

Summary : RESRAD Default Parameters

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## Dose Conversion Factor (and Related) Parameter Summary

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| A-1  | DCF's for external ground radiation, (mrem/yr)/(pCi/g) |                |            |                |
| A-1  | Ac-225 (Source: FGR 12)                                | 6.371E-02      | 6.371E-02  | DCF1 ( 1)      |
| A-1  | Ac-227 (Source: FGR 12)                                | 4.951E-04      | 4.951E-04  | DCF1 ( 2)      |
| A-1  | Ac-228 (Source: FGR 12)                                | 5.978E+00      | 5.978E+00  | DCF1 ( 3)      |
| A-1  | Am-241 (Source: FGR 12)                                | 4.372E-02      | 4.372E-02  | DCF1 ( 4)      |
| A-1  | Am-243 (Source: FGR 12)                                | 1.420E-01      | 1.420E-01  | DCF1 ( 5)      |
| A-1  | At-217 (Source: FGR 12)                                | 1.773E-03      | 1.773E-03  | DCF1 ( 6)      |
| A-1  | At-218 (Source: FGR 12)                                | 5.847E-03      | 5.847E-03  | DCF1 ( 7)      |
| A-1  | Ba-137m (Source: FGR 12)                               | 3.606E+00      | 3.606E+00  | DCF1 ( 8)      |
| A-1  | Bi-210 (Source: FGR 12)                                | 3.606E-03      | 3.606E-03  | DCF1 ( 9)      |
| A-1  | Bi-211 (Source: FGR 12)                                | 2.559E-01      | 2.559E-01  | DCF1 ( 10)     |
| A-1  | Bi-212 (Source: FGR 12)                                | 1.171E+00      | 1.171E+00  | DCF1 ( 11)     |
| A-1  | Bi-213 (Source: FGR 12)                                | 7.660E-01      | 7.660E-01  | DCF1 ( 12)     |
| A-1  | Bi-214 (Source: FGR 12)                                | 9.808E+00      | 9.808E+00  | DCF1 ( 13)     |
| A-1  | C-14 (Source: FGR 12)                                  | 1.345E-05      | 1.345E-05  | DCF1 ( 14)     |
| A-1  | Ce-144 (Source: FGR 12)                                | 7.174E-02      | 7.174E-02  | DCF1 ( 15)     |
| A-1  | Cm-243 (Source: FGR 12)                                | 5.829E-01      | 5.829E-01  | DCF1 ( 16)     |
| A-1  | Cm-244 (Source: FGR 12)                                | 1.259E-04      | 1.259E-04  | DCF1 ( 17)     |
| A-1  | Co-58 (Source: FGR 12)                                 | 5.960E+00      | 5.960E+00  | DCF1 ( 18)     |
| A-1  | Co-60 (Source: FGR 12)                                 | 1.622E+01      | 1.622E+01  | DCF1 ( 19)     |
| A-1  | Cs-134 (Source: FGR 12)                                | 9.472E+00      | 9.472E+00  | DCF1 ( 20)     |
| A-1  | Cs-137 (Source: FGR 12)                                | 7.510E-04      | 7.510E-04  | DCF1 ( 21)     |
| A-1  | Eu-152 (Source: FGR 12)                                | 7.006E+00      | 7.006E+00  | DCF1 ( 22)     |
| A-1  | Eu-154 (Source: FGR 12)                                | 7.678E+00      | 7.678E+00  | DCF1 ( 23)     |
| A-1  | Eu-155 (Source: FGR 12)                                | 1.822E-01      | 1.822E-01  | DCF1 ( 24)     |
| A-1  | Fe-55 (Source: FGR 12)                                 | 0.000E+00      | 0.000E+00  | DCF1 ( 25)     |
| A-1  | Fr-221 (Source: FGR 12)                                | 1.536E-01      | 1.536E-01  | DCF1 ( 26)     |
| A-1  | Fr-223 (Source: FGR 12)                                | 1.980E-01      | 1.980E-01  | DCF1 ( 27)     |
| A-1  | Gd-152 (Source: FGR 12)                                | 0.000E+00      | 0.000E+00  | DCF1 ( 28)     |
| A-1  | H-3 (Source: FGR 12)                                   | 0.000E+00      | 0.000E+00  | DCF1 ( 29)     |
| A-1  | Ni-59 (Source: FGR 12)                                 | 0.000E+00      | 0.000E+00  | DCF1 ( 30)     |
| A-1  | Ni-63 (Source: FGR 12)                                 | 0.000E+00      | 0.000E+00  | DCF1 ( 31)     |
| A-1  | Np-237 (Source: FGR 12)                                | 7.790E-02      | 7.790E-02  | DCF1 ( 32)     |
| A-1  | Np-239 (Source: FGR 12)                                | 7.529E-01      | 7.529E-01  | DCF1 ( 33)     |
| A-1  | Pa-231 (Source: FGR 12)                                | 1.906E-01      | 1.906E-01  | DCF1 ( 34)     |
| A-1  | Pa-233 (Source: FGR 12)                                | 1.020E+00      | 1.020E+00  | DCF1 ( 35)     |
| A-1  | Pb-209 (Source: FGR 12)                                | 7.734E-04      | 7.734E-04  | DCF1 ( 36)     |
| A-1  | Pb-210 (Source: FGR 12)                                | 2.447E-03      | 2.447E-03  | DCF1 ( 37)     |
| A-1  | Pb-211 (Source: FGR 12)                                | 3.064E-01      | 3.064E-01  | DCF1 ( 38)     |
| A-1  | Pb-212 (Source: FGR 12)                                | 7.043E-01      | 7.043E-01  | DCF1 ( 39)     |
| A-1  | Pb-214 (Source: FGR 12)                                | 1.341E+00      | 1.341E+00  | DCF1 ( 40)     |
| A-1  | Po-210 (Source: FGR 12)                                | 5.231E-05      | 5.231E-05  | DCF1 ( 41)     |
| A-1  | Po-211 (Source: FGR 12)                                | 4.764E-02      | 4.764E-02  | DCF1 ( 42)     |
| A-1  | Po-212 (Source: FGR 12)                                | 0.000E+00      | 0.000E+00  | DCF1 ( 43)     |
| A-1  | Po-213 (Source: FGR 12)                                | 0.000E+00      | 0.000E+00  | DCF1 ( 44)     |
| A-1  | Po-214 (Source: FGR 12)                                | 5.138E-04      | 5.138E-04  | DCF1 ( 45)     |
| A-1  | Po-215 (Source: FGR 12)                                | 1.016E-03      | 1.016E-03  | DCF1 ( 46)     |
| A-1  | Po-216 (Source: FGR 12)                                | 1.042E-04      | 1.042E-04  | DCF1 ( 47)     |
| A-1  | Po-218 (Source: FGR 12)                                | 5.642E-05      | 5.642E-05  | DCF1 ( 48)     |
| A-1  | Pr-144 (Source: FGR 12)                                | 2.522E-01      | 2.522E-01  | DCF1 ( 49)     |

