403        | 8.8401        | 6.4822        |
| Pb-202+E       | 2.8345        | 2.3315        | 3.5459        | 3.4667        | 2.6107        | 2.0113        | 6.1238        | 4.7462        |
| Pb-210+E       | 0.2547        | 0.2214        | 0.2851        | 0.2957        | 0.1677        | 0.1604        | 0.3223        | 0.3994        |
| Pd-103+E       | 0.6558        | 0.4625        | 0.4628        | 0.9747        | 0.5272        | 0.4889        | 0.6497        | 0.7641        |
| Pt-202+E       | 0.3992        | 0.3040        | 0.4653        | 0.5344        | 0.3891        | 0.2554        | 1.1523        | 0.8770        |
| Pu-239+E       | 0.0614        | 0.0533        | 0.0647        | 0.0712        | 0.0407        | 0.0406        | 0.0671        | 0.0927        |
| Pu-244+E       | 1.6102        | 1.3396        | 1.7699        | 1.9538        | 1.3586        | 1.1072        | 3.0094        | 2.4213        |
| Pu-246+E       | 3.9977        | 3.0769        | 4.9537        | 5.3349        | 3.6885        | 2.6423        | 9.5542        | 7.2129        |
| Ra-219+E       | 1.1035        | 1.0943        | 1.4508        | 1.5040        | 1.0390        | 0.7645        | 2.4793        | 1.5312        |
| Ra-221+E       | 0.6177        | 0.5023        | 0.7922        | 0.7050        | 0.5182        | 0.4088        | 1.2976        | 0.7678        |
| Ra-222+E       | 0.0533        | 0.0533        | 0.0674        | 0.0739        | 0.0509        | 0.0351        | 0.1346        | 0.0840        |
| Ra-223+E       | 2.2971        | 1.9257        | 2.9907        | 2.9150        | 2.1302        | 1.6446        | 5.0063        | 3.2135        |
| Ra-224+E       | 1.5957        | 1.5998        | 1.6347        | 1.5826        | 1.5659        | 1.5589        | 1.6986        | 1.5617        |
| Ra-226+E       | 5.2019        | 4.6207        | 5.8819        | 6.2085        | 5.0267        | 4.0723        | 11.2785       | 7.7139        |
| Ra-228+E       | 3.7154        | 3.3171        | 4.1714        | 4.5425        | 3.5330        | 2.9509        | 7.3965        | 6.0712        |
| Rb-81+E        | 2.2578        | 1.7634        | 3.0405        | 2.4971        | 2.0831        | 1.4129        | 5.4574        | 3.5119        |
| Rb-83+E        | 2.0976        | 1.7695        | 2.3812        | 2.4441        | 1.8297        | 1.3853        | 4.3163        | 3.2136        |
| Re-186m+E      | 1.0425        | 0.8753        | 1.2776        | 1.2193        | 0.7917        | 0.6989        | 1.6334        | 1.6774        |
| Rn-219+E       | 0.3441        | 0.2683        | 0.4134        | 0.4257        | 0.3302        | 0.2469        | 0.8108        | 0.5351        |
| Rn-220+E       | 1.5138        | 1.5402        | 1.5353        | 1.4954        | 1.4872        | 1.4943        | 1.5469        | 1.4727        |
| Rn-222+E       | 0.0013        | 0.0011        | 0.0015        | 0.0016        | 0.0013        | 0.0009        | 0.0030        | 0.0022        |
| Ru-103+E       | 1.7936        | 1.4660        | 2.0223        | 2.1187        | 1.7029        | 1.1845        | 4.0093        | 2.9391        |
| Ru-106+E       | 0.5916        | 0.4851        | 0.6651        | 0.6989        | 0.5640        | 0.4018        | 1.4267        | 0.9454        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 2.0074        | 1.4643        | 2.0852        | 2.6615        | 1.8599        | 1.3213        | 4.8812        | 3.8025        |
| Sn-121m+E      | 0.1639        | 0.1311        | 0.1296        | 0.2039        | 0.1415        | 0.1148        | 0.2240        | 0.2252        |
| Sn-126+E       | 6.4905        | 5.1198        | 7.7387        | 8.6902        | 6.1910        | 4.4839        | 17.3335       | 11.6688       |
| Sr-82+E        | 0.6834        | 0.5971        | 0.7842        | 0.8919        | 0.5349        | 0.4633        | 1.3520        | 1.1551        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0001        | 0.0000        | 0.0001        | 0.0001        | 0.0001        |
| Te-118+E       | 0.8513        | 0.6627        | 0.6525        | 1.0634        | 0.7623        | 0.6095        | 1.3264        | 1.1973        |
| Te-129m+E      | 0.5474        | 0.4400        | 0.5077        | 0.7062        | 0.4986        | 0.3730        | 1.0010        | 0.8481        |
| Th-229+E       | 3.5039        | 2.8874        | 4.5640        | 4.2814        | 3.0070        | 2.3697        | 6.3579        | 4.8098        |
| Th-232+E       | 9.7047        | 8.7759        | 10.7977       | 11.0425       | 9.2979        | 8.1187        | 17.5532       | 13.1776       |
| Th-234+E       | 0.2678        | 0.2267        | 0.3702        | 0.3509        | 0.2282        | 0.1943        | 0.4383        | 0.3551        |
| Ti-44+E        | 3.6961        | 3.2037        | 4.5196        | 4.4396        | 3.6926        | 3.0366        | 7.7137        | 5.5203        |
| U-228+E        | 0.3873        | 0.3092        | 0.5052        | 0.4346        | 0.3356        | 0.2537        | 0.8129        | 0.5150        |
| U-230+E        | 0.3482        | 0.3027        | 0.4313        | 0.4178        | 0.2755        | 0.2321        | 0.5704        | 0.4783        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5258        | 2.4027        | 2.6127        | 2.6790        | 2.2474        | 2.2175        | 2.6895        | 2.7650        |
| U-238+E        | 1.4454        | 1.4326        | 1.5370        | 1.5520        | 1.3928        | 1.3879        | 1.5904        | 1.4405        |
| W-178+E        | 1.5286        | 1.3013        | 2.0084        | 1.8030        | 1.3657        | 1.1883        | 2.2176        | 2.0019        |
| Xe-122+E       | 1.4648        | 1.2119        | 1.4038        | 1.8812        | 1.3718        | 0.9888        | 2.7714        | 2.0932        |
| Zr-93+E        | 0.1091        | 0.0984        | 0.1096        | 0.1128        | 0.0787        | 0.0797        | 0.0908        | 0.1333        |

Table 78: Composite 2 – 5cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1907        | 0.1672        | 0.3762        | 0.4330        |
| Ac-225+E       | 1.0580        | 0.7273        | 1.8147        | 1.5741        |
| Ac-227+E       | 3.1354        | 2.4334        | 4.8786        | 4.7896        |
| Ag-108m+E      | 4.8626        | 3.5955        | 7.0981        | 6.4726        |
| Ag-110m+E      | 5.1884        | 3.8242        | 7.5847        | 8.3795        |
| Am-242m+E      | 0.4833        | 0.5284        | 0.9335        | 1.2986        |
| Am-243+E       | 2.7554        | 2.4370        | 3.6171        | 4.1439        |
| Ar-42+E        | 0.2866        | 0.2541        | 0.4336        | 0.2997        |
| At-211+E       | 0.5096        | 0.4705        | 0.6851        | 0.7241        |
| Ba-128+E       | 1.4657        | 1.1228        | 2.0699        | 1.9550        |
| Bi-210m+E      | 1.5048        | 1.0837        | 2.1806        | 1.6134        |
| Bi-212+E       | 0.2176        | 0.1787        | 0.3956        | 0.4767        |
| Bi-213+E       | 0.5036        | 0.2719        | 0.8924        | 0.6903        |
| Bi-214+E       | 2.1300        | 1.6305        | 3.2305        | 2.6791        |
| Bi-215+E       | 1.0707        | 0.7440        | 1.6909        | 1.2739        |
| Bi-216+E       | 2.4383        | 1.5585        | 4.3016        | 2.6302        |
| Cd-118+E       | 0.1076        | 0.0631        | 0.1912        | 0.1419        |
| Ce-134+E       | 0.8681        | 0.8472        | 0.9991        | 1.1356        |
| Ce-144+E       | 0.2796        | 0.2442        | 0.3300        | 0.3038        |
| Cl-34m+E       | 1.6213        | 1.0325        | 2.7191        | 1.9969        |
| Cm-245+E       | 1.4211        | 1.3137        | 1.8996        | 2.6040        |
| Cm-247+E       | 1.7073        | 1.0026        | 2.5047        | 2.7011        |
| Cm-250+E       | 22.7917       | 15.2088       | 36.9497       | 31.2658       |
| Cs-137+E       | 2.8368        | 2.7237        | 3.1405        | 3.2930        |
| Es-254+E       | 2.0650        | 1.5254        | 3.8962        | 5.3619        |
| Fe-60+E        | 3.2727        | 2.0874        | 5.7882        | 4.9044        |
| Fr-220+E       | 0.1695        | 0.1592        | 0.2745        | 0.3134        |
| Fr-221+E       | 0.2392        | 0.1626        | 0.3574        | 0.2524        |
| Ge-68+E        | 0.1699        | 0.2172        | 0.7408        | 1.2687        |
| Hf-172+E       | 1.6625        | 1.4093        | 2.4933        | 3.0230        |
| Hf-182+E       | 4.6924        | 3.2773        | 6.8804        | 6.1553        |
| Hg-193+E       | 2.7297        | 2.0002        | 4.2673        | 4.2127        |
| Hg-194+E       | 2.9687        | 2.1185        | 5.1285        | 4.1392        |
| In-114m+E      | 0.5792        | 0.4189        | 0.8777        | 0.7976        |
| Ir-192m+E      | 3.7465        | 2.2691        | 7.1986        | 4.3185        |
| Kr-76+E        | 2.2985        | 1.5801        | 4.1169        | 3.3605        |
| Mg-28+E        | 4.1086        | 2.9255        | 6.4735        | 5.9047        |
| Nd-140+E       | 0.8467        | 0.8570        | 0.9947        | 1.2346        |
| Ni-66+E        | 0.1556        | 0.0875        | 0.2634        | 0.3431        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1632        | 0.2110        | 0.4559        | 0.6332        |
| Np-237+E       | 2.2318        | 1.8779        | 3.8028        | 3.9137        |
| Os-194+E       | 0.4290        | 0.3185        | 0.9098        | 0.8914        |
| Pa-231+E       | 3.6193        | 2.9288        | 5.9570        | 6.1144        |
| Pb-202+E       | 2.4216        | 1.6098        | 4.2195        | 3.7823        |
| Pb-210+E       | 0.1060        | 0.1358        | 0.3472        | 0.5165        |
| Pd-103+E       | 0.3900        | 0.3849        | 0.6876        | 0.8131        |
| Pt-202+E       | 0.3793        | 0.2077        | 0.6751        | 0.5707        |
| Pu-239+E       | 0.0250        | 0.0329        | 0.0767        | 0.1115        |
| Pu-244+E       | 1.1861        | 1.0389        | 2.1696        | 2.0354        |
| Pu-246+E       | 3.4330        | 2.5375        | 5.3164        | 6.2211        |
| Ra-219+E       | 1.0033        | 0.6461        | 1.7840        | 1.0951        |
| Ra-221+E       | 0.4595        | 0.3872        | 0.7535        | 0.7525        |
| Ra-222+E       | 0.0497        | 0.0280        | 0.0931        | 0.0513        |
| Ra-223+E       | 2.0138        | 1.4751        | 2.9516        | 2.7849        |
| Ra-224+E       | 1.5096        | 1.5144        | 1.5930        | 1.7565        |
| Ra-226+E       | 4.8965        | 3.9291        | 6.9635        | 5.9642        |
| Ra-228+E       | 3.3525        | 2.7291        | 4.8702        | 5.3723        |
| Rb-81+E        | 1.8972        | 1.1392        | 3.6156        | 2.3488        |
| Rb-83+E        | 1.6852        | 1.2201        | 3.7344        | 2.2755        |
| Re-186m+E      | 0.6205        | 0.6331        | 1.4109        | 2.0341        |
| Rn-219+E       | 0.3131        | 0.2039        | 0.4434        | 0.4070        |
| Rn-220+E       | 1.4368        | 1.4581        | 1.5036        | 1.6748        |
| Rn-222+E       | 0.0013        | 0.0007        | 0.0028        | 0.0011        |
| Ru-103+E       | 1.6722        | 0.9492        | 3.6847        | 1.6034        |
| Ru-106+E       | 0.5649        | 0.3895        | 1.0248        | 0.5449        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.6830        | 1.0753        | 2.3803        | 2.9965        |
| Sn-121m+E      | 0.1155        | 0.1140        | 0.1515        | 0.2534        |
| Sn-126+E       | 6.1054        | 4.6005        | 8.1193        | 8.4550        |
| Sr-82+E        | 0.4184        | 0.3917        | 0.9051        | 1.0777        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.6434        | 0.5854        | 0.7639        | 1.2023        |
| Te-129m+E      | 0.4403        | 0.3648        | 0.6325        | 0.7499        |
| Th-229+E       | 2.6433        | 2.2769        | 4.3728        | 4.7439        |
| Th-232+E       | 8.8749        | 7.6111        | 12.1360       | 12.1837       |
| Th-234+E       | 0.1981        | 0.1846        | 0.3002        | 0.3884        |
| Ti-44+E        | 3.5843        | 2.5796        | 4.8330        | 4.1269        |
| U-228+E        | 0.2953        | 0.2180        | 0.5098        | 0.4284        |
| U-230+E        | 0.2224        | 0.2134        | 0.4217        | 0.4747        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 1.9978        | 2.0956        | 2.5908        | 3.1465        |
| U-238+E        | 1.3270        | 1.3655        | 1.5016        | 1.7472        |
| W-178+E        | 1.2052        | 0.9845        | 1.7948        | 2.0538        |
| Xe-122+E       | 1.2460        | 1.0167        | 1.6939        | 1.6675        |
| Zr-93+E        | 0.0519        | 0.0622        | 0.1033        | 0.1197        |

Table 79: Composite 2 – 15cm Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.3269  | 0.3026  | 0.3579  | 0.4217  | 0.2889  | 0.2291  | 0.2824  | 0.3764  |
| Ac-225+E  | 1.3046  | 1.2173  | 1.3113  | 1.3560  | 1.2272  | 1.0384  | 1.1290  | 1.3694  |
| Ac-227+E  | 3.9980  | 3.7719  | 3.9974  | 4.4963  | 3.7706  | 3.0907  | 3.5316  | 4.2048  |
| Ag-108m+E | 5.0323  | 4.7993  | 5.0881  | 4.6364  | 5.3977  | 4.3366  | 4.6366  | 5.5893  |
| Ag-110m+E | 4.6980  | 4.3966  | 4.4594  | 3.8178  | 5.2407  | 3.9527  | 4.3922  | 6.8277  |
| Am-242m+E | 0.9710  | 0.9620  | 1.1630  | 1.5394  | 0.9480  | 0.7135  | 0.8699  | 1.0335  |
| Am-243+E  | 3.4128  | 3.3059  | 3.3154  | 4.1270  | 3.2230  | 2.5849  | 3.0747  | 3.2494  |
| Ar-42+E   | 0.2480  | 0.2333  | 0.2201  | 0.2145  | 0.2688  | 0.2190  | 0.2301  | 0.3983  |
| At-211+E  | 0.7437  | 0.6851  | 0.6849  | 0.9061  | 0.6062  | 0.4854  | 0.6426  | 0.6808  |
| Ba-128+E  | 1.8331  | 1.8349  | 1.9109  | 2.2794  | 2.0308  | 1.4857  | 1.8627  | 1.8168  |
| Bi-210m+E | 1.5501  | 1.4744  | 1.4045  | 1.4157  | 1.5936  | 1.3532  | 1.3934  | 1.5002  |
| Bi-212+E  | 0.2937  | 0.2674  | 0.3056  | 0.3167  | 0.2866  | 0.2163  | 0.2649  | 0.4014  |
| Bi-213+E  | 0.5579  | 0.5187  | 0.5434  | 0.4685  | 0.5345  | 0.4812  | 0.4904  | 0.5157  |
| Bi-214+E  | 1.9545  | 1.8218  | 1.8612  | 1.6157  | 2.1317  | 1.6808  | 1.8521  | 2.8295  |
| Bi-215+E  | 1.1400  | 1.0782  | 1.0399  | 1.0770  | 1.1348  | 0.9490  | 1.0277  | 1.1416  |
| Bi-216+E  | 2.6251  | 2.4403  | 2.6428  | 2.1098  | 2.6331  | 2.3060  | 2.3560  | 2.6433  |
| Cd-118+E  | 0.0956  | 0.0908  | 0.0875  | 0.0786  | 0.1054  | 0.0821  | 0.0884  | 0.1482  |
| Ce-134+E  | 1.2148  | 1.2228  | 1.3071  | 1.7211  | 1.4157  | 0.8895  | 1.3625  | 1.2867  |
| Ce-144+E  | 0.3028  | 0.3020  | 0.2950  | 0.3249  | 0.3145  | 0.2365  | 0.2767  | 0.3451  |
| Cl-34m+E  | 1.5098  | 1.4395  | 1.4124  | 1.3571  | 1.6198  | 1.3155  | 1.4345  | 2.6135  |
| Cm-245+E  | 1.7345  | 1.7399  | 1.8491  | 2.2411  | 1.6987  | 1.3421  | 1.5375  | 1.9187  |
| Cm-247+E  | 1.8346  | 1.7344  | 1.7774  | 1.6999  | 1.7605  | 1.5515  | 1.6153  | 1.6599  |
| Cm-250+E  | 21.8778 | 20.5552 | 20.4947 | 18.8111 | 23.2500 | 18.9158 | 20.3636 | 28.6403 |
| Cs-137+E  | 3.2672  | 3.1904  | 3.2112  | 2.9471  | 3.5878  | 3.2563  | 3.2842  | 3.7221  |
| Es-254+E  | 2.8201  | 2.7094  | 3.0024  | 3.6239  | 2.9106  | 2.1645  | 2.5604  | 3.6807  |
| Fe-60+E   | 3.0754  | 2.9087  | 2.8584  | 2.8054  | 3.3207  | 2.5276  | 2.8231  | 4.9516  |
| Fr-220+E  | 0.2800  | 0.2582  | 0.2883  | 0.3568  | 0.2371  | 0.1864  | 0.2416  | 0.3057  |
| Fr-221+E  | 0.2419  | 0.2271  | 0.2135  | 0.2444  | 0.2398  | 0.1967  | 0.2014  | 0.2563  |
| Ge-68+E   | 0.7028  | 0.6298  | 0.8432  | 1.0863  | 0.5648  | 0.3942  | 0.5945  | 1.0247  |
| Hf-172+E  | 2.7171  | 2.5149  | 2.6408  | 3.3908  | 2.5376  | 1.8746  | 2.7074  | 2.6450  |
| Hf-182+E  | 4.9040  | 4.6160  | 4.3743  | 4.7102  | 4.9897  | 3.9745  | 4.5561  | 5.8830  |
| Hg-193+E  | 3.3814  | 3.0852  | 3.0623  | 3.5055  | 3.1484  | 2.5021  | 3.0885  | 3.7735  |
| Hg-194+E  | 3.6766  | 3.3697  | 3.3986  | 3.7067  | 3.4800  | 2.8425  | 3.4408  | 3.8934  |
| In-114m+E | 0.7139  | 0.7266  | 0.7342  | 0.9279  | 0.7542  | 0.6187  | 0.6384  | 0.7302  |