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## Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter   | Current Value# | Base Case* | Parameter Name |
|------|---|----------------|------------|----------------|
| A-1  | Pr-144m (Source: FGR 12)                          | 1.437E-02      | 1.437E-02  | DCF1 ( 50)     |
| A-1  | Pu-238 (Source: FGR 12)                           | 1.513E-04      | 1.513E-04  | DCF1 ( 51)     |
| A-1  | Pu-239 (Source: FGR 12)                           | 2.952E-04      | 2.952E-04  | DCF1 ( 52)     |
| A-1  | Pu-240 (Source: FGR 12)                           | 1.467E-04      | 1.467E-04  | DCF1 ( 53)     |
| A-1  | Pu-241 (Source: FGR 12)                           | 5.904E-06      | 5.904E-06  | DCF1 ( 54)     |
| A-1  | Ra-223 (Source: FGR 12)                           | 6.034E-01      | 6.034E-01  | DCF1 ( 55)     |
| A-1  | Ra-224 (Source: FGR 12)                           | 5.119E-02      | 5.119E-02  | DCF1 ( 56)     |
| A-1  | Ra-225 (Source: FGR 12)                           | 1.102E-02      | 1.102E-02  | DCF1 ( 57)     |
| A-1  | Ra-226 (Source: FGR 12)                           | 3.176E-02      | 3.176E-02  | DCF1 ( 58)     |
| A-1  | Ra-228 (Source: FGR 12)                           | 0.000E+00      | 0.000E+00  | DCF1 ( 59)     |
| A-1  | Rn-219 (Source: FGR 12)                           | 3.083E-01      | 3.083E-01  | DCF1 ( 60)     |
| A-1  | Rn-220 (Source: FGR 12)                           | 2.298E-03      | 2.298E-03  | DCF1 ( 61)     |
| A-1  | Rn-222 (Source: FGR 12)                           | 2.354E-03      | 2.354E-03  | DCF1 ( 62)     |
| A-1  | Sb-125 (Source: FGR 12)                           | 2.447E+00      | 2.447E+00  | DCF1 ( 63)     |
| A-1  | Sr-90 (Source: FGR 12)                            | 7.043E-04      | 7.043E-04  | DCF1 ( 64)     |
| A-1  | Tc-99 (Source: FGR 12)                            | 1.255E-04      | 1.255E-04  | DCF1 ( 65)     |
| A-1  | Te-125m (Source: FGR 12)                          | 1.515E-02      | 1.515E-02  | DCF1 ( 66)     |
| A-1  | Th-227 (Source: FGR 12)                           | 5.212E-01      | 5.212E-01  | DCF1 ( 67)     |
| A-1  | Th-228 (Source: FGR 12)                           | 7.940E-03      | 7.940E-03  | DCF1 ( 68)     |
| A-1  | Th-229 (Source: FGR 12)                           | 3.213E-01      | 3.213E-01  | DCF1 ( 69)     |
| A-1  | Th-230 (Source: FGR 12)                           | 1.209E-03      | 1.209E-03  | DCF1 ( 70)     |
| A-1  | Th-231 (Source: FGR 12)                           | 3.643E-02      | 3.643E-02  | DCF1 ( 71)     |
| A-1  | Th-232 (Source: FGR 12)                           | 5.212E-04      | 5.212E-04  | DCF1 ( 72)     |
| A-1  | Tl-207 (Source: FGR 12)                           | 1.980E-02      | 1.980E-02  | DCF1 ( 73)     |
| A-1  | Tl-208 (Source: FGR 12)                           | 2.298E+01      | 2.298E+01  | DCF1 ( 74)     |
| A-1  | Tl-209 (Source: FGR 12)                           | 1.293E+01      | 1.293E+01  | DCF1 ( 75)     |
| A-1  | Tl-210 (Source: no data)                          | 0.000E+00      | -2.000E+00 | DCF1 ( 76)     |
| A-1  | U-233 (Source: FGR 12)                            | 1.397E-03      | 1.397E-03  | DCF1 ( 77)     |
| A-1  | U-234 (Source: FGR 12)                            | 4.017E-04      | 4.017E-04  | DCF1 ( 78)     |
| A-1  | U-235 (Source: FGR 12)                            | 7.211E-01      | 7.211E-01  | DCF1 ( 79)     |
| A-1  | U-236 (Source: FGR 12)                            | 2.148E-04      | 2.148E-04  | DCF1 ( 80)     |
| A-1  | U-237 (Source: FGR 12)                            | 5.306E-01      | 5.306E-01  | DCF1 ( 81)     |
| A-1  | Y-90 (Source: FGR 12)                             | 2.391E-02      | 2.391E-02  | DCF1 ( 82)     |
| B-1  | Dose conversion factors for inhalation, mrem/pCi: |                |            |                |
| B-1  | Ac-227+D  | 6.724E+00      | 6.700E+00  | DCF2 ( 1)      |
| B-1  | Am-241  | 4.440E-01      | 4.440E-01  | DCF2 ( 2)      |
| B-1  | Am-243+D  | 4.400E-01      | 4.400E-01  | DCF2 ( 3)      |
| B-1  | C-14 (p) (Class: ORGANIC)                         | 2.090E-06      | 2.090E-06  | DCF2 ( 4)      |
| B-1  | C-14 (g) (Class: CO2)                             | 2.350E-08      | 2.350E-08  | C14GInhDCF     |
| B-1  | Ce-144+D  | 3.740E-04      | 3.740E-04  | DCF2 ( 5)      |
| B-1  | Cm-243  | 3.070E-01      | 3.070E-01  | DCF2 ( 6)      |
| B-1  | Cm-244  | 2.480E-01      | 2.480E-01  | DCF2 ( 8)      |
| B-1  | Co-58   | 1.090E-05      | 1.090E-05  | DCF2 ( 11)     |
| B-1  | Co-60   | 2.190E-04      | 2.190E-04  | DCF2 ( 12)     |
| B-1  | Cs-134  | 4.620E-05      | 4.620E-05  | DCF2 ( 13)     |
| B-1  | Cs-137+D  | 3.190E-05      | 3.190E-05  | DCF2 ( 14)     |
| B-1  | Eu-152  | 2.210E-04      | 2.210E-04  | DCF2 ( 15)     |
| B-1  | Eu-154  | 2.860E-04      | 2.860E-04  | DCF2 ( 17)     |
| B-1  | Eu-155  | 4.140E-05      | 4.140E-05  | DCF2 ( 18)     |

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## Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| B-1  | Fe-55  | 2.690E-06      | 2.690E-06  | DCF2 ( 19)     |
| B-1  | Gd-152   | 2.430E-01      | 2.430E-01  | DCF2 ( 20)     |
| B-1  | H-3  | 6.400E-08      | 6.400E-08  | DCF2 ( 21)     |
| B-1  | Ni-59  | 2.700E-06      | 2.700E-06  | DCF2 ( 22)     |
| B-1  | Ni-63  | 6.290E-06      | 6.290E-06  | DCF2 ( 23)     |
| B-1  | Np-237+D   | 5.400E-01      | 5.400E-01  | DCF2 ( 24)     |
| B-1  | Pa-231   | 1.280E+00      | 1.280E+00  | DCF2 ( 25)     |
| B-1  | Pb-210+D   | 1.380E-02      | 1.360E-02  | DCF2 ( 26)     |
| B-1  | Po-210   | 9.400E-03      | 9.400E-03  | DCF2 ( 27)     |
| B-1  | Pu-238   | 3.920E-01      | 3.920E-01  | DCF2 ( 28)     |
| B-1  | Pu-239   | 4.290E-01      | 4.290E-01  | DCF2 ( 30)     |
| B-1  | Pu-240   | 4.290E-01      | 4.290E-01  | DCF2 ( 31)     |
| B-1  | Pu-241   | 8.250E-03      | 8.250E-03  | DCF2 ( 33)     |
| B-1  | Pu-241+D   | 8.254E-03      | 8.250E-03  | DCF2 ( 34)     |
| B-1  | Ra-226+D   | 8.594E-03      | 8.580E-03  | DCF2 ( 35)     |
| B-1  | Ra-228+D   | 5.078E-03      | 4.770E-03  | DCF2 ( 36)     |
| B-1  | Sb-125   | 1.220E-05      | 1.220E-05  | DCF2 ( 37)     |
| B-1  | Sr-90+D  | 1.308E-03      | 1.300E-03  | DCF2 ( 39)     |
| B-1  | Tc-99  | 8.320E-06      | 8.320E-06  | DCF2 ( 40)     |
| B-1  | Te-125m  | 7.290E-06      | 7.290E-06  | DCF2 ( 41)     |
| B-1  | Th-228+D   | 3.454E-01      | 3.420E-01  | DCF2 ( 42)     |
| B-1  | Th-229+D   | 2.169E+00      | 2.150E+00  | DCF2 ( 43)     |
| B-1  | Th-230   | 3.260E-01      | 3.260E-01  | DCF2 ( 44)     |
| B-1  | Th-232   | 1.640E+00      | 1.640E+00  | DCF2 ( 45)     |
| B-1  | U-233  | 1.350E-01      | 1.350E-01  | DCF2 ( 46)     |
| B-1  | U-234  | 1.320E-01      | 1.320E-01  | DCF2 ( 47)     |
| B-1  | U-235+D  | 1.230E-01      | 1.230E-01  | DCF2 ( 48)     |
| B-1  | U-236  | 1.250E-01      | 1.250E-01  | DCF2 ( 49)     |
| D-1  | Dose conversion factors for ingestion, mrem/pCi: |                |            |                |
| D-1  | Ac-227+D   | 1.480E-02      | 1.410E-02  | DCF3 ( 1)      |
| D-1  | Am-241   | 3.640E-03      | 3.640E-03  | DCF3 ( 2)      |
| D-1  | Am-243+D   | 3.623E-03      | 3.620E-03  | DCF3 ( 3)      |
| D-1  | C-14   | 2.090E-06      | 2.090E-06  | DCF3 ( 4)      |
| D-1  | Ce-144+D   | 2.112E-05      | 2.100E-05  | DCF3 ( 5)      |
| D-1  | Cm-243   | 2.510E-03      | 2.510E-03  | DCF3 ( 6)      |
| D-1  | Cm-244   | 2.020E-03      | 2.020E-03  | DCF3 ( 8)      |
| D-1  | Co-58  | 3.580E-06      | 3.580E-06  | DCF3 ( 11)     |
| D-1  | Co-60  | 2.690E-05      | 2.690E-05  | DCF3 ( 12)     |
| D-1  | Cs-134   | 7.330E-05      | 7.330E-05  | DCF3 ( 13)     |
| D-1  | Cs-137+D   | 5.000E-05      | 5.000E-05  | DCF3 ( 14)     |
| D-1  | Eu-152   | 6.480E-06      | 6.480E-06  | DCF3 ( 15)     |
| D-1  | Eu-154   | 9.550E-06      | 9.550E-06  | DCF3 ( 17)     |
| D-1  | Eu-155   | 1.530E-06      | 1.530E-06  | DCF3 ( 18)     |
| D-1  | Fe-55  | 6.070E-07      | 6.070E-07  | DCF3 ( 19)     |
| D-1  | Gd-152   | 1.610E-04      | 1.610E-04  | DCF3 ( 20)     |
| D-1  | H-3  | 6.400E-08      | 6.400E-08  | DCF3 ( 21)     |
| D-1  | Ni-59  | 2.100E-07      | 2.100E-07  | DCF3 ( 22)     |
| D-1  | Ni-63  | 5.770E-07      | 5.770E-07  | DCF3 ( 23)     |
| D-1  | Np-237+D   | 4.444E-03      | 4.440E-03  | DCF3 ( 24)     |