| Ir-192m+E | 4.2448  | 3.9811  | 4.0882  | 3.8520  | 4.2276  | 3.6344  | 3.8950  | 4.0531  |
| Kr-76+E   | 2.9235  | 2.6974  | 2.9244  | 2.9124  | 2.8243  | 2.3484  | 2.6290  | 2.9806  |
| Mg-28+E   | 3.9394  | 3.7664  | 3.6761  | 3.7619  | 4.3236  | 3.3830  | 3.8076  | 5.5675  |
| Nd-140+E  | 1.2533  | 1.2070  | 1.3060  | 1.6209  | 1.3850  | 0.9322  | 1.4004  | 1.2366  |
| Ni-66+E   | 0.1368  | 0.1277  | 0.1185  | 0.1136  | 0.1522  | 0.1130  | 0.1257  | 0.2138  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50   | ctr50  | mid50  | cnr50   |
|-----------|--------|--------|--------|--------|---------|--------|--------|---------|
| Np-235+E  | 0.4912 | 0.4598 | 0.6204 | 0.7817 | 0.4366  | 0.3283 | 0.4269 | 0.5808  |
| Np-237+E  | 3.1405 | 3.0302 | 3.3713 | 3.9685 | 3.0165  | 2.4256 | 2.8533 | 3.1916  |
| Os-194+E  | 0.6678 | 0.6130 | 0.6994 | 0.7707 | 0.6224  | 0.4918 | 0.6086 | 0.7631  |
| Pa-231+E  | 5.0504 | 4.7593 | 5.2492 | 6.0115 | 4.7227  | 3.8331 | 4.4619 | 5.4019  |
| Pb-202+E  | 3.2875 | 2.9955 | 3.1692 | 3.3407 | 2.9279  | 2.4927 | 2.9314 | 3.1250  |
| Pb-210+E  | 0.3792 | 0.3306 | 0.4512 | 0.5410 | 0.3074  | 0.2232 | 0.3292 | 0.4743  |
| Pd-103+E  | 0.7623 | 0.8314 | 0.8378 | 1.4013 | 0.9141  | 0.6304 | 0.7261 | 0.5218  |
| Pt-202+E  | 0.3795 | 0.3546 | 0.3600 | 0.3072 | 0.3893  | 0.3295 | 0.3413 | 0.4460  |
| Pu-239+E  | 0.0813 | 0.0760 | 0.1022 | 0.1309 | 0.0716  | 0.0529 | 0.0706 | 0.0994  |
| Pu-244+E  | 1.7204 | 1.6343 | 1.9312 | 2.1078 | 1.7145  | 1.3522 | 1.5516 | 1.9780  |
| Pu-246+E  | 3.7631 | 3.6400 | 3.7056 | 4.1462 | 3.9502  | 3.0348 | 3.4297 | 4.6384  |
| Ra-219+E  | 1.0962 | 1.0428 | 1.0119 | 1.0535 | 1.0746  | 0.9168 | 1.0125 | 0.9730  |
| Ra-221+E  | 0.6728 | 0.6406 | 0.7265 | 0.8447 | 0.6098  | 0.4801 | 0.5722 | 0.9033  |
| Ra-222+E  | 0.0509 | 0.0484 | 0.0471 | 0.0436 | 0.0521  | 0.0453 | 0.0476 | 0.0445  |
| Ra-223+E  | 2.3177 | 2.1991 | 2.1971 | 2.4143 | 2.1851  | 1.8257 | 2.0410 | 2.3729  |
| Ra-224+E  | 1.8607 | 1.8681 | 1.7407 | 1.7498 | 1.9872  | 2.0225 | 1.8847 | 1.8672  |
| Ra-226+E  | 4.9574 | 4.7210 | 4.6616 | 4.4674 | 5.2039  | 4.5520 | 4.7446 | 5.7454  |
| Ra-228+E  | 3.4910 | 3.3544 | 3.3656 | 3.4258 | 3.6563  | 3.2040 | 3.3356 | 4.1438  |
| Rb-81+E   | 2.2903 | 2.0858 | 2.2788 | 2.2736 | 2.1794  | 1.8017 | 1.9180 | 2.7155  |
| Rb-83+E   | 2.5054 | 2.2474 | 2.6913 | 2.4400 | 2.3118  | 1.9631 | 2.1836 | 2.6672  |
| Re-186m+E | 1.4679 | 1.3247 | 1.5861 | 2.0000 | 1.2428  | 0.9078 | 1.3280 | 1.8148  |
| Rn-219+E  | 0.3191 | 0.3025 | 0.2969 | 0.2806 | 0.3218  | 0.2807 | 0.2796 | 0.3054  |
| Rn-220+E  | 1.7889 | 1.7995 | 1.6762 | 1.6812 | 1.9122  | 1.9596 | 1.8241 | 1.7908  |
| Rn-222+E  | 0.0015 | 0.0014 | 0.0015 | 0.0012 | 0.0015  | 0.0013 | 0.0013 | 0.0014  |
| Ru-103+E  | 2.0126 | 1.8794 | 2.0339 | 1.7061 | 1.9904  | 1.7866 | 1.7961 | 1.8860  |
| Ru-106+E  | 0.6011 | 0.5590 | 0.6077 | 0.4803 | 0.6192  | 0.5288 | 0.5469 | 0.6541  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000  |
| Sn-113+E  | 2.0865 | 2.1007 | 2.1748 | 2.4740 | 2.1330  | 1.8674 | 1.8896 | 1.7253  |
| Sn-121m+E | 0.2061 | 0.2144 | 0.2331 | 0.3237 | 0.2143  | 0.1662 | 0.2012 | 0.1895  |
| Sn-126+E  | 6.0409 | 5.7102 | 5.9520 | 5.3309 | 6.3490  | 5.0937 | 5.5910 | 6.9425  |
| Sr-82+E   | 0.8244 | 0.7135 | 0.9407 | 0.9648 | 0.7218  | 0.5549 | 0.7030 | 1.0065  |
| Sr-90+E   | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001  | 0.0001 | 0.0001 | 0.0001  |
| Te-118+E  | 1.0036 | 1.0749 | 1.1195 | 1.5653 | 1.0775  | 0.8693 | 0.9743 | 0.8571  |
| Te-129m+E | 0.6229 | 0.6340 | 0.6770 | 0.8472 | 0.6640  | 0.5117 | 0.6057 | 0.6140  |
| Th-229+E  | 3.8675 | 3.6117 | 4.0826 | 4.6869 | 3.5389  | 2.8509 | 3.4323 | 4.1852  |
| Th-232+E  | 9.6440 | 9.2407 | 9.1342 | 9.3096 | 10.0010 | 9.0607 | 9.3639 | 10.8647 |
| Th-234+E  | 0.3020 | 0.2816 | 0.3103 | 0.3822 | 0.2749  | 0.2156 | 0.2797 | 0.3135  |
| Ti-44+E   | 3.8053 | 3.5137 | 3.0281 | 3.6898 | 3.5514  | 2.8087 | 3.5480 | 3.9457  |
| U-228+E   | 0.3868 | 0.3714 | 0.4192 | 0.4768 | 0.3732  | 0.3007 | 0.3330 | 0.5061  |
| U-230+E   | 0.3843 | 0.3647 | 0.4439 | 0.5237 | 0.3538  | 0.2811 | 0.3361 | 0.4280  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.6390       | 2.6060       | 2.8298       | 3.1884       | 2.6077       | 2.3912       | 2.5186       | 2.7495       |
| U-238+E        | 1.3589       | 1.3412       | 1.3062       | 1.3693       | 1.4194       | 1.3874       | 1.3404       | 1.4294       |
| W-178+E        | 1.9250       | 1.7265       | 1.7805       | 2.2625       | 1.7678       | 1.3055       | 1.9815       | 1.8786       |
| Xe-122+E       | 1.5906       | 1.6209       | 1.6972       | 2.0696       | 1.7518       | 1.3170       | 1.5901       | 1.5923       |
| Zr-93+E        | 0.1057       | 0.1109       | 0.1479       | 0.1937       | 0.1108       | 0.0879       | 0.0985       | 0.1156       |

Table 80: Composite 2 – 15cm Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100  | ctr100  | mid100  | cnr100  | avg200  | ctr200  | mid200  | cnr200  |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.2691  | 0.2386  | 0.3050  | 0.3209  | 0.2225  | 0.2015  | 0.3459  | 0.2971  |
| Ac-225+E  | 1.2017  | 1.1258  | 1.4732  | 1.4108  | 1.1290  | 1.0081  | 1.7489  | 0.9097  |
| Ac-227+E  | 3.6348  | 3.3503  | 3.9171  | 4.1783  | 3.3406  | 2.9393  | 4.8496  | 2.9927  |
| Ag-108m+E | 5.0124  | 4.9840  | 7.1676  | 5.6923  | 4.9577  | 4.6053  | 8.3415  | 4.1855  |
| Ag-110m+E | 4.8287  | 4.5402  | 7.8023  | 5.6805  | 4.8836  | 4.4024  | 9.1965  | 4.7142  |
| Am-242m+E | 0.8012  | 0.7090  | 0.8300  | 0.7695  | 0.6137  | 0.6115  | 0.8740  | 0.9550  |
| Am-243+E  | 3.0736  | 2.6989  | 2.8280  | 3.5839  | 2.8762  | 2.4295  | 3.9130  | 2.4709  |
| Ar-42+E   | 0.2642  | 0.2287  | 0.3872  | 0.3015  | 0.2596  | 0.2200  | 0.5239  | 0.2545  |
| At-211+E  | 0.6052  | 0.5046  | 0.5521  | 0.7282  | 0.5751  | 0.4415  | 0.7494  | 0.5969  |
| Ba-128+E  | 1.8496  | 1.5706  | 1.7982  | 2.1084  | 1.7180  | 1.5151  | 2.4393  | 1.8003  |
| Bi-210m+E | 1.5722  | 1.5423  | 1.6590  | 1.8598  | 1.5276  | 1.3785  | 2.1156  | 0.9718  |
| Bi-212+E  | 0.2617  | 0.2384  | 0.3683  | 0.3188  | 0.2330  | 0.2061  | 0.4481  | 0.3181  |
| Bi-213+E  | 0.5479  | 0.5415  | 0.7457  | 0.6544  | 0.5434  | 0.4861  | 0.8319  | 0.3274  |
| Bi-214+E  | 2.0114  | 1.8098  | 3.0151  | 2.3704  | 2.0211  | 1.8252  | 3.7959  | 1.8345  |
| Bi-215+E  | 1.1197  | 1.0669  | 1.2728  | 1.3093  | 1.0970  | 0.9604  | 1.5558  | 0.7935  |
| Bi-216+E  | 2.5902  | 2.6105  | 3.7270  | 2.9998  | 2.6246  | 2.4193  | 4.0742  | 1.6891  |
| Cd-118+E  | 0.1019  | 0.0874  | 0.1560  | 0.1178  | 0.1011  | 0.0859  | 0.1947  | 0.1055  |
| Ce-134+E  | 1.1893  | 0.8896  | 0.8755  | 1.3442  | 1.0810  | 0.8767  | 1.4638  | 1.4211  |
| Ce-144+E  | 0.2961  | 0.2539  | 0.2911  | 0.3566  | 0.2878  | 0.2307  | 0.5177  | 0.2242  |
| Cl-34m+E  | 1.5869  | 1.2519  | 1.9899  | 1.9116  | 1.5720  | 1.3761  | 3.3498  | 1.1944  |
| Cm-245+E  | 1.5745  | 1.3985  | 1.5302  | 1.6638  | 1.4267  | 1.2341  | 2.1067  | 1.2800  |
| Cm-247+E  | 1.8019  | 1.7526  | 2.2813  | 2.1869  | 1.7424  | 1.5412  | 2.6807  | 1.0836  |
| Cm-250+E  | 22.5090 | 20.3225 | 31.1680 | 26.8468 | 22.3942 | 19.9597 | 39.1282 | 17.6089 |
| Cs-137+E  | 3.4504  | 3.4849  | 4.1284  | 3.6082  | 3.4647  | 3.4585  | 4.5823  | 3.2586  |
| Es-254+E  | 2.6028  | 2.1263  | 3.9666  | 2.9402  | 2.2551  | 2.2310  | 3.2508  | 2.7344  |
| Fe-60+E   | 3.1935  | 2.6491  | 4.9447  | 3.8268  | 3.0559  | 2.5994  | 5.9666  | 3.5907  |
| Fr-220+E  | 0.2254  | 0.1924  | 0.2276  | 0.2620  | 0.1968  | 0.1646  | 0.2863  | 0.2402  |
| Fr-221+E  | 0.2339  | 0.2122  | 0.2545  | 0.2836  | 0.2294  | 0.1998  | 0.3419  | 0.1423  |
| Ge-68+E   | 0.5052  | 0.3878  | 0.7002  | 0.7935  | 0.3024  | 0.2882  | 0.6510  | 0.9577  |
| Hf-172+E  | 2.3441  | 1.8576  | 2.0680  | 3.4956  | 1.9799  | 1.7307  | 2.7875  | 2.4637  |
| Hf-182+E  | 4.8484  | 4.2119  | 5.7315  | 6.2782  | 4.6796  | 4.1192  | 7.2351  | 3.8215  |
| Hg-193+E  | 3.0642  | 2.6139  | 3.5961  | 4.2158  | 2.8924  | 2.5146  | 4.5962  | 2.7510  |