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## Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| D-1  | Pa-231   | 1.060E-02      | 1.060E-02  | DCF3 ( 25)     |
| D-1  | Pb-210+D   | 5.376E-03      | 5.370E-03  | DCF3 ( 26)     |
| D-1  | Po-210   | 1.900E-03      | 1.900E-03  | DCF3 ( 27)     |
| D-1  | Pu-238   | 3.200E-03      | 3.200E-03  | DCF3 ( 28)     |
| D-1  | Pu-239   | 3.540E-03      | 3.540E-03  | DCF3 ( 30)     |
| D-1  | Pu-240   | 3.540E-03      | 3.540E-03  | DCF3 ( 31)     |
| D-1  | Pu-241   | 6.840E-05      | 6.840E-05  | DCF3 ( 33)     |
| D-1  | Pu-241+D   | 7.157E-05      | 6.840E-05  | DCF3 ( 34)     |
| D-1  | Ra-226+D   | 1.321E-03      | 1.320E-03  | DCF3 ( 35)     |
| D-1  | Ra-228+D   | 1.442E-03      | 1.440E-03  | DCF3 ( 36)     |
| D-1  | Sb-125   | 2.810E-06      | 2.810E-06  | DCF3 ( 37)     |
| D-1  | Sr-90+D  | 1.528E-04      | 1.420E-04  | DCF3 ( 39)     |
| D-1  | Tc-99  | 1.460E-06      | 1.460E-06  | DCF3 ( 40)     |
| D-1  | Te-125m  | 3.670E-06      | 3.670E-06  | DCF3 ( 41)     |
| D-1  | Th-228+D   | 8.086E-04      | 3.960E-04  | DCF3 ( 42)     |
| D-1  | Th-229+D   | 4.027E-03      | 3.530E-03  | DCF3 ( 43)     |
| D-1  | Th-230   | 5.480E-04      | 5.480E-04  | DCF3 ( 44)     |
| D-1  | Th-232   | 2.730E-03      | 2.730E-03  | DCF3 ( 45)     |
| D-1  | U-233  | 2.890E-04      | 2.890E-04  | DCF3 ( 46)     |
| D-1  | U-234  | 2.830E-04      | 2.830E-04  | DCF3 ( 47)     |
| D-1  | U-235+D  | 2.673E-04      | 2.660E-04  | DCF3 ( 48)     |
| D-1  | U-236  | 2.690E-04      | 2.690E-04  | DCF3 ( 49)     |
| D-34 | Food transfer factors:                                   |                |            |                |
| D-34 | Ac-227+D , plant/soil concentration ratio, dimensionless | 2.500E-03      | 2.500E-03  | RTF( 1,1)      |
| D-34 | Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 2.000E-05      | 2.000E-05  | RTF( 1,2)      |
| D-34 | Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 2.000E-05      | 2.000E-05  | RTF( 1,3)      |
| D-34 |  |                |            |                |
| D-34 | Am-241 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 2,1)      |
| D-34 | Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 5.740E-05      | 5.000E-05  | RTF( 2,2)      |
| D-34 | Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 3.260E-06      | 2.000E-06  | RTF( 2,3)      |
| D-34 |  |                |            |                |
| D-34 | Am-243+D , plant/soil concentration ratio, dimensionless | 1.830E-03      | 1.000E-03  | RTF( 3,1)      |
| D-34 | Am-243+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 5.740E-05      | 5.000E-05  | RTF( 3,2)      |
| D-34 | Am-243+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 3.260E-06      | 2.000E-06  | RTF( 3,3)      |
| D-34 |  |                |            |                |
| D-34 | C-14 , plant/soil concentration ratio, dimensionless     | 1.280E+00      | 5.500E+00  | RTF( 4,1)      |
| D-34 | C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)     | 6.110E-02      | 3.100E-02  | RTF( 4,2)      |
| D-34 | C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)      | 2.250E-02      | 1.200E-02  | RTF( 4,3)      |
| D-34 |  |                |            |                |
| D-34 | Ce-144+D , plant/soil concentration ratio, dimensionless | 3.940E-03      | 2.000E-03  | RTF( 5,1)      |
| D-34 | Ce-144+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 3.790E-05      | 2.000E-05  | RTF( 5,2)      |
| D-34 | Ce-144+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 4.840E-05      | 5.000E-05  | RTF( 5,3)      |
| D-34 |  |                |            |                |
| D-34 | Cm-243 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 6,1)      |
| D-34 | Cm-243 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 4.080E-05      | 2.000E-05  | RTF( 6,2)      |
| D-34 | Cm-243 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 3.800E-06      | 2.000E-06  | RTF( 6,3)      |
| D-34 |  |                |            |                |

Summary : RESRAD Default Parameters

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Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| D-34 | Cm-244 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 8,1)      |
| D-34 | Cm-244 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 4.080E-05      | 2.000E-05  | RTF( 8,2)      |
| D-34 | Cm-244 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 3.800E-06      | 2.000E-06  | RTF( 8,3)      |
| D-34 |  |                |            |                |
| D-34 | Co-58 , plant/soil concentration ratio, dimensionless    | 1.460E-01      | 8.000E-02  | RTF( 11,1)     |
| D-34 | Co-58 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 5.980E-02      | 2.000E-02  | RTF( 11,2)     |
| D-34 | Co-58 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 3.220E-03      | 2.000E-03  | RTF( 11,3)     |
| D-34 |  |                |            |                |
| D-34 | Co-60 , plant/soil concentration ratio, dimensionless    | 1.460E-01      | 8.000E-02  | RTF( 12,1)     |
| D-34 | Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 5.980E-02      | 2.000E-02  | RTF( 12,2)     |
| D-34 | Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 3.220E-03      | 2.000E-03  | RTF( 12,3)     |
| D-34 |  |                |            |                |
| D-34 | Cs-134 , plant/soil concentration ratio, dimensionless   | 7.830E-02      | 4.000E-02  | RTF( 13,1)     |
| D-34 | Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 6.560E-02      | 3.000E-02  | RTF( 13,2)     |
| D-34 | Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.370E-02      | 8.000E-03  | RTF( 13,3)     |
| D-34 |  |                |            |                |
| D-34 | Cs-137+D , plant/soil concentration ratio, dimensionless | 7.830E-02      | 4.000E-02  | RTF( 14,1)     |
| D-34 | Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 6.560E-02      | 3.000E-02  | RTF( 14,2)     |
| D-34 | Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 1.370E-02      | 8.000E-03  | RTF( 14,3)     |
| D-34 |  |                |            |                |
| D-34 | Eu-152 , plant/soil concentration ratio, dimensionless   | 4.210E-03      | 2.500E-03  | RTF( 15,1)     |
| D-34 | Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 4.020E-03      | 2.000E-03  | RTF( 15,2)     |
| D-34 | Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.120E-04      | 5.000E-05  | RTF( 15,3)     |
| D-34 |  |                |            |                |
| D-34 | Eu-154 , plant/soil concentration ratio, dimensionless   | 4.210E-03      | 2.500E-03  | RTF( 17,1)     |
| D-34 | Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 4.020E-03      | 2.000E-03  | RTF( 17,2)     |
| D-34 | Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.120E-04      | 5.000E-05  | RTF( 17,3)     |
| D-34 |  |                |            |                |
| D-34 | Eu-155 , plant/soil concentration ratio, dimensionless   | 4.210E-03      | 2.500E-03  | RTF( 18,1)     |
| D-34 | Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 4.020E-03      | 2.000E-03  | RTF( 18,2)     |
| D-34 | Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.120E-04      | 5.000E-05  | RTF( 18,3)     |
| D-34 |  |                |            |                |
| D-34 | Fe-55 , plant/soil concentration ratio, dimensionless    | 1.830E-03      | 1.000E-03  | RTF( 19,1)     |
| D-34 | Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 3.940E-02      | 2.000E-02  | RTF( 19,2)     |
| D-34 | Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 4.780E-04      | 3.000E-04  | RTF( 19,3)     |
| D-34 |  |                |            |                |
| D-34 | Gd-152 , plant/soil concentration ratio, dimensionless   | 2.500E-03      | 2.500E-03  | RTF( 20,1)     |
| D-34 | Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 2.000E-03      | 2.000E-03  | RTF( 20,2)     |
| D-34 | Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 2.000E-05      | 2.000E-05  | RTF( 20,3)     |
| D-34 |  |                |            |                |
| D-34 | H-3 , plant/soil concentration ratio, dimensionless      | 1.010E+01      | 4.800E+00  | RTF( 21,1)     |
| D-34 | H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)      | 2.360E-02      | 1.200E-02  | RTF( 21,2)     |
| D-34 | H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)       | 1.850E-02      | 1.000E-02  | RTF( 21,3)     |
| D-34 |  |                |            |                |
| D-34 | Ni-59 , plant/soil concentration ratio, dimensionless    | 9.130E-02      | 5.000E-02  | RTF( 22,1)     |
| D-34 | Ni-59 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 9.260E-03      | 5.000E-03  | RTF( 22,2)     |
| D-34 | Ni-59 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 3.190E-02      | 2.000E-02  | RTF( 22,3)     |
| D-34 |  |                |            |                |