| Hg-194+E  | 3.3952  | 3.0184  | 3.8765  | 4.6273  | 3.1704  | 2.8338  | 4.8589  | 2.8943  |
| In-114m+E | 0.7079  | 0.6158  | 0.8118  | 0.7558  | 0.6484  | 0.6005  | 0.9148  | 0.6679  |
| Ir-192m+E | 4.1560  | 4.1236  | 5.0398  | 5.0501  | 3.9952  | 3.6715  | 5.6466  | 2.7832  |
| Kr-76+E   | 2.7144  | 2.6219  | 3.1075  | 3.1539  | 2.4891  | 2.2636  | 3.5995  | 2.0755  |
| Mg-28+E   | 4.1534  | 3.4600  | 5.5349  | 4.8869  | 4.0383  | 3.5267  | 7.5729  | 3.8665  |
| Nd-140+E  | 1.1784  | 0.8715  | 0.8053  | 1.2866  | 1.0853  | 0.7780  | 1.2460  | 1.2979  |
| Ni-66+E   | 0.1457  | 0.1131  | 0.2747  | 0.1788  | 0.1459  | 0.1380  | 0.2137  | 0.1158  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3648        | 0.3211        | 0.4072        | 0.3649        | 0.2472        | 0.2623        | 0.3986        | 0.5291        |
| Np-237+E       | 2.7909        | 2.5657        | 2.8472        | 2.9891        | 2.4545        | 2.2339        | 3.3530        | 2.5378        |
| Os-194+E       | 0.5853        | 0.5308        | 0.7034        | 0.7597        | 0.4951        | 0.4460        | 0.7578        | 0.6220        |
| Pa-231+E       | 4.4782        | 4.0988        | 4.8330        | 5.0901        | 3.9789        | 3.5677        | 5.8232        | 4.0704        |
| Pb-202+E       | 2.9371        | 2.6851        | 3.5388        | 3.9317        | 2.7539        | 2.4228        | 4.1473        | 2.3833        |
| Pb-210+E       | 0.2667        | 0.2232        | 0.3002        | 0.3299        | 0.1750        | 0.1673        | 0.2988        | 0.4243        |
| Pd-103+E       | 0.7070        | 0.6392        | 0.6822        | 0.5317        | 0.5605        | 0.5944        | 0.5600        | 0.7415        |
| Pt-202+E       | 0.3881        | 0.3637        | 0.5823        | 0.4626        | 0.3862        | 0.3455        | 0.6420        | 0.2856        |
| Pu-239+E       | 0.0601        | 0.0517        | 0.0693        | 0.0662        | 0.0396        | 0.0415        | 0.0670        | 0.0925        |
| Pu-244+E       | 1.5270        | 1.4341        | 1.9711        | 1.6080        | 1.3462        | 1.3015        | 2.1313        | 1.5620        |
| Pu-246+E       | 3.6554        | 3.1840        | 4.7009        | 4.0972        | 3.4449        | 3.0487        | 5.4116        | 3.1732        |
| Ra-219+E       | 1.0646        | 1.0386        | 1.1368        | 1.2421        | 1.0380        | 0.9119        | 1.3425        | 0.6889        |
| Ra-221+E       | 0.5720        | 0.5001        | 0.6610        | 0.6226        | 0.5052        | 0.4473        | 0.8396        | 0.5346        |
| Ra-222+E       | 0.0518        | 0.0527        | 0.0597        | 0.0614        | 0.0507        | 0.0462        | 0.0677        | 0.0293        |
| Ra-223+E       | 2.1716        | 2.0133        | 2.3883        | 2.5407        | 2.0902        | 1.7839        | 3.0317        | 1.5942        |
| Ra-224+E       | 2.0194        | 2.0424        | 2.0074        | 2.0305        | 2.0016        | 1.9996        | 1.9948        | 1.8086        |
| Ra-226+E       | 5.1240        | 4.8757        | 6.2817        | 5.7687        | 5.0641        | 4.7064        | 7.4238        | 4.3371        |
| Ra-228+E       | 3.5600        | 3.3502        | 4.5106        | 3.8407        | 3.4409        | 3.2739        | 4.7001        | 3.2377        |
| Rb-81+E        | 2.0798        | 1.9461        | 2.7136        | 2.3719        | 1.9674        | 1.8121        | 3.1794        | 1.4486        |
| Rb-83+E        | 2.1832        | 2.1532        | 2.9812        | 2.3708        | 2.0411        | 1.9244        | 3.1234        | 1.9049        |
| Re-186m+E      | 1.1385        | 0.8982        | 1.2494        | 1.7831        | 0.8421        | 0.7556        | 1.4885        | 1.5904        |
| Rn-219+E       | 0.3253        | 0.3218        | 0.3780        | 0.3865        | 0.3158        | 0.2843        | 0.4680        | 0.1872        |
| Rn-220+E       | 1.9459        | 1.9722        | 1.9320        | 1.9463        | 1.9303        | 1.9358        | 1.8911        | 1.7647        |
| Rn-222+E       | 0.0015        | 0.0015        | 0.0021        | 0.0016        | 0.0015        | 0.0014        | 0.0022        | 0.0009        |
| Ru-103+E       | 1.9613        | 1.9626        | 2.7415        | 2.1430        | 1.9867        | 1.8206        | 2.8521        | 1.2513        |
| Ru-106+E       | 0.5943        | 0.5922        | 0.8843        | 0.6712        | 0.6099        | 0.5672        | 0.9431        | 0.4216        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 2.1113        | 1.9537        | 2.5007        | 2.3579        | 1.9134        | 1.7828        | 2.6762        | 1.7871        |
| Sn-121m+E      | 0.1965        | 0.1534        | 0.1775        | 0.2129        | 0.1623        | 0.1457        | 0.1999        | 0.2639        |
| Sn-126+E       | 6.0144        | 5.8626        | 8.4468        | 7.1940        | 6.0107        | 5.4327        | 10.2679       | 5.0772        |
| Sr-82+E        | 0.6255        | 0.6072        | 0.7654        | 0.5638        | 0.5075        | 0.4913        | 0.9379        | 0.7863        |
| Sr-90+E        | 0.0001        | 0.0000        | 0.0001        | 0.0000        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 1.0091        | 0.8027        | 0.9381        | 1.0328        | 0.8620        | 0.7915        | 1.0482        | 1.2895        |
| Te-129m+E      | 0.6124        | 0.5159        | 0.6415        | 0.6806        | 0.5445        | 0.4949        | 0.7697        | 0.7075        |
| Th-229+E       | 3.3154        | 2.9278        | 3.5346        | 3.6916        | 2.9550        | 2.5331        | 4.2645        | 3.1067        |
| Th-232+E       | 9.8775        | 9.3730        | 11.3387       | 10.7450       | 9.6398        | 9.1395        | 12.7681       | 8.7436        |
| Th-234+E       | 0.2530        | 0.2146        | 0.2505        | 0.3136        | 0.2215        | 0.2005        | 0.3057        | 0.2483        |
| Ti-44+E        | 3.5744        | 2.8622        | 4.1021        | 4.8923        | 3.6416        | 2.9675        | 5.2745        | 3.0063        |
| U-228+E        | 0.3459        | 0.3111        | 0.4162        | 0.3625        | 0.3120        | 0.2882        | 0.4959        | 0.2825        |
| U-230+E        | 0.3178        | 0.2901        | 0.3399        | 0.3371        | 0.2581        | 0.2471        | 0.4003        | 0.3387        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.5038        | 2.3750        | 2.5373        | 2.4380        | 2.2561        | 2.2398        | 2.5344        | 2.7509        |
| U-238+E        | 1.4219        | 1.3982        | 1.3671        | 1.4705        | 1.3784        | 1.3663        | 1.4274        | 1.3390        |
| W-178+E        | 1.6392        | 1.2713        | 1.4096        | 2.6232        | 1.4134        | 1.2396        | 1.8962        | 1.6557        |
| Xe-122+E       | 1.5993        | 1.3580        | 1.6305        | 1.7709        | 1.4722        | 1.3304        | 2.0957        | 1.6908        |
| Zr-93+E        | 0.0890        | 0.0810        | 0.0928        | 0.0632        | 0.0658        | 0.0740        | 0.0945        | 0.1049        |

Table 81: Composite 2 – 15cm Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.1829        | 0.1701        | 0.3136        | 0.4150        |
| Ac-225+E       | 1.0360        | 0.8233        | 1.2361        | 1.2300        |
| Ac-227+E       | 3.0205        | 2.6169        | 4.2055        | 4.4801        |
| Ag-108m+E      | 4.7501        | 3.8586        | 4.0425        | 3.4094        |
| Ag-110m+E      | 4.8056        | 3.5642        | 5.0996        | 3.5284        |
| Am-242m+E      | 0.4579        | 0.4734        | 0.7843        | 1.1121        |
| Am-243+E       | 2.6286        | 2.1273        | 3.4797        | 3.4002        |
| Ar-42+E        | 0.2576        | 0.2007        | 0.2368        | 0.2887        |
| At-211+E       | 0.5115        | 0.4514        | 1.1417        | 0.9825        |
| Ba-128+E       | 1.5729        | 1.3048        | 2.5070        | 2.0793        |
| Bi-210m+E      | 1.4810        | 1.3121        | 1.5413        | 1.7095        |