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## Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| D-34 | Ni-63 , plant/soil concentration ratio, dimensionless    | 9.130E-02      | 5.000E-02  | RTF( 23,1)     |
| D-34 | Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 9.260E-03      | 5.000E-03  | RTF( 23,2)     |
| D-34 | Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 3.190E-02      | 2.000E-02  | RTF( 23,3)     |
| D-34 |  |                |            |                |
| D-34 | Np-237+D , plant/soil concentration ratio, dimensionless | 3.670E-02      | 2.000E-02  | RTF( 24,1)     |
| D-34 | Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.590E-03      | 1.000E-03  | RTF( 24,2)     |
| D-34 | Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 1.610E-05      | 5.000E-06  | RTF( 24,3)     |
| D-34 |  |                |            |                |
| D-34 | Pa-231 , plant/soil concentration ratio, dimensionless   | 1.000E-02      | 1.000E-02  | RTF( 25,1)     |
| D-34 | Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 5.000E-03      | 5.000E-03  | RTF( 25,2)     |
| D-34 | Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 5.000E-06      | 5.000E-06  | RTF( 25,3)     |
| D-34 |  |                |            |                |
| D-34 | Pb-210+D , plant/soil concentration ratio, dimensionless | 1.000E-02      | 1.000E-02  | RTF( 26,1)     |
| D-34 | Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 8.000E-04      | 8.000E-04  | RTF( 26,2)     |
| D-34 | Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 3.000E-04      | 3.000E-04  | RTF( 26,3)     |
| D-34 |  |                |            |                |
| D-34 | Po-210 , plant/soil concentration ratio, dimensionless   | 1.000E-03      | 1.000E-03  | RTF( 27,1)     |
| D-34 | Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 5.000E-03      | 5.000E-03  | RTF( 27,2)     |
| D-34 | Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 3.400E-04      | 3.400E-04  | RTF( 27,3)     |
| D-34 |  |                |            |                |
| D-34 | Pu-238 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 28,1)     |
| D-34 | Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.140E-04      | 1.000E-04  | RTF( 28,2)     |
| D-34 | Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.390E-06      | 1.000E-06  | RTF( 28,3)     |
| D-34 |  |                |            |                |
| D-34 | Pu-239 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 30,1)     |
| D-34 | Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.140E-04      | 1.000E-04  | RTF( 30,2)     |
| D-34 | Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.390E-06      | 1.000E-06  | RTF( 30,3)     |
| D-34 |  |                |            |                |
| D-34 | Pu-240 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 31,1)     |
| D-34 | Pu-240 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.140E-04      | 1.000E-04  | RTF( 31,2)     |
| D-34 | Pu-240 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.390E-06      | 1.000E-06  | RTF( 31,3)     |
| D-34 |  |                |            |                |
| D-34 | Pu-241 , plant/soil concentration ratio, dimensionless   | 1.830E-03      | 1.000E-03  | RTF( 33,1)     |
| D-34 | Pu-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.140E-04      | 1.000E-04  | RTF( 33,2)     |
| D-34 | Pu-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.390E-06      | 1.000E-06  | RTF( 33,3)     |
| D-34 |  |                |            |                |
| D-34 | Pu-241+D , plant/soil concentration ratio, dimensionless | 1.830E-03      | 1.000E-03  | RTF( 34,1)     |
| D-34 | Pu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.140E-04      | 1.000E-04  | RTF( 34,2)     |
| D-34 | Pu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 1.390E-06      | 1.000E-06  | RTF( 34,3)     |
| D-34 |  |                |            |                |
| D-34 | Ra-226+D , plant/soil concentration ratio, dimensionless | 4.000E-02      | 4.000E-02  | RTF( 35,1)     |
| D-34 | Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03      | 1.000E-03  | RTF( 35,2)     |
| D-34 | Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 1.000E-03      | 1.000E-03  | RTF( 35,3)     |
| D-34 |  |                |            |                |
| D-34 | Ra-228+D , plant/soil concentration ratio, dimensionless | 4.000E-02      | 4.000E-02  | RTF( 36,1)     |
| D-34 | Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-03      | 1.000E-03  | RTF( 36,2)     |
| D-34 | Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 1.000E-03      | 1.000E-03  | RTF( 36,3)     |
| D-34 |  |                |            |                |

Summary : RESRAD Default Parameters

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Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter  | Current Value# | Base Case* | Parameter Name |
|------|--|----------------|------------|----------------|
| D-34 | Sb-125 , plant/soil concentration ratio, dimensionless   | 1.950E-02      | 1.000E-02  | RTF( 37,1)     |
| D-34 | Sb-125 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.850E-03      | 1.000E-03  | RTF( 37,2)     |
| D-34 | Sb-125 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 1.120E-04      | 1.000E-04  | RTF( 37,3)     |
| D-34 |  |                |            |                |
| D-34 | Sr-90+D , plant/soil concentration ratio, dimensionless  | 5.900E-01      | 3.000E-01  | RTF( 39,1)     |
| D-34 | Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)  | 1.310E-02      | 8.000E-03  | RTF( 39,2)     |
| D-34 | Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)   | 2.760E-03      | 2.000E-03  | RTF( 39,3)     |
| D-34 |  |                |            |                |
| D-34 | Tc-99 , plant/soil concentration ratio, dimensionless    | 9.170E+00      | 5.000E+00  | RTF( 40,1)     |
| D-34 | Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 1.590E-04      | 1.000E-04  | RTF( 40,2)     |
| D-34 | Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 1.590E-03      | 1.000E-03  | RTF( 40,3)     |
| D-34 |  |                |            |                |
| D-34 | Te-125m , plant/soil concentration ratio, dimensionless  | 6.000E-01      | 6.000E-01  | RTF( 41,1)     |
| D-34 | Te-125m , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)  | 7.000E-03      | 7.000E-03  | RTF( 41,2)     |
| D-34 | Te-125m , milk/livestock-intake ratio, (pCi/L)/(pCi/d)   | 5.000E-04      | 5.000E-04  | RTF( 41,3)     |
| D-34 |  |                |            |                |
| D-34 | Th-228+D , plant/soil concentration ratio, dimensionless | 1.000E-03      | 1.000E-03  | RTF( 42,1)     |
| D-34 | Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04      | 1.000E-04  | RTF( 42,2)     |
| D-34 | Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 5.000E-06      | 5.000E-06  | RTF( 42,3)     |
| D-34 |  |                |            |                |
| D-34 | Th-229+D , plant/soil concentration ratio, dimensionless | 1.000E-03      | 1.000E-03  | RTF( 43,1)     |
| D-34 | Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d) | 1.000E-04      | 1.000E-04  | RTF( 43,2)     |
| D-34 | Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)  | 5.000E-06      | 5.000E-06  | RTF( 43,3)     |
| D-34 |  |                |            |                |
| D-34 | Th-230 , plant/soil concentration ratio, dimensionless   | 1.000E-03      | 1.000E-03  | RTF( 44,1)     |
| D-34 | Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.000E-04      | 1.000E-04  | RTF( 44,2)     |
| D-34 | Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 5.000E-06      | 5.000E-06  | RTF( 44,3)     |
| D-34 |  |                |            |                |
| D-34 | Th-232 , plant/soil concentration ratio, dimensionless   | 1.000E-03      | 1.000E-03  | RTF( 45,1)     |
| D-34 | Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)   | 1.000E-04      | 1.000E-04  | RTF( 45,2)     |
| D-34 | Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)    | 5.000E-06      | 5.000E-06  | RTF( 45,3)     |
| D-34 |  |                |            |                |
| D-34 | U-233 , plant/soil concentration ratio, dimensionless    | 2.500E-03      | 2.500E-03  | RTF( 46,1)     |
| D-34 | U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 3.400E-04      | 3.400E-04  | RTF( 46,2)     |
| D-34 | U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 6.000E-04      | 6.000E-04  | RTF( 46,3)     |
| D-34 |  |                |            |                |
| D-34 | U-234 , plant/soil concentration ratio, dimensionless    | 2.500E-03      | 2.500E-03  | RTF( 47,1)     |
| D-34 | U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 3.400E-04      | 3.400E-04  | RTF( 47,2)     |
| D-34 | U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 6.000E-04      | 6.000E-04  | RTF( 47,3)     |
| D-34 |  |                |            |                |
| D-34 | U-235+D , plant/soil concentration ratio, dimensionless  | 2.500E-03      | 2.500E-03  | RTF( 48,1)     |
| D-34 | U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)  | 3.400E-04      | 3.400E-04  | RTF( 48,2)     |
| D-34 | U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)   | 6.000E-04      | 6.000E-04  | RTF( 48,3)     |
| D-34 |  |                |            |                |
| D-34 | U-236 , plant/soil concentration ratio, dimensionless    | 2.500E-03      | 2.500E-03  | RTF( 49,1)     |
| D-34 | U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)    | 3.400E-04      | 3.400E-04  | RTF( 49,2)     |
| D-34 | U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)     | 6.000E-04      | 6.000E-04  | RTF( 49,3)     |
| D-34 |  |                |            |                |



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Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter                                   | Current Value# | Base Case* | Parameter Name |
|------|---|----------------|------------|----------------|
| D-5  | Bioaccumulation factors, fresh water, L/kg: |                |            |                |
| D-5  | Ac-227+D , fish                             | 1.500E+01      | 1.500E+01  | BIOFAC ( 1,1)  |
| D-5  | Ac-227+D , crustacea and mollusks           | 1.000E+03      | 1.000E+03  | BIOFAC ( 1,2)  |
| D-5  |   |                |            |                |
| D-5  | Am-241 , fish                               | 3.000E+01      | 3.000E+01  | BIOFAC ( 2,1)  |
| D-5  | Am-241 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 2,2)  |
| D-5  |   |                |            |                |
| D-5  | Am-243+D , fish                             | 3.000E+01      | 3.000E+01  | BIOFAC ( 3,1)  |
| D-5  | Am-243+D , crustacea and mollusks           | 1.000E+03      | 1.000E+03  | BIOFAC ( 3,2)  |
| D-5  |   |                |            |                |
| D-5  | C-14 , fish                                 | 5.000E+04      | 5.000E+04  | BIOFAC ( 4,1)  |
| D-5  | C-14 , crustacea and mollusks               | 9.100E+03      | 9.100E+03  | BIOFAC ( 4,2)  |
| D-5  |   |                |            |                |
| D-5  | Ce-144+D , fish                             | 3.000E+01      | 3.000E+01  | BIOFAC ( 5,1)  |
| D-5  | Ce-144+D , crustacea and mollusks           | 1.000E+03      | 1.000E+03  | BIOFAC ( 5,2)  |
| D-5  |   |                |            |                |
| D-5  | Cm-243 , fish                               | 3.000E+01      | 3.000E+01  | BIOFAC ( 6,1)  |
| D-5  | Cm-243 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 6,2)  |
| D-5  |   |                |            |                |
| D-5  | Cm-244 , fish                               | 3.000E+01      | 3.000E+01  | BIOFAC ( 8,1)  |
| D-5  | Cm-244 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 8,2)  |
| D-5  |   |                |            |                |
| D-5  | Co-58 , fish                                | 3.000E+02      | 3.000E+02  | BIOFAC ( 11,1) |
| D-5  | Co-58 , crustacea and mollusks              | 2.000E+02      | 2.000E+02  | BIOFAC ( 11,2) |
| D-5  |   |                |            |                |
| D-5  | Co-60 , fish                                | 3.000E+02      | 3.000E+02  | BIOFAC ( 12,1) |
| D-5  | Co-60 , crustacea and mollusks              | 2.000E+02      | 2.000E+02  | BIOFAC ( 12,2) |
| D-5  |   |                |            |                |
| D-5  | Cs-134 , fish                               | 2.000E+03      | 2.000E+03  | BIOFAC ( 13,1) |
| D-5  | Cs-134 , crustacea and mollusks             | 1.000E+02      | 1.000E+02  | BIOFAC ( 13,2) |
| D-5  |   |                |            |                |
| D-5  | Cs-137+D , fish                             | 2.000E+03      | 2.000E+03  | BIOFAC ( 14,1) |
| D-5  | Cs-137+D , crustacea and mollusks           | 1.000E+02      | 1.000E+02  | BIOFAC ( 14,2) |
| D-5  |   |                |            |                |
| D-5  | Eu-152 , fish                               | 5.000E+01      | 5.000E+01  | BIOFAC ( 15,1) |
| D-5  | Eu-152 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 15,2) |
| D-5  |   |                |            |                |
| D-5  | Eu-154 , fish                               | 5.000E+01      | 5.000E+01  | BIOFAC ( 17,1) |
| D-5  | Eu-154 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 17,2) |
| D-5  |   |                |            |                |
| D-5  | Eu-155 , fish                               | 5.000E+01      | 5.000E+01  | BIOFAC ( 18,1) |
| D-5  | Eu-155 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 18,2) |
| D-5  |   |                |            |                |
| D-5  | Fe-55 , fish                                | 2.000E+02      | 2.000E+02  | BIOFAC ( 19,1) |
| D-5  | Fe-55 , crustacea and mollusks              | 3.200E+03      | 3.200E+03  | BIOFAC ( 19,2) |
| D-5  |   |                |            |                |
| D-5  | Gd-152 , fish                               | 2.500E+01      | 2.500E+01  | BIOFAC ( 20,1) |
| D-5  | Gd-152 , crustacea and mollusks             | 1.000E+03      | 1.000E+03  | BIOFAC ( 20,2) |
| D-5  |   |                |            |                |

Summary : RESRAD Default Parameters

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Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter                         | Current Value# | Base Case* | Parameter Name |
|------|-----------------------------------|----------------|------------|----------------|
| D-5  | H-3 , fish                        | 1.000E+00      | 1.000E+00  | BIOFAC ( 21,1) |
| D-5  | H-3 , crustacea and mollusks      | 1.000E+00      | 1.000E+00  | BIOFAC ( 21,2) |
| D-5  |                                   |                |            |                |
| D-5  | Ni-59 , fish                      | 1.000E+02      | 1.000E+02  | BIOFAC ( 22,1) |
| D-5  | Ni-59 , crustacea and mollusks    | 1.000E+02      | 1.000E+02  | BIOFAC ( 22,2) |
| D-5  |                                   |                |            |                |
| D-5  | Ni-63 , fish                      | 1.000E+02      | 1.000E+02  | BIOFAC ( 23,1) |
| D-5  | Ni-63 , crustacea and mollusks    | 1.000E+02      | 1.000E+02  | BIOFAC ( 23,2) |
| D-5  |                                   |                |            |                |
| D-5  | Np-237+D , fish                   | 3.000E+01      | 3.000E+01  | BIOFAC ( 24,1) |
| D-5  | Np-237+D , crustacea and mollusks | 4.000E+02      | 4.000E+02  | BIOFAC ( 24,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pa-231 , fish                     | 1.000E+01      | 1.000E+01  | BIOFAC ( 25,1) |
| D-5  | Pa-231 , crustacea and mollusks   | 1.100E+02      | 1.100E+02  | BIOFAC ( 25,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pb-210+D , fish                   | 3.000E+02      | 3.000E+02  | BIOFAC ( 26,1) |
| D-5  | Pb-210+D , crustacea and mollusks | 1.000E+02      | 1.000E+02  | BIOFAC ( 26,2) |
| D-5  |                                   |                |            |                |
| D-5  | Po-210 , fish                     | 1.000E+02      | 1.000E+02  | BIOFAC ( 27,1) |
| D-5  | Po-210 , crustacea and mollusks   | 2.000E+04      | 2.000E+04  | BIOFAC ( 27,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pu-238 , fish                     | 3.000E+01      | 3.000E+01  | BIOFAC ( 28,1) |
| D-5  | Pu-238 , crustacea and mollusks   | 1.000E+02      | 1.000E+02  | BIOFAC ( 28,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pu-239 , fish                     | 3.000E+01      | 3.000E+01  | BIOFAC ( 30,1) |
| D-5  | Pu-239 , crustacea and mollusks   | 1.000E+02      | 1.000E+02  | BIOFAC ( 30,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pu-240 , fish                     | 3.000E+01      | 3.000E+01  | BIOFAC ( 31,1) |
| D-5  | Pu-240 , crustacea and mollusks   | 1.000E+02      | 1.000E+02  | BIOFAC ( 31,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pu-241 , fish                     | 3.000E+01      | 3.000E+01  | BIOFAC ( 33,1) |
| D-5  | Pu-241 , crustacea and mollusks   | 1.000E+02      | 1.000E+02  | BIOFAC ( 33,2) |
| D-5  |                                   |                |            |                |
| D-5  | Pu-241+D , fish                   | 3.000E+01      | 3.000E+01  | BIOFAC ( 34,1) |
| D-5  | Pu-241+D , crustacea and mollusks | 1.000E+02      | 1.000E+02  | BIOFAC ( 34,2) |
| D-5  |                                   |                |            |                |
| D-5  | Ra-226+D , fish                   | 5.000E+01      | 5.000E+01  | BIOFAC ( 35,1) |
| D-5  | Ra-226+D , crustacea and mollusks | 2.500E+02      | 2.500E+02  | BIOFAC ( 35,2) |
| D-5  |                                   |                |            |                |
| D-5  | Ra-228+D , fish                   | 5.000E+01      | 5.000E+01  | BIOFAC ( 36,1) |
| D-5  | Ra-228+D , crustacea and mollusks | 2.500E+02      | 2.500E+02  | BIOFAC ( 36,2) |
| D-5  |                                   |                |            |                |
| D-5  | Sb-125 , fish                     | 1.000E+02      | 1.000E+02  | BIOFAC ( 37,1) |
| D-5  | Sb-125 , crustacea and mollusks   | 1.000E+01      | 1.000E+01  | BIOFAC ( 37,2) |
| D-5  |                                   |                |            |                |
| D-5  | Sr-90+D , fish                    | 6.000E+01      | 6.000E+01  | BIOFAC ( 39,1) |
| D-5  | Sr-90+D , crustacea and mollusks  | 1.000E+02      | 1.000E+02  | BIOFAC ( 39,2) |
| D-5  |                                   |                |            |                |
| D-5  | Tc-99 , fish                      | 2.000E+01      | 2.000E+01  | BIOFAC ( 40,1) |
| D-5  | Tc-99 , crustacea and mollusks    | 5.000E+00      | 5.000E+00  | BIOFAC ( 40,2) |