| Bi-212+E       | 0.2098        | 0.1775        | 0.2828        | 0.3481        |
| Bi-213+E       | 0.5239        | 0.4206        | 0.4704        | 0.3812        |
| Bi-214+E       | 1.9854        | 1.4917        | 2.2561        | 1.6075        |
| Bi-215+E       | 1.0528        | 0.8978        | 1.2702        | 1.0970        |
| Bi-216+E       | 2.5527        | 2.0581        | 1.9218        | 1.6605        |
| Cd-118+E       | 0.0992        | 0.0711        | 0.1295        | 0.0721        |
| Ce-134+E       | 0.9532        | 0.8017        | 2.0331        | 1.6971        |
| Ce-144+E       | 0.2749        | 0.1922        | 0.3202        | 0.2804        |
| Cl-34m+E       | 1.5227        | 0.9175        | 2.4206        | 1.2321        |
| Cm-245+E       | 1.2788        | 0.9258        | 1.2411        | 1.3708        |
| Cm-247+E       | 1.6569        | 1.3596        | 1.6617        | 1.3544        |
| Cm-250+E       | 21.8455       | 16.2328       | 24.4718       | 17.1111       |
| Cs-137+E       | 3.3717        | 3.1460        | 3.1914        | 3.0054        |
| Es-254+E       | 1.9473        | 1.6439        | 3.5747        | 3.0013        |
| Fe-60+E        | 2.9450        | 2.1970        | 4.1162        | 2.8916        |
| Fr-220+E       | 0.1651        | 0.1490        | 0.3429        | 0.3703        |
| Fr-221+E       | 0.2143        | 0.1415        | 0.2961        | 0.2464        |
| Ge-68+E        | 0.1821        | 0.2742        | 0.6506        | 1.3180        |
| Hf-172+E       | 1.7183        | 1.6761        | 2.3983        | 3.5458        |
| Hf-182+E       | 4.4700        | 3.5361        | 5.7248        | 5.1323        |
| Hg-193+E       | 2.6804        | 2.1583        | 4.2090        | 3.8229        |
| Hg-194+E       | 2.9558        | 2.5707        | 3.9585        | 3.7661        |
| In-114m+E      | 0.5678        | 0.4056        | 0.7227        | 0.6203        |
| Ir-192m+E      | 3.8014        | 3.3310        | 3.4292        | 3.1269        |
| Kr-76+E        | 2.2832        | 2.0555        | 2.4347        | 2.9214        |
| Mg-28+E        | 3.9150        | 2.8178        | 5.6812        | 3.9396        |
| Nd-140+E       | 0.9520        | 0.8275        | 1.7163        | 1.7902        |
| Ni-66+E        | 0.1429        | 0.0982        | 0.2358        | 0.1033        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.1543        | 0.2058        | 0.4259        | 0.7056        |
| Np-237+E       | 2.1319        | 1.9168        | 2.8269        | 3.0623        |
| Os-194+E       | 0.4294        | 0.4242        | 0.5786        | 0.8034        |
| Pa-231+E       | 3.4952        | 3.1447        | 5.1728        | 5.9152        |
| Pb-202+E       | 2.5423        | 2.1992        | 3.3098        | 3.3708        |
| Pb-210+E       | 0.1094        | 0.1543        | 0.3221        | 0.6301        |
| Pd-103+E       | 0.4262        | 0.4432        | 0.5993        | 0.5980        |
| Pt-202+E       | 0.3765        | 0.2855        | 0.3880        | 0.2573        |
| Pu-239+E       | 0.0242        | 0.0337        | 0.0707        | 0.1237        |
| Pu-244+E       | 1.1659        | 1.0603        | 1.4498        | 1.7480        |
| Pu-246+E       | 3.1973        | 2.3495        | 4.0479        | 3.3274        |
| Ra-219+E       | 0.9862        | 0.8614        | 1.0741        | 0.7767        |
| Ra-221+E       | 0.4222        | 0.3219        | 0.7474        | 0.7754        |
| Ra-222+E       | 0.0488        | 0.0431        | 0.0415        | 0.0272        |
| Ra-223+E       | 1.9535        | 1.6088        | 2.6019        | 2.3363        |
| Ra-224+E       | 1.9443        | 1.9162        | 1.9573        | 1.9403        |
| Ra-226+E       | 4.9163        | 4.2703        | 5.4779        | 4.6529        |
| Ra-228+E       | 3.2793        | 2.8312        | 3.8566        | 3.3075        |
| Rb-81+E        | 1.7548        | 1.1623        | 2.2837        | 1.9060        |
| Rb-83+E        | 1.8528        | 1.6030        | 1.8596        | 2.3086        |
| Re-186m+E      | 0.6496        | 0.7055        | 1.2987        | 2.3107        |
| Rn-219+E       | 0.3061        | 0.2621        | 0.3003        | 0.3218        |
| Rn-220+E       | 1.8754        | 1.8606        | 1.8778        | 1.8409        |
| Rn-222+E       | 0.0015        | 0.0012        | 0.0011        | 0.0009        |
| Ru-103+E       | 1.9224        | 1.5223        | 1.4112        | 1.2579        |
| Ru-106+E       | 0.5959        | 0.4744        | 0.4566        | 0.3816        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 1.7293        | 1.4828        | 1.7165        | 1.7042        |
| Sn-121m+E      | 0.1328        | 0.1226        | 0.2358        | 0.2745        |
| Sn-126+E       | 5.8148        | 4.6393        | 5.4323        | 4.4113        |
| Sr-82+E        | 0.3955        | 0.3747        | 0.7483        | 0.9850        |
| Sr-90+E        | 0.0000        | 0.0000        | 0.0001        | 0.0001        |
| Te-118+E       | 0.7268        | 0.6348        | 1.1507        | 1.1757        |
| Te-129m+E      | 0.4796        | 0.4084        | 0.7263        | 0.7042        |
| Th-229+E       | 2.5512        | 2.1559        | 3.8289        | 4.3836        |
| Th-232+E       | 9.2602        | 8.2714        | 10.5551       | 9.7323        |
| Th-234+E       | 0.1904        | 0.1680        | 0.2974        | 0.3340        |
| Ti-44+E        | 3.5132        | 2.7633        | 6.2512        | 3.9737        |
| U-228+E        | 0.2636        | 0.1882        | 0.4134        | 0.3860        |
| U-230+E        | 0.2070        | 0.2010        | 0.3353        | 0.4480        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 2.0138        | 2.0542        | 2.6561        | 3.0334        |
| U-238+E        | 1.3199        | 1.3221        | 1.4485        | 1.4326        |
| W-178+E        | 1.2422        | 1.2138        | 1.7791        | 2.5193        |
| Xe-122+E       | 1.3264        | 1.0935        | 1.9976        | 1.6695        |
| Zr-93+E        | 0.0437        | 0.0523        | 0.0979        | 0.1172        |

Table 82: Composite 2 –Infinite Contamination Thickness for 10x10x10 ft and 50x50x10 ft rooms

| Element   | avg10   | ctr10   | mid10   | cnr10   | avg50   | ctr50   | mid50   | cnr50   |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ac-223+E  | 0.1896  | 0.1679  | 0.2310  | 0.2075  | 0.9045  | 0.7922  | 0.9123  | 1.1901  |
| Ac-225+E  | 0.9998  | 0.8375  | 1.1624  | 1.0277  | 2.3594  | 2.1174  | 2.3132  | 2.8208  |
| Ac-227+E  | 3.0252  | 2.4612  | 4.0726  | 2.8825  | 8.2652  | 7.4160  | 8.3062  | 10.1329 |
| Ag-108m+E | 4.5740  | 3.5882  | 3.7718  | 4.1262  | 7.0553  | 6.6526  | 6.9459  | 6.7785  |
| Ag-110m+E | 5.0042  | 3.5674  | 3.7833  | 4.9049  | 4.5387  | 4.1897  | 4.4314  | 3.7995  |
| Am-242m+E | 0.5097  | 0.4915  | 0.4577  | 0.5890  | 4.2648  | 3.8375  | 4.2496  | 5.1263  |
| Am-243+E  | 2.5539  | 2.2551  | 3.4078  | 2.2774  | 7.4531  | 6.8070  | 7.4672  | 8.8350  |
| Ar-42+E   | 0.3078  | 0.2026  | 0.2847  | 0.3953  | 0.2854  | 0.2506  | 0.2757  | 0.2413  |
| At-211+E  | 0.5015  | 0.4936  | 1.2168  | 0.4580  | 1.5181  | 1.3507  | 1.5384  | 2.0016  |
| Ba-128+E  | 1.4241  | 1.3041  | 1.7303  | 1.1882  | 6.3790  | 6.1665  | 6.4272  | 6.5047  |
| Bi-210m+E | 1.4341  | 0.9980  | 1.7905  | 1.2019  | 1.6446  | 1.5377  | 1.7271  | 1.7257  |
| Bi-212+E  | 0.2218  | 0.1694  | 0.1789  | 0.2320  | 0.6179  | 0.5449  | 0.6246  | 0.7739  |
| Bi-213+E  | 0.4686  | 0.3836  | 0.5286  | 0.4783  | 0.5199  | 0.4843  | 0.4859  | 0.5301  |
| Bi-214+E  | 2.0872  | 1.4825  | 1.8316  | 2.2458  | 1.9450  | 1.7532  | 1.8960  | 1.6533  |
| Bi-215+E  | 1.0096  | 0.7496  | 1.4092  | 0.9639  | 1.3527  | 1.2443  | 1.4047  | 1.4773  |
| Bi-216+E  | 2.2694  | 1.8508  | 2.1574  | 2.3579  | 2.1955  | 2.0269  | 2.0172  | 1.9807  |
| Cd-118+E  | 0.0953  | 0.0664  | 0.1015  | 0.1187  | 0.0872  | 0.0774  | 0.0825  | 0.0745  |
| Ce-134+E  | 0.8477  | 0.8881  | 1.0841  | 0.5877  | 6.1356  | 5.9516  | 6.2136  | 6.3555  |
| Ce-144+E  | 0.2258  | 0.1813  | 0.2223  | 0.1593  | 0.6756  | 0.6529  | 0.6785  | 0.7130  |
| Cl-34m+E  | 1.5638  | 1.0459  | 1.6221  | 1.6262  | 1.4341  | 1.3105  | 1.4247  | 1.2971  |
| Cm-245+E  | 1.2746  | 1.1166  | 1.0242  | 1.2918  | 4.5733  | 4.1497  | 4.5390  | 5.4105  |
| Cm-247+E  | 1.5766  | 1.2691  | 1.8372  | 1.4090  | 2.3511  | 2.2110  | 2.2928  | 2.5669  |
| Cm-250+E  | 21.8199 | 15.8336 | 21.1725 | 22.4649 | 22.7672 | 21.1035 | 22.3067 | 20.6406 |
| Cs-137+E  | 2.1902  | 1.8561  | 1.7261  | 1.9556  | 2.7943  | 2.6853  | 2.7841  | 2.6432  |
| Es-254+E  | 2.0832  | 1.5797  | 1.9555  | 2.4380  | 8.2926  | 7.4792  | 8.2914  | 9.5546  |
| Fe-60+E   | 2.9472  | 1.9951  | 3.0804  | 3.7113  | 3.4709  | 3.0198  | 3.4292  | 3.6244  |
| Fr-220+E  | 0.1697  | 0.1595  | 0.3096  | 0.1795  | 0.7597  | 0.6700  | 0.7631  | 0.9943  |
| Fr-221+E  | 0.2119  | 0.1724  | 0.2690  | 0.1710  | 0.3191  | 0.2949  | 0.3219  | 0.3699  |
| Ge-68+E   | 0.1726  | 0.1410  | 0.0784  | 0.1520  | 1.7578  | 1.4559  | 1.9100  | 2.8526  |
| Hf-172+E  | 1.5112  | 1.2902  | 1.1869  | 0.9424  | 4.8387  | 4.3303  | 5.0597  | 6.6067  |
| Hf-182+E  | 4.2965  | 3.1324  | 4.7243  | 3.9597  | 5.1656  | 4.7363  | 5.2605  | 5.7135  |
| Hg-193+E  | 2.6099  | 2.0985  | 3.3672  | 2.3865  | 4.6408  | 4.1578  | 4.7330  | 5.7795  |
| Hg-194+E  | 2.8393  | 2.1435  | 3.4206  | 2.8628  | 4.8834  | 4.3503  | 5.1136  | 5.9781  |
| In-114m+E | 0.5226  | 0.4496  | 0.5857  | 0.4413  | 2.2174  | 2.1249  | 2.2495  | 2.3523  |
| Ir-192m+E | 3.4241  | 2.4868  | 3.8247  | 3.6108  | 4.5101  | 4.1005  | 4.7969  | 4.9963  |
| Kr-76+E   | 2.2175  | 1.6690  | 2.4009  | 2.3921  | 5.8193  | 5.2270  | 5.8751  | 6.9768  |
| Mg-28+E   | 4.2119  | 3.0412  | 4.1449  | 4.7839  | 7.0029  | 6.5640  | 6.9293  | 6.4398  |
| Nd-140+E  | 0.7941  | 0.8393  | 0.9985  | 0.4909  | 6.4923  | 6.3181  | 6.5576  | 6.8663  |
| Ni-66+E   | 0.1487  | 0.0966  | 0.1430  | 0.1819  | 0.1309  | 0.1201  | 0.1275  | 0.0997  |

| Element   | avg10  | ctr10  | mid10  | cnr10  | avg50   | ctr50   | mid50   | cnr50   |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Np-235+E  | 0.2060 | 0.2096 | 0.2060 | 0.2998 | 2.4064  | 2.1200  | 2.3865  | 3.0335  |
| Np-237+E  | 2.1836 | 1.8722 | 2.5880 | 2.4268 | 9.4326  | 8.5090  | 9.4538  | 11.2027 |
| Os-194+E  | 0.4019 | 0.2986 | 0.4080 | 0.4073 | 1.3431  | 1.1845  | 1.4234  | 1.8055  |
| Pa-231+E  | 3.5659 | 2.9578 | 4.6912 | 3.5597 | 12.6422 | 11.3027 | 12.6746 | 15.5927 |
| Pb-202+E  | 2.2904 | 1.9760 | 3.0800 | 2.1599 | 4.3906  | 3.9214  | 4.3914  | 5.6249  |
| Pb-210+E  | 0.1355 | 0.1321 | 0.1275 | 0.2085 | 1.5041  | 1.2998  | 1.5167  | 2.0581  |
| Pd-103+E  | 0.3977 | 0.3874 | 0.3808 | 0.3832 | 3.7791  | 3.5793  | 3.8550  | 4.0356  |
| Pt-202+E  | 0.3516 | 0.2642 | 0.3475 | 0.3895 | 0.3270  | 0.3022  | 0.3049  | 0.2922  |
| Pu-239+E  | 0.0306 | 0.0307 | 0.0278 | 0.0410 | 0.3642  | 0.3194  | 0.3654  | 0.4722  |
| Pu-244+E  | 1.2039 | 1.0229 | 1.0883 | 1.3497 | 5.1127  | 4.5775  | 5.0373  | 5.9775  |
| Pu-246+E  | 3.1979 | 2.4805 | 2.8524 | 3.2201 | 8.1062  | 7.4726  | 8.0421  | 8.8728  |
| Ra-219+E  | 0.9138 | 0.6813 | 1.3228 | 0.9668 | 1.3647  | 1.2534  | 1.4702  | 1.5175  |
| Ra-221+E  | 0.4314 | 0.3669 | 0.5735 | 0.4690 | 1.7578  | 1.5553  | 1.7575  | 2.2589  |
| Ra-222+E  | 0.0445 | 0.0304 | 0.0539 | 0.0478 | 0.0482  | 0.0451  | 0.0538  | 0.0474  |
| Ra-223+E  | 1.8874 | 1.5217 | 2.7586 | 1.7279 | 3.4379  | 3.1331  | 3.4916  | 4.1259  |
| Ra-224+E  | 0.8599 | 0.8349 | 0.8596 | 0.8422 | 1.2271  | 1.2221  | 1.1904  | 1.2893  |
| Ra-226+E  | 4.2373 | 3.3090 | 4.4585 | 4.3357 | 5.1324  | 4.7696  | 5.1812  | 5.1545  |
| Ra-228+E  | 2.7703 | 2.2484 | 2.6298 | 2.9882 | 5.1798  | 4.7732  | 5.1208  | 5.5452  |
| Rb-81+E   | 1.7457 | 1.4623 | 1.8085 | 2.0443 | 4.7077  | 4.1982  | 4.5903  | 5.6327  |
| Rb-83+E   | 1.7287 | 1.5179 | 1.7752 | 2.3558 | 5.4736  | 4.7899  | 5.2443  | 6.5328  |
| Re-186m+E | 0.5715 | 0.4868 | 0.3902 | 0.4134 | 3.2196  | 2.7621  | 3.4213  | 4.8523  |
| Rn-219+E  | 0.2969 | 0.2144 | 0.3461 | 0.2474 | 0.3343  | 0.3154  | 0.3345  | 0.3485  |
| Rn-220+E  | 0.7896 | 0.7843 | 0.7768 | 0.7923 | 1.1383  | 1.1389  | 1.1022  | 1.1940  |
| Rn-222+E  | 0.0012 | 0.0010 | 0.0013 | 0.0015 | 0.0011  | 0.0010  | 0.0010  | 0.0010  |
| Ru-103+E  | 1.5771 | 1.3598 | 1.6277 | 1.8936 | 1.8665  | 1.7117  | 1.6902  | 1.6912  |
| Ru-106+E  | 0.5295 | 0.4287 | 0.4811 | 0.5766 | 0.4867  | 0.4441  | 0.4453  | 0.4036  |
| Si-32+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Sn-113+E  | 1.5912 | 1.3084 | 1.7524 | 1.3494 | 5.9958  | 5.7756  | 6.0216  | 6.2714  |
| Sn-121m+E | 0.1157 | 0.1151 | 0.1613 | 0.0821 | 1.0143  | 0.9701  | 1.0330  | 1.1108  |
| Sn-126+E  | 5.7116 | 4.4562 | 5.0728 | 4.8880 | 7.1986  | 6.8075  | 7.1162  | 6.9650  |
| Sr-82+E   | 0.5385 | 0.4873 | 0.5653 | 0.8956 | 3.8506  | 3.3776  | 3.7042  | 4.6801  |
| Sr-90+E   | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0004  | 0.0004  | 0.0004  | 0.0005  |
| Te-118+E  | 0.6419 | 0.6157 | 0.9214 | 0.4977 | 5.0217  | 4.8416  | 5.0849  | 5.2786  |
| Te-129m+E | 0.4322 | 0.3977 | 0.5187 | 0.3588 | 2.3529  | 2.2527  | 2.3813  | 2.4976  |
| Th-229+E  | 2.5662 | 2.3303 | 3.2747 | 2.6819 | 11.3139 | 10.2038 | 11.2219 | 13.8158 |
| Th-232+E  | 9.1069 | 7.9475 | 9.6449 | 9.0411 | 14.7347 | 13.9070 | 14.7715 | 15.7579 |
| Th-234+E  | 0.2007 | 0.1831 | 0.2274 | 0.2128 | 0.8693  | 0.7762  | 0.8600  | 1.0624  |
| Ti-44+E   | 3.2834 | 2.7262 | 5.9302 | 3.0333 | 3.3669  | 3.1324  | 3.3985  | 3.6385  |
| U-228+E   | 0.2755 | 0.2336 | 0.3092 | 0.2917 | 1.0464  | 0.9380  | 1.0352  | 1.2690  |
| U-230+E   | 0.2284 | 0.2031 | 0.2458 | 0.2720 | 1.4194  | 1.2563  | 1.4031  | 1.7505  |

| <b>Element</b> | <b>avg10</b> | <b>ctr10</b> | <b>mid10</b> | <b>cnr10</b> | <b>avg50</b> | <b>ctr50</b> | <b>mid50</b> | <b>cnr50</b> |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| U-235+E        | 2.3018       | 2.3237       | 2.4859       | 2.4789       | 8.0486       | 7.4359       | 7.8786       | 9.2506       |
| U-238+E        | 0.9241       | 0.8993       | 0.9483       | 0.9141       | 1.9414       | 1.8757       | 1.9071       | 2.1805       |
| W-178+E        | 1.1325       | 0.9711       | 0.8846       | 0.7574       | 2.7948       | 2.4640       | 2.9326       | 3.9641       |
| Xe-122+E       | 1.2026       | 1.0967       | 1.4421       | 1.0107       | 5.7959       | 5.5900       | 5.8570       | 5.9405       |
| Zr-93+E        | 0.0595       | 0.0623       | 0.0567       | 0.0632       | 0.6574       | 0.5924       | 0.6383       | 0.7514       |

Table 83: Composite 2 – Infinite Contamination for 100x100x10 ft and 200x200x20 ft rooms

| Element   | avg100 | ctr100 | mid100 | cnr100 | avg200  | ctr200  | mid200  | cnr200  |
|-----------|--------|--------|--------|--------|---------|---------|---------|---------|
| Ac-223+E  | 0.1405 | 0.1267 | 0.1374 | 0.1471 | 0.3238  | 0.3395  | 0.3235  | 0.4296  |
| Ac-225+E  | 0.3761 | 0.3486 | 0.3624 | 0.3651 | 1.3069  | 1.2774  | 1.3479  | 1.5932  |
| Ac-227+E  | 1.3148 | 1.2104 | 1.2708 | 1.3144 | 4.2778  | 4.2511  | 4.1938  | 5.1098  |
| Ag-108m+E | 1.1913 | 1.0741 | 1.0004 | 0.9536 | 6.8306  | 6.5592  | 5.8238  | 7.5267  |
| Ag-110m+E | 0.8311 | 0.6648 | 0.6482 | 0.6024 | 5.0875  | 4.0677  | 3.9771  | 5.4144  |
| Am-242m+E | 0.6560 | 0.6176 | 0.6377 | 0.6578 | 2.2049  | 2.4385  | 2.3022  | 2.9714  |
| Am-243+E  | 1.1901 | 1.1046 | 1.1475 | 1.1850 | 4.6839  | 4.7834  | 4.6476  | 5.9762  |
| Ar-42+E   | 0.0517 | 0.0439 | 0.0402 | 0.0439 | 0.3225  | 0.2712  | 0.4010  | 0.2912  |
| At-211+E  | 0.2416 | 0.2201 | 0.2343 | 0.2272 | 0.6184  | 0.6268  | 0.6630  | 0.6672  |
| Ba-128+E  | 1.0437 | 1.0149 | 1.1137 | 1.0547 | 5.7625  | 5.7451  | 6.1550  | 5.7854  |
| Bi-210m+E | 0.2834 | 0.2589 | 0.2529 | 0.2889 | 1.4852  | 1.3563  | 1.2430  | 1.3413  |
| Bi-212+E  | 0.0998 | 0.0867 | 0.0917 | 0.0968 | 0.2852  | 0.2634  | 0.2393  | 0.3172  |
| Bi-213+E  | 0.0883 | 0.0809 | 0.0809 | 0.0788 | 0.4849  | 0.4376  | 0.4771  | 0.5380  |
| Bi-214+E  | 0.3476 | 0.2865 | 0.2783 | 0.2692 | 2.1325  | 1.7285  | 1.9154  | 2.1000  |
| Bi-215+E  | 0.2299 | 0.2058 | 0.2051 | 0.2157 | 1.0776  | 0.9629  | 0.9180  | 1.0283  |