Summary : RESRAD Default Parameters

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## Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: FCS FGR11 Plus FGR 11

| Menu | Parameter                         | Current Value# | Base Case* | Parameter Name |
|------|-----------------------------------|----------------|------------|----------------|
| D-5  | Te-125m , fish                    | 4.000E+02      | 4.000E+02  | BIOFAC ( 41,1) |
| D-5  | Te-125m , crustacea and mollusks  | 7.500E+01      | 7.500E+01  | BIOFAC ( 41,2) |
| D-5  |                                   |                |            |                |
| D-5  | Th-228+D , fish                   | 1.000E+02      | 1.000E+02  | BIOFAC ( 42,1) |
| D-5  | Th-228+D , crustacea and mollusks | 5.000E+02      | 5.000E+02  | BIOFAC ( 42,2) |
| D-5  |                                   |                |            |                |
| D-5  | Th-229+D , fish                   | 1.000E+02      | 1.000E+02  | BIOFAC ( 43,1) |
| D-5  | Th-229+D , crustacea and mollusks | 5.000E+02      | 5.000E+02  | BIOFAC ( 43,2) |
| D-5  |                                   |                |            |                |
| D-5  | Th-230 , fish                     | 1.000E+02      | 1.000E+02  | BIOFAC ( 44,1) |
| D-5  | Th-230 , crustacea and mollusks   | 5.000E+02      | 5.000E+02  | BIOFAC ( 44,2) |
| D-5  |                                   |                |            |                |
| D-5  | Th-232 , fish                     | 1.000E+02      | 1.000E+02  | BIOFAC ( 45,1) |
| D-5  | Th-232 , crustacea and mollusks   | 5.000E+02      | 5.000E+02  | BIOFAC ( 45,2) |
| D-5  |                                   |                |            |                |
| D-5  | U-233 , fish                      | 1.000E+01      | 1.000E+01  | BIOFAC ( 46,1) |
| D-5  | U-233 , crustacea and mollusks    | 6.000E+01      | 6.000E+01  | BIOFAC ( 46,2) |
| D-5  |                                   |                |            |                |
| D-5  | U-234 , fish                      | 1.000E+01      | 1.000E+01  | BIOFAC ( 47,1) |
| D-5  | U-234 , crustacea and mollusks    | 6.000E+01      | 6.000E+01  | BIOFAC ( 47,2) |
| D-5  |                                   |                |            |                |
| D-5  | U-235+D , fish                    | 1.000E+01      | 1.000E+01  | BIOFAC ( 48,1) |
| D-5  | U-235+D , crustacea and mollusks  | 6.000E+01      | 6.000E+01  | BIOFAC ( 48,2) |
| D-5  |                                   |                |            |                |
| D-5  | U-236 , fish                      | 1.000E+01      | 1.000E+01  | BIOFAC ( 49,1) |
| D-5  | U-236 , crustacea and mollusks    | 6.000E+01      | 6.000E+01  | BIOFAC ( 49,2) |

#For DCF1(xxx) only, factors are for infinite depth &amp; area. See ETEG table in Ground Pathway of Detailed Report.

\*Base Case means Default.Lib w/o Associate Nuclide contributions.