| Bi-216+E  | 0.3763 | 0.3273 | 0.3081 | 0.2909 | 2.3267  | 2.0541  | 2.0854  | 2.5795  |
| Cd-118+E  | 0.0157 | 0.0129 | 0.0134 | 0.0113 | 0.0974  | 0.0666  | 0.0938  | 0.0789  |
| Ce-134+E  | 1.0024 | 0.9757 | 1.0935 | 1.0374 | 5.4557  | 5.4698  | 5.8521  | 5.4848  |
| Ce-144+E  | 0.1124 | 0.1078 | 0.1172 | 0.1150 | 0.6287  | 0.6139  | 0.6483  | 0.6728  |
| Cl-34m+E  | 0.2558 | 0.2278 | 0.2368 | 0.2359 | 1.5806  | 1.3540  | 1.6050  | 1.5753  |
| Cm-245+E  | 0.7189 | 0.6720 | 0.6934 | 0.7153 | 2.6536  | 2.7642  | 2.5112  | 3.8245  |
| Cm-247+E  | 0.3951 | 0.3691 | 0.3821 | 0.3896 | 2.0110  | 1.9271  | 2.0050  | 2.3651  |
| Cm-250+E  | 4.0110 | 3.5296 | 3.4711 | 3.4964 | 24.1657 | 20.6369 | 22.8882 | 24.7711 |
| Cs-137+E  | 1.5938 | 1.5469 | 1.4753 | 1.4920 | 3.0463  | 2.8335  | 2.5748  | 3.1595  |
| Es-254+E  | 1.3178 | 1.2060 | 1.2553 | 1.3415 | 5.0841  | 5.0461  | 5.3003  | 6.0454  |
| Fe-60+E   | 0.6115 | 0.4968 | 0.5351 | 0.5390 | 3.0157  | 2.1004  | 3.0434  | 2.3432  |
| Fr-220+E  | 0.1181 | 0.1092 | 0.1152 | 0.1150 | 0.2627  | 0.2743  | 0.2705  | 0.3233  |
| Fr-221+E  | 0.0534 | 0.0505 | 0.0525 | 0.0542 | 0.2334  | 0.2280  | 0.2480  | 0.2406  |
| Ge-68+E   | 0.2789 | 0.2109 | 0.2736 | 0.3752 | 0.1807  | 0.2366  | 0.0840  | 0.1448  |
| Hf-172+E  | 0.7792 | 0.6707 | 0.7475 | 0.8966 | 2.3655  | 2.3927  | 2.2685  | 2.2848  |
| Hf-182+E  | 0.8956 | 0.7859 | 0.8185 | 0.9038 | 4.4563  | 3.7737  | 4.1741  | 3.9747  |
| Hg-193+E  | 0.7723 | 0.6757 | 0.7239 | 0.7747 | 2.7440  | 2.4839  | 2.6823  | 2.6050  |
| Hg-194+E  | 0.8128 | 0.7000 | 0.7351 | 0.8284 | 2.9799  | 2.6488  | 2.5986  | 2.7454  |
| In-114m+E | 0.3567 | 0.3482 | 0.3351 | 0.3336 | 1.8961  | 1.9520  | 2.0264  | 1.9624  |
| Ir-192m+E | 0.7652 | 0.6573 | 0.6520 | 0.7528 | 3.5508  | 3.1389  | 2.6028  | 3.4104  |
| Kr-76+E   | 0.9204 | 0.8748 | 0.8512 | 0.8535 | 2.7196  | 2.5716  | 2.2315  | 2.7926  |
| Mg-28+E   | 1.1958 | 1.1040 | 1.1704 | 1.1093 | 7.1383  | 6.4570  | 7.6913  | 6.9028  |
| Nd-140+E  | 1.0596 | 1.0337 | 1.1220 | 1.1092 | 5.7814  | 5.7552  | 6.1837  | 5.9209  |
| Ni-66+E   | 0.0242 | 0.0210 | 0.0199 | 0.0210 | 0.1460  | 0.0982  | 0.1384  | 0.1228  |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.3647        | 0.3408        | 0.3607        | 0.3686        | 0.9063        | 1.0084        | 0.9971        | 1.2999        |
| Np-237+E       | 1.4729        | 1.3787        | 1.4310        | 1.4513        | 5.0444        | 5.1878        | 4.9750        | 6.5532        |
| Os-194+E       | 0.2171        | 0.1850        | 0.2039        | 0.2445        | 0.5828        | 0.5595        | 0.4605        | 0.5654        |
| Pa-231+E       | 1.9853        | 1.8360        | 1.9350        | 1.9937        | 6.1017        | 6.1879        | 6.1634        | 7.5165        |
| Pb-202+E       | 0.7177        | 0.6317        | 0.6794        | 0.7326        | 2.3931        | 2.2627        | 2.3763        | 2.4772        |
| Pb-210+E       | 0.2277        | 0.2108        | 0.2208        | 0.2291        | 0.2782        | 0.3144        | 0.2514        | 0.3482        |
| Pd-103+E       | 0.5921        | 0.5980        | 0.5251        | 0.5180        | 2.8441        | 3.2996        | 2.6593        | 3.0126        |
| Pt-202+E       | 0.0578        | 0.0507        | 0.0503        | 0.0480        | 0.3557        | 0.2868        | 0.3406        | 0.3573        |
| Pu-239+E       | 0.0556        | 0.0507        | 0.0549        | 0.0587        | 0.1324        | 0.1489        | 0.1431        | 0.1862        |
| Pu-244+E       | 0.7962        | 0.7361        | 0.7561        | 0.7637        | 2.7992        | 2.8955        | 2.8399        | 3.6227        |
| Pu-246+E       | 1.3186        | 1.2228        | 1.2482        | 1.2746        | 5.9742        | 5.7370        | 5.8538        | 7.0500        |
| Ra-219+E       | 0.2297        | 0.2033        | 0.2005        | 0.2161        | 1.0349        | 0.9327        | 0.7691        | 1.0498        |
| Ra-221+E       | 0.2737        | 0.2543        | 0.2688        | 0.2686        | 0.6705        | 0.7056        | 0.6854        | 0.8692        |
| Ra-222+E       | 0.0084        | 0.0073        | 0.0069        | 0.0079        | 0.0475        | 0.0410        | 0.0315        | 0.0453        |
| Ra-223+E       | 0.5667        | 0.5148        | 0.5370        | 0.5547        | 2.1828        | 2.0869        | 2.0311        | 2.4097        |
| Ra-224+E       | 1.2449        | 1.2338        | 1.1852        | 1.2134        | 1.3532        | 1.3362        | 1.3155        | 1.3460        |
| Ra-226+E       | 1.9818        | 1.8749        | 1.8384        | 1.8765        | 4.8877        | 4.3215        | 4.3448        | 4.7342        |
| Ra-228+E       | 1.8866        | 1.8185        | 1.7991        | 1.8176        | 3.9900        | 3.6861        | 3.8177        | 4.5031        |
| Rb-81+E        | 0.7321        | 0.7231        | 0.6949        | 0.6165        | 1.8749        | 1.8370        | 1.8477        | 2.0820        |
| Rb-83+E        | 0.8339        | 0.8009        | 0.7524        | 0.6643        | 1.8971        | 1.8030        | 1.6556        | 2.2242        |
| Re-186m+E      | 0.5125        | 0.4172        | 0.5016        | 0.6395        | 0.8218        | 0.8855        | 0.6933        | 0.8096        |
| Rn-219+E       | 0.0575        | 0.0540        | 0.0539        | 0.0586        | 0.3083        | 0.2847        | 0.2851        | 0.3071        |
| Rn-220+E       | 1.2299        | 1.2194        | 1.1707        | 1.1974        | 1.2774        | 1.2631        | 1.2387        | 1.2727        |
| Rn-222+E       | 0.0002        | 0.0002        | 0.0001        | 0.0001        | 0.0012        | 0.0011        | 0.0012        | 0.0013        |
| Ru-103+E       | 0.3072        | 0.2770        | 0.2495        | 0.2321        | 1.8837        | 1.7424        | 1.8011        | 2.0449        |
| Ru-106+E       | 0.0838        | 0.0703        | 0.0633        | 0.0583        | 0.5443        | 0.4672        | 0.4696        | 0.5866        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 0.9665        | 0.9511        | 0.9129        | 0.9140        | 5.2631        | 5.3549        | 5.5912        | 5.5439        |
| Sn-121m+E      | 0.1620        | 0.1569        | 0.1617        | 0.1626        | 0.8156        | 0.8350        | 0.8948        | 0.8337        |
| Sn-126+E       | 1.2518        | 1.0850        | 1.0782        | 1.0410        | 7.3249        | 6.6369        | 6.2254        | 8.1269        |
| Sr-82+E        | 0.5724        | 0.5742        | 0.5454        | 0.4511        | 0.9207        | 0.9446        | 0.8672        | 1.3422        |
| Sr-90+E        | 0.0001        | 0.0001        | 0.0001        | 0.0001        | 0.0003        | 0.0003        | 0.0003        | 0.0004        |
| Te-118+E       | 0.8009        | 0.7882        | 0.7881        | 0.7692        | 4.2993        | 4.3836        | 4.7560        | 4.3924        |
| Te-129m+E      | 0.3794        | 0.3656        | 0.3819        | 0.3735        | 1.9822        | 1.9999        | 2.1314        | 2.0258        |
| Th-229+E       | 1.7716        | 1.6593        | 1.7440        | 1.7688        | 5.7636        | 5.8577        | 6.0630        | 7.3283        |
| Th-232+E       | 8.1133        | 7.8451        | 7.8870        | 7.7989        | 12.8321       | 12.2074       | 12.2352       | 13.2715       |
| Th-234+E       | 0.1349        | 0.1257        | 0.1307        | 0.1324        | 0.4105        | 0.4212        | 0.4223        | 0.5594        |
| Ti-44+E        | 0.6057        | 0.5211        | 0.5553        | 0.5221        | 3.4064        | 2.7727        | 3.6924        | 2.7385        |
| U-228+E        | 0.1637        | 0.1527        | 0.1628        | 0.1641        | 0.5379        | 0.5622        | 0.5862        | 0.7185        |
| U-230+E        | 0.2171        | 0.2023        | 0.2153        | 0.2188        | 0.6098        | 0.6449        | 0.6564        | 0.8816        |

| <b>Element</b> | <b>avg100</b> | <b>ctr100</b> | <b>mid100</b> | <b>cnr100</b> | <b>avg200</b> | <b>ctr200</b> | <b>mid200</b> | <b>cnr200</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| U-235+E        | 3.5658        | 3.5110        | 3.4003        | 3.5110        | 5.2702        | 5.4042        | 5.3820        | 5.8669        |
| U-238+E        | 1.2535        | 1.2522        | 1.1456        | 1.2381        | 1.5917        | 1.6079        | 1.6102        | 1.6360        |
| W-178+E        | 0.4541        | 0.3781        | 0.4322        | 0.5369        | 1.2097        | 1.1548        | 1.1001        | 1.0864        |
| Xe-122+E       | 0.9412        | 0.9132        | 0.9654        | 0.9181        | 5.1692        | 5.1827        | 5.5148        | 5.2484        |
| Zr-93+E        | 0.1006        | 0.0922        | 0.1045        | 0.1094        | 0.4256        | 0.4591        | 0.5152        | 0.6484        |

Table 84: Composite 2 – Infinite Contamination Thickness 400x400x40 ft room

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Ac-223+E       | 0.3968        | 0.3843        | 0.9094        | 0.8011        |
| Ac-225+E       | 1.4150        | 1.2475        | 2.1334        | 2.1822        |
| Ac-227+E       | 4.6933        | 4.4123        | 7.8381        | 7.0785        |
| Ag-108m+E      | 6.0615        | 4.6491        | 5.2350        | 6.5668        |
| Ag-110m+E      | 4.9593        | 3.2875        | 3.9261        | 2.5114        |
| Am-242m+E      | 1.9402        | 2.0539        | 4.1456        | 3.8297        |
| Am-243+E       | 4.4842        | 4.3196        | 7.1596        | 6.5642        |
| Ar-42+E        | 0.3148        | 0.2307        | 0.4076        | 0.1686        |
| At-211+E       | 0.7983        | 0.6964        | 1.5440        | 1.3043        |
| Ba-128+E       | 5.2827        | 5.1492        | 6.6436        | 6.4646        |
| Bi-210m+E      | 1.5403        | 1.3104        | 1.2292        | 1.4176        |
| Bi-212+E       | 0.3555        | 0.2970        | 0.6453        | 0.5229        |
| Bi-213+E       | 0.4821        | 0.3425        | 0.3452        | 0.5574        |
| Bi-214+E       | 2.0704        | 1.3113        | 1.7046        | 1.3193        |
| Bi-215+E       | 1.1393        | 0.9567        | 1.1596        | 1.0871        |
| Bi-216+E       | 2.2067        | 1.2805        | 1.0659        | 2.3294        |
| Cd-118+E       | 0.0965        | 0.0638        | 0.0767        | 0.0542        |
| Ce-134+E       | 5.0841        | 5.0643        | 6.9100        | 6.0334        |
| Ce-144+E       | 0.6048        | 0.5759        | 0.7317        | 0.6104        |
| Cl-34m+E       | 1.5664        | 1.1397        | 1.1897        | 1.0119        |
| Cm-245+E       | 2.4966        | 2.5512        | 4.3683        | 4.0693        |
| Cm-247+E       | 1.9237        | 1.6772        | 1.9776        | 2.2111        |
| Cm-250+E       | 23.4325       | 17.2795       | 20.0718       | 18.0516       |
| Cs-137+E       | 2.9398        | 2.3480        | 2.5126        | 2.1624        |
| Es-254+E       | 4.5600        | 4.1944        | 8.5246        | 7.0421        |
| Fe-60+E        | 3.1684        | 2.1856        | 3.7522        | 2.2283        |
| Fr-220+E       | 0.3484        | 0.3341        | 0.7773        | 0.6694        |
| Fr-221+E       | 0.2494        | 0.2271        | 0.2601        | 0.3051        |
| Ge-68+E        | 0.5097        | 0.3746        | 2.0036        | 1.6240        |
| Hf-172+E       | 2.6763        | 2.3482        | 5.3296        | 4.4839        |
| Hf-182+E       | 4.6683        | 3.6682        | 4.7819        | 4.2397        |
| Hg-193+E       | 3.1973        | 2.5440        | 4.6866        | 4.0382        |
| Hg-194+E       | 3.4146        | 2.7939        | 4.9398        | 4.1516        |
| In-114m+E      | 1.6180        | 1.6490        | 2.1648        | 2.3367        |
| Ir-192m+E      | 3.7408        | 3.0795        | 3.6428        | 3.9062        |
| Kr-76+E        | 3.4862        | 3.2577        | 5.6374        | 5.4833        |
| Mg-28+E        | 6.7068        | 5.6527        | 7.5625        | 6.0996        |
| Nd-140+E       | 5.4768        | 5.4957        | 7.7481        | 6.3178        |
| Ni-66+E        | 0.1476        | 0.0910        | 0.1635        | 0.0828        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| Np-235+E       | 0.9323        | 1.0063        | 2.4128        | 2.0865        |
| Np-237+E       | 4.9623        | 5.1032        | 9.2371        | 8.1691        |
| Os-194+E       | 0.7423        | 0.6631        | 1.4470        | 1.1961        |
| Pa-231+E       | 6.6233        | 6.4514        | 12.2873       | 10.9173       |
| Pb-202+E       | 2.8128        | 2.1183        | 4.0283        | 4.3457        |
| Pb-210+E       | 0.5368        | 0.5425        | 1.6242        | 1.4184        |
| Pd-103+E       | 2.1689        | 2.2168        | 3.4006        | 4.2767        |
| Pt-202+E       | 0.3483        | 0.2341        | 0.2489        | 0.2966        |
| Pu-239+E       | 0.1383        | 0.1455        | 0.3689        | 0.3175        |
| Pu-244+E       | 2.6148        | 2.4419        | 4.7649        | 4.4531        |
| Pu-246+E       | 5.5996        | 5.1532        | 8.0786        | 6.9330        |
| Ra-219+E       | 1.0823        | 1.0076        | 1.2323        | 1.0312        |
| Ra-221+E       | 0.8271        | 0.8175        | 1.7240        | 1.4932        |
| Ra-222+E       | 0.0474        | 0.0440        | 0.0395        | 0.0338        |
| Ra-223+E       | 2.3875        | 2.1010        | 3.1278        | 2.9331        |
| Ra-224+E       | 1.3483        | 1.2585        | 1.3793        | 1.2390        |
| Ra-226+E       | 4.9616        | 3.9643        | 4.7695        | 4.1877        |
| Ra-228+E       | 3.9771        | 3.5510        | 5.5040        | 4.2597        |
| Rb-81+E        | 2.5821        | 2.4329        | 4.2668        | 4.6824        |
| Rb-83+E        | 2.7017        | 2.1266        | 4.7925        | 5.6506        |
| Re-186m+E      | 1.3193        | 1.1108        | 3.6296        | 2.9953        |
| Rn-219+E       | 0.3158        | 0.2659        | 0.2433        | 0.3149        |
| Rn-220+E       | 1.2700        | 1.1917        | 1.3172        | 1.1519        |
| Rn-222+E       | 0.0011        | 0.0005        | 0.0004        | 0.0015        |
| Ru-103+E       | 1.6980        | 0.9410        | 0.8433        | 2.3418        |
| Ru-106+E       | 0.5063        | 0.2547        | 0.2133        | 0.5007        |
| Si-32+E        | 0.0000        | 0.0000        | 0.0000        | 0.0000        |
| Sn-113+E       | 4.4982        | 4.5591        | 5.8836        | 6.4324        |
| Sn-121m+E      | 0.7217        | 0.7497        | 1.0998        | 1.0532        |
| Sn-126+E       | 6.8781        | 5.2287        | 5.6828        | 5.9098        |
| Sr-82+E        | 1.5140        | 1.6328        | 3.8718        | 3.5174        |
| Sr-90+E        | 0.0002        | 0.0002        | 0.0004        | 0.0003        |
| Te-118+E       | 3.6746        | 3.8558        | 5.3201        | 5.2934        |
| Te-129m+E      | 1.7632        | 1.7582        | 2.4394        | 2.4232        |
| Th-229+E       | 6.1621        | 6.0771        | 11.5960       | 10.0308       |
| Th-232+E       | 13.0274       | 11.6535       | 15.2091       | 13.0013       |
| Th-234+E       | 0.4232        | 0.4214        | 0.8734        | 0.7550        |
| Ti-44+E        | 3.4540        | 2.4192        | 3.4818        | 2.3129        |
| U-228+E        | 0.5339        | 0.5438        | 0.9790        | 0.8624        |
| U-230+E        | 0.6163        | 0.6538        | 1.3965        | 1.1774        |

| <b>Element</b> | <b>avg400</b> | <b>ctr400</b> | <b>mid400</b> | <b>cnr400</b> |
|----------------|---------------|---------------|---------------|---------------|
| U-235+E        | 5.2634        | 5.3241        | 8.4124        | 7.7379        |
| U-238+E        | 1.5942        | 1.6273        | 2.1781        | 1.6571        |
| W-178+E        | 1.5377        | 1.2415        | 3.1788        | 2.4991        |
| Xe-122+E       | 4.6058        | 4.5546        | 5.9710        | 5.8867        |
| Zr-93+E        | 0.2915        | 0.3322        | 0.6182        | 0.4583        |