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary

| Menu | Parameter                                      | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|-----------|--|----------------|
| R011 | Area of contaminated zone (m**2)               | 5.660E-01  | 1.000E+04 | ---  | AREA           |
| R011 | Thickness of contaminated zone (m)             | 1.500E-01  | 2.000E+00 | ---  | THICK0         |
| R011 | Fraction of contamination that is submerged    | 0.000E+00  | 0.000E+00 | ---  | SUBMFRACT      |
| R011 | Length parallel to aquifer flow (m)            | 8.500E-01  | 1.000E+02 | ---  | LCZPAQ         |
| R011 | Basic radiation dose limit (mrem/yr)           | 2.500E+01  | 3.000E+01 | ---  | BRDL           |
| R011 | Time since placement of material (yr)          | 0.000E+00  | 0.000E+00 | ---  | TI             |
| R011 | Times for calculations (yr)                    | 1.000E+00  | 1.000E+00 | ---  | T( 2)          |
| R011 | Times for calculations (yr)                    | 3.000E+00  | 3.000E+00 | ---  | T( 3)          |
| R011 | Times for calculations (yr)                    | 1.000E+01  | 1.000E+01 | ---  | T( 4)          |
| R011 | Times for calculations (yr)                    | 3.000E+01  | 3.000E+01 | ---  | T( 5)          |
| R011 | Times for calculations (yr)                    | 1.000E+02  | 1.000E+02 | ---  | T( 6)          |
| R011 | Times for calculations (yr)                    | 3.000E+02  | 3.000E+02 | ---  | T( 7)          |
| R011 | Times for calculations (yr)                    | 1.000E+03  | 1.000E+03 | ---  | T( 8)          |
| R011 | Times for calculations (yr)                    | not used   | 0.000E+00 | ---  | T( 9)          |
| R011 | Times for calculations (yr)                    | not used   | 0.000E+00 | ---  | T(10)          |
| R012 | Initial principal radionuclide (pCi/g): Am-241 | 1.000E+00  | 0.000E+00 | ---  | S1(2)          |
| R012 | Initial principal radionuclide (pCi/g): C-14   | 1.000E+00  | 0.000E+00 | ---  | S1(4)          |
| R012 | Initial principal radionuclide (pCi/g): Ce-144 | 1.000E+00  | 0.000E+00 | ---  | S1(5)          |
| R012 | Initial principal radionuclide (pCi/g): Cm-243 | 1.000E+00  | 0.000E+00 | ---  | S1(6)          |
| R012 | Initial principal radionuclide (pCi/g): Cm-244 | 1.000E+00  | 0.000E+00 | ---  | S1(8)          |
| R012 | Initial principal radionuclide (pCi/g): Co-58  | 1.000E+00  | 0.000E+00 | ---  | S1(11)         |
| R012 | Initial principal radionuclide (pCi/g): Co-60  | 1.000E+00  | 0.000E+00 | ---  | S1(12)         |
| R012 | Initial principal radionuclide (pCi/g): Cs-134 | 1.000E+00  | 0.000E+00 | ---  | S1(13)         |
| R012 | Initial principal radionuclide (pCi/g): Cs-137 | 1.000E+00  | 0.000E+00 | ---  | S1(14)         |
| R012 | Initial principal radionuclide (pCi/g): Eu-152 | 1.000E+00  | 0.000E+00 | ---  | S1(15)         |
| R012 | Initial principal radionuclide (pCi/g): Eu-154 | 1.000E+00  | 0.000E+00 | ---  | S1(17)         |
| R012 | Initial principal radionuclide (pCi/g): Eu-155 | 1.000E+00  | 0.000E+00 | ---  | S1(18)         |
| R012 | Initial principal radionuclide (pCi/g): Fe-55  | 1.000E+00  | 0.000E+00 | ---  | S1(19)         |
| R012 | Initial principal radionuclide (pCi/g): H-3    | 1.000E+00  | 0.000E+00 | ---  | S1(21)         |
| R012 | Initial principal radionuclide (pCi/g): Ni-59  | 1.000E+00  | 0.000E+00 | ---  | S1(22)         |
| R012 | Initial principal radionuclide (pCi/g): Ni-63  | 1.000E+00  | 0.000E+00 | ---  | S1(23)         |
| R012 | Initial principal radionuclide (pCi/g): Np-237 | 1.000E+00  | 0.000E+00 | ---  | S1(24)         |
| R012 | Initial principal radionuclide (pCi/g): Pu-238 | 1.000E+00  | 0.000E+00 | ---  | S1(28)         |
| R012 | Initial principal radionuclide (pCi/g): Pu-239 | 1.000E+00  | 0.000E+00 | ---  | S1(30)         |
| R012 | Initial principal radionuclide (pCi/g): Pu-240 | 1.000E+00  | 0.000E+00 | ---  | S1(31)         |
| R012 | Initial principal radionuclide (pCi/g): Pu-241 | 1.000E+00  | 0.000E+00 | ---  | S1(33)         |
| R012 | Initial principal radionuclide (pCi/g): Sb-125 | 1.000E+00  | 0.000E+00 | ---  | S1(37)         |
| R012 | Initial principal radionuclide (pCi/g): Sr-90  | 1.000E+00  | 0.000E+00 | ---  | S1(39)         |
| R012 | Initial principal radionuclide (pCi/g): Tc-99  | 1.000E+00  | 0.000E+00 | ---  | S1(40)         |
| R012 | Concentration in groundwater (pCi/L): Am-241   | not used   | 0.000E+00 | ---  | W1( 2)         |
| R012 | Concentration in groundwater (pCi/L): C-14     | not used   | 0.000E+00 | ---  | W1( 4)         |
| R012 | Concentration in groundwater (pCi/L): Ce-144   | not used   | 0.000E+00 | ---  | W1( 5)         |
| R012 | Concentration in groundwater (pCi/L): Cm-243   | not used   | 0.000E+00 | ---  | W1( 6)         |
| R012 | Concentration in groundwater (pCi/L): Cm-244   | not used   | 0.000E+00 | ---  | W1( 8)         |
| R012 | Concentration in groundwater (pCi/L): Co-58    | not used   | 0.000E+00 | ---  | W1(11)         |
| R012 | Concentration in groundwater (pCi/L): Co-60    | not used   | 0.000E+00 | ---  | W1(12)         |
| R012 | Concentration in groundwater (pCi/L): Cs-134   | not used   | 0.000E+00 | ---  | W1(13)         |
| R012 | Concentration in groundwater (pCi/L): Cs-137   | not used   | 0.000E+00 | ---  | W1(14)         |
| R012 | Concentration in groundwater (pCi/L): Eu-152   | not used   | 0.000E+00 | ---  | W1(15)         |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                       | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|---|------------|-----------|--|----------------|
| R012 | Concentration in groundwater (pCi/L): Eu-154    | not used   | 0.000E+00 | ---  | W1 (17)        |
| R012 | Concentration in groundwater (pCi/L): Eu-155    | not used   | 0.000E+00 | ---  | W1 (18)        |
| R012 | Concentration in groundwater (pCi/L): Fe-55     | not used   | 0.000E+00 | ---  | W1 (19)        |
| R012 | Concentration in groundwater (pCi/L): H-3       | not used   | 0.000E+00 | ---  | W1 (21)        |
| R012 | Concentration in groundwater (pCi/L): Ni-59     | not used   | 0.000E+00 | ---  | W1 (22)        |
| R012 | Concentration in groundwater (pCi/L): Ni-63     | not used   | 0.000E+00 | ---  | W1 (23)        |
| R012 | Concentration in groundwater (pCi/L): Np-237    | not used   | 0.000E+00 | ---  | W1 (24)        |
| R012 | Concentration in groundwater (pCi/L): Pu-238    | not used   | 0.000E+00 | ---  | W1 (28)        |
| R012 | Concentration in groundwater (pCi/L): Pu-239    | not used   | 0.000E+00 | ---  | W1 (30)        |
| R012 | Concentration in groundwater (pCi/L): Pu-240    | not used   | 0.000E+00 | ---  | W1 (31)        |
| R012 | Concentration in groundwater (pCi/L): Pu-241    | not used   | 0.000E+00 | ---  | W1 (33)        |
| R012 | Concentration in groundwater (pCi/L): Sb-125    | not used   | 0.000E+00 | ---  | W1 (37)        |
| R012 | Concentration in groundwater (pCi/L): Sr-90     | not used   | 0.000E+00 | ---  | W1 (39)        |
| R012 | Concentration in groundwater (pCi/L): Tc-99     | not used   | 0.000E+00 | ---  | W1 (40)        |
| R013 | Cover depth (m)                                 | 0.000E+00  | 0.000E+00 | ---  | COVER0         |
| R013 | Density of cover material (g/cm**3)             | not used   | 1.500E+00 | ---  | DENSCV         |
| R013 | Cover depth erosion rate (m/yr)                 | not used   | 1.000E-03 | ---  | VCV            |
| R013 | Density of contaminated zone (g/cm**3)          | 1.500E+00  | 1.500E+00 | ---  | DENSCZ         |
| R013 | Contaminated zone erosion rate (m/yr)           | 7.590E-04  | 1.000E-03 | ---  | VCZ            |
| R013 | Contaminated zone total porosity                | 4.300E-01  | 4.000E-01 | ---  | TPCZ           |
| R013 | Contaminated zone field capacity                | 2.800E-01  | 2.000E-01 | ---  | FCCZ           |
| R013 | Contaminated zone hydraulic conductivity (m/yr) | 3.440E+01  | 1.000E+01 | ---  | HCCZ           |
| R013 | Contaminated zone b parameter                   | 2.870E+00  | 5.300E+00 | ---  | BCZ            |
| R013 | Average annual wind speed (m/sec)               | 3.270E+00  | 2.000E+00 | ---  | WIND           |
| R013 | Humidity in air (g/m**3)                        | 7.240E+00  | 8.000E+00 | ---  | HUMID          |
| R013 | Evapotranspiration coefficient                  | 8.700E-01  | 5.000E-01 | ---  | EVAPTR         |
| R013 | Precipitation (m/yr)                            | 7.600E-01  | 1.000E+00 | ---  | PRECIP         |
| R013 | Irrigation (m/yr)                               | 1.900E-01  | 2.000E-01 | ---  | RI             |
| R013 | Irrigation mode                                 | overhead   | overhead  | ---  | IDITCH         |
| R013 | Runoff coefficient                              | 6.300E-01  | 2.000E-01 | ---  | RUNOFF         |
| R013 | Watershed area for nearby stream or pond (m**2) | 1.000E+06  | 1.000E+06 | ---  | WAREA          |
| R013 | Accuracy for water/soil computations            | 1.000E-03  | 1.000E-03 | ---  | EPS            |
| R014 | Density of saturated zone (g/cm**3)             | 1.490E+00  | 1.500E+00 | ---  | DENSAQ         |
| R014 | Saturated zone total porosity                   | 4.500E-01  | 4.000E-01 | ---  | TPSZ           |
| R014 | Saturated zone effective porosity               | 2.000E-01  | 2.000E-01 | ---  | EPSZ           |
| R014 | Saturated zone field capacity                   | 2.400E-01  | 2.000E-01 | ---  | FCSZ           |
| R014 | Saturated zone hydraulic conductivity (m/yr)    | 4.350E+03  | 1.000E+02 | ---  | HCSZ           |
| R014 | Saturated zone hydraulic gradient               | 8.400E-04  | 2.000E-02 | ---  | HGWT           |
| R014 | Saturated zone b parameter                      | not used   | 5.300E+00 | ---  | BSZ            |
| R014 | Water table drop rate (m/yr)                    | 0.000E+00  | 1.000E-03 | ---  | VWT            |
| R014 | Well pump intake depth (m below water table)    | 2.140E+01  | 1.000E+01 | ---  | DWIBWT         |
| R014 | Model: Nondispersion (ND) or Mass-Balance (MB)  | ND         | ND        | ---  | MODEL          |
| R014 | Well pumping rate (m**3/yr)                     | 4.550E+03  | 2.500E+02 | ---  | UW             |
| R015 | Number of unsaturated zone strata               | 1          | 1         | ---  | NS             |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                    | User Input | Default    | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|------------|--|----------------|
| R015 | Unsat. zone 1, thickness (m)                 | 1.000E-01  | 4.000E+00  | ---  | H(1)           |
| R015 | Unsat. zone 1, soil density (g/cm**3)        | 1.500E+00  | 1.500E+00  | ---  | DENSUZ(1)      |
| R015 | Unsat. zone 1, total porosity                | 4.300E-01  | 4.000E-01  | ---  | TPUZ(1)        |
| R015 | Unsat. zone 1, effective porosity            | 1.600E-01  | 2.000E-01  | ---  | EPUZ(1)        |
| R015 | Unsat. zone 1, field capacity                | 2.800E-01  | 2.000E-01  | ---  | FCUZ(1)        |
| R015 | Unsat. zone 1, soil-specific b parameter     | 3.600E+00  | 5.300E+00  | ---  | BUZ(1)         |
| R015 | Unsat. zone 1, hydraulic conductivity (m/yr) | 3.440E+01  | 1.000E+01  | ---  | HCUZ(1)        |
| R016 | Distribution coefficients for Am-241         |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 1.250E+03  | 2.000E+01  | ---  | DCNUCC( 2)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 1.250E+03  | 2.000E+01  | ---  | DCNUCU( 2,1)   |
| R016 | Saturated zone (cm**3/g)                     | 1.000E+03  | 2.000E+01  | ---  | DCNUCS( 2)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 2.178E-04  | ALEACH( 2)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK( 2)     |
| R016 | Distribution coefficients for C-14           |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 9.670E+01  | 0.000E+00  | ---  | DCNUCC( 4)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 9.670E+01  | 0.000E+00  | ---  | DCNUCU( 4,1)   |
| R016 | Saturated zone (cm**3/g)                     | 1.100E+01  | 0.000E+00  | ---  | DCNUCS( 4)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 2.810E-03  | ALEACH( 4)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK( 4)     |
| R016 | Distribution coefficients for Ce-144         |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 3.010E+03  | 1.000E+03  | ---  | DCNUCC( 5)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 3.010E+03  | 1.000E+03  | ---  | DCNUCU( 5,1)   |
| R016 | Saturated zone (cm**3/g)                     | 3.990E+02  | 1.000E+03  | ---  | DCNUCS( 5)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 9.044E-05  | ALEACH( 5)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK( 5)     |
| R016 | Distribution coefficients for Cm-243         |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 1.900E+04  | -1.000E+00 | ---  | DCNUCC( 6)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 1.900E+04  | -1.000E+00 | ---  | DCNUCU( 6,1)   |
| R016 | Saturated zone (cm**3/g)                     | 3.390E+03  | -1.000E+00 | ---  | DCNUCS( 6)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 1.433E-05  | ALEACH( 6)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK( 6)     |
| R016 | Distribution coefficients for Cm-244         |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 1.900E+04  | -1.000E+00 | ---  | DCNUCC( 8)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 1.900E+04  | -1.000E+00 | ---  | DCNUCU( 8,1)   |
| R016 | Saturated zone (cm**3/g)                     | 3.390E+03  | -1.000E+00 | ---  | DCNUCS( 8)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 1.433E-05  | ALEACH( 8)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK( 8)     |
| R016 | Distribution coefficients for Co-58          |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                  | 5.050E+03  | 1.000E+03  | ---  | DCNUCC(11)     |
| R016 | Unsaturated zone 1 (cm**3/g)                 | 5.050E+03  | 1.000E+03  | ---  | DCNUCU(11,1)   |
| R016 | Saturated zone (cm**3/g)                     | 2.600E+02  | 1.000E+03  | ---  | DCNUCS(11)     |
| R016 | Leach rate (/yr)                             | 0.000E+00  | 0.000E+00  | 5.391E-05  | ALEACH(11)     |
| R016 | Solubility constant                          | 0.000E+00  | 0.000E+00  | not used   | SOLUBK(11)     |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                            | User Input | Default    | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--------------------------------------|------------|------------|--|----------------|
| R016 | Distribution coefficients for Co-60  |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 5.050E+03  | 1.000E+03  | ---  | DCNUCC (12)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 5.050E+03  | 1.000E+03  | ---  | DCNUCU (12,1)  |
| R016 | Saturated zone (cm**3/g)             | 2.600E+02  | 1.000E+03  | ---  | DCNUCS (12)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 5.391E-05  | ALEACH (12)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (12)    |
| R016 | Distribution coefficients for Cs-134 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 3.500E+03  | 4.600E+03  | ---  | DCNUCC (13)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 3.500E+03  | 4.600E+03  | ---  | DCNUCU (13,1)  |
| R016 | Saturated zone (cm**3/g)             | 5.280E+02  | 4.600E+03  | ---  | DCNUCS (13)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 7.778E-05  | ALEACH (13)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (13)    |
| R016 | Distribution coefficients for Cs-137 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 3.500E+03  | 4.600E+03  | ---  | DCNUCC (14)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 3.500E+03  | 4.600E+03  | ---  | DCNUCU (14,1)  |
| R016 | Saturated zone (cm**3/g)             | 5.280E+02  | 4.600E+03  | ---  | DCNUCS (14)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 7.778E-05  | ALEACH (14)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (14)    |
| R016 | Distribution coefficients for Eu-152 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 7.270E+03  | -1.000E+00 | ---  | DCNUCC (15)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 7.270E+03  | -1.000E+00 | ---  | DCNUCU (15,1)  |
| R016 | Saturated zone (cm**3/g)             | 8.290E+02  | -1.000E+00 | ---  | DCNUCS (15)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 3.745E-05  | ALEACH (15)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (15)    |
| R016 | Distribution coefficients for Eu-154 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 7.270E+03  | -1.000E+00 | ---  | DCNUCC (17)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 7.270E+03  | -1.000E+00 | ---  | DCNUCU (17,1)  |
| R016 | Saturated zone (cm**3/g)             | 8.290E+02  | -1.000E+00 | ---  | DCNUCS (17)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 3.745E-05  | ALEACH (17)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (17)    |
| R016 | Distribution coefficients for Eu-155 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 7.270E+03  | -1.000E+00 | ---  | DCNUCC (18)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 7.270E+03  | -1.000E+00 | ---  | DCNUCU (18,1)  |
| R016 | Saturated zone (cm**3/g)             | 8.290E+02  | -1.000E+00 | ---  | DCNUCS (18)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 3.745E-05  | ALEACH (18)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (18)    |
| R016 | Distribution coefficients for Fe-55  |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 8.890E+02  | 1.000E+03  | ---  | DCNUCC (19)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 8.890E+02  | 1.000E+03  | ---  | DCNUCU (19,1)  |
| R016 | Saturated zone (cm**3/g)             | 3.210E+02  | 1.000E+03  | ---  | DCNUCS (19)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 3.062E-04  | ALEACH (19)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (19)    |

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Site-Specific Parameter Summary (continued)

| Menu | Parameter                            | User Input | Default    | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--------------------------------------|------------|------------|--|----------------|
| R016 | Distribution coefficients for H-3    |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 4.300E-02  | 0.000E+00  | ---  | DCNUCC (21)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 4.300E-02  | 0.000E+00  | ---  | DCNUCU (21,1)  |
| R016 | Saturated zone (cm**3/g)             | 6.020E-02  | 0.000E+00  | ---  | DCNUCS (21)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 1.185E+00  | ALEACH (21)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (21)    |
| R016 | Distribution coefficients for Ni-59  |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 1.790E+02  | 1.000E+03  | ---  | DCNUCC (22)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 1.790E+02  | 1.000E+03  | ---  | DCNUCU (22,1)  |
| R016 | Saturated zone (cm**3/g)             | 1.300E+02  | 1.000E+03  | ---  | DCNUCS (22)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 1.519E-03  | ALEACH (22)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (22)    |
| R016 | Distribution coefficients for Ni-63  |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 5.320E+02  | 1.000E+03  | ---  | DCNUCC (23)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 5.320E+02  | 1.000E+03  | ---  | DCNUCU (23,1)  |
| R016 | Saturated zone (cm**3/g)             | 1.300E+02  | 1.000E+03  | ---  | DCNUCS (23)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 5.116E-04  | ALEACH (23)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (23)    |
| R016 | Distribution coefficients for Np-237 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 9.050E+00  | -1.000E+00 | ---  | DCNUCC (24)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 9.050E+00  | -1.000E+00 | ---  | DCNUCU (24,1)  |
| R016 | Saturated zone (cm**3/g)             | 5.490E+00  | -1.000E+00 | ---  | DCNUCS (24)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 2.947E-02  | ALEACH (24)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (24)    |
| R016 | Distribution coefficients for Pu-238 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 9.530E+02  | 2.000E+03  | ---  | DCNUCC (28)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 9.530E+02  | 2.000E+03  | ---  | DCNUCU (28,1)  |
| R016 | Saturated zone (cm**3/g)             | 3.990E+02  | 2.000E+03  | ---  | DCNUCS (28)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 2.856E-04  | ALEACH (28)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (28)    |
| R016 | Distribution coefficients for Pu-239 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 9.530E+02  | 2.000E+03  | ---  | DCNUCC (30)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 9.530E+02  | 2.000E+03  | ---  | DCNUCU (30,1)  |
| R016 | Saturated zone (cm**3/g)             | 3.990E+02  | 2.000E+03  | ---  | DCNUCS (30)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 2.856E-04  | ALEACH (30)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (30)    |
| R016 | Distribution coefficients for Pu-240 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)          | 9.530E+02  | 2.000E+03  | ---  | DCNUCC (31)    |
| R016 | Unsaturated zone 1 (cm**3/g)         | 9.530E+02  | 2.000E+03  | ---  | DCNUCU (31,1)  |
| R016 | Saturated zone (cm**3/g)             | 3.990E+02  | 2.000E+03  | ---  | DCNUCS (31)    |
| R016 | Leach rate (/yr)                     | 0.000E+00  | 0.000E+00  | 2.856E-04  | ALEACH (31)    |
| R016 | Solubility constant                  | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (31)    |



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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                     | User Input | Default    | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|---|------------|------------|--|----------------|
| R016 | Distribution coefficients for Pu-241          |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 9.530E+02  | 2.000E+03  | ---  | DCNUCC (33)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 9.530E+02  | 2.000E+03  | ---  | DCNUCU (33,1)  |
| R016 | Saturated zone (cm**3/g)                      | 3.990E+02  | 2.000E+03  | ---  | DCNUCS (33)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 2.856E-04  | ALEACH (33)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (33)    |
| R016 | Distribution coefficients for Sb-125          |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.280E+02  | 0.000E+00  | ---  | DCNUCC (37)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.280E+02  | 0.000E+00  | ---  | DCNUCU (37,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.690E+01  | 0.000E+00  | ---  | DCNUCS (37)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 2.124E-03  | ALEACH (37)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (37)    |
| R016 | Distribution coefficients for Sr-90           |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.680E+02  | 3.000E+01  | ---  | DCNUCC (39)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.680E+02  | 3.000E+01  | ---  | DCNUCU (39,1)  |
| R016 | Saturated zone (cm**3/g)                      | 2.200E+01  | 3.000E+01  | ---  | DCNUCS (39)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 1.619E-03  | ALEACH (39)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (39)    |
| R016 | Distribution coefficients for Tc-99           |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.470E-01  | 0.000E+00  | ---  | DCNUCC (40)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.470E-01  | 0.000E+00  | ---  | DCNUCU (40,1)  |
| R016 | Saturated zone (cm**3/g)                      | 4.000E-01  | 0.000E+00  | ---  | DCNUCS (40)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 8.159E-01  | ALEACH (40)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (40)    |
| R016 | Distribution coefficients for daughter Ac-227 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 8.290E+02  | 2.000E+01  | ---  | DCNUCC ( 1)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 8.290E+02  | 2.000E+01  | ---  | DCNUCU ( 1,1)  |
| R016 | Saturated zone (cm**3/g)                      | 8.290E+02  | 2.000E+01  | ---  | DCNUCS ( 1)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 3.283E-04  | ALEACH ( 1)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK ( 1)    |
| R016 | Distribution coefficients for daughter Am-243 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 4.190E+03  | 2.000E+01  | ---  | DCNUCC ( 3)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 4.190E+03  | 2.000E+01  | ---  | DCNUCU ( 3,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.000E+03  | 2.000E+01  | ---  | DCNUCS ( 3)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 6.497E-05  | ALEACH ( 3)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK ( 3)    |
| R016 | Distribution coefficients for daughter Gd-152 |            |            |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 8.290E+02  | -1.000E+00 | ---  | DCNUCC (20)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 8.290E+02  | -1.000E+00 | ---  | DCNUCU (20,1)  |
| R016 | Saturated zone (cm**3/g)                      | 8.290E+02  | -1.000E+00 | ---  | DCNUCS (20)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00  | 3.283E-04  | ALEACH (20)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00  | not used   | SOLUBK (20)    |

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                      | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|-----------|--|----------------|
| R016 | Distribution coefficients for daughter Pa-231  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 3.800E+02  | 5.000E+01 | ---  | DCNUCC (25)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 3.800E+02  | 5.000E+01 | ---  | DCNUCU (25,1)  |
| R016 | Saturated zone (cm**3/g)                       | 3.800E+02  | 5.000E+01 | ---  | DCNUCS (25)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 7.161E-04  | ALEACH (25)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (25)    |
| R016 | Distribution coefficients for daughter Pb-210  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 1.000E+04  | 1.000E+02 | ---  | DCNUCC (26)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 1.000E+04  | 1.000E+02 | ---  | DCNUCU (26,1)  |
| R016 | Saturated zone (cm**3/g)                       | 2.190E+02  | 1.000E+02 | ---  | DCNUCS (26)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 2.722E-05  | ALEACH (26)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (26)    |
| R016 | Distribution coefficients for daughter Po-210  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 2.300E+02  | 1.000E+01 | ---  | DCNUCC (27)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 2.300E+02  | 1.000E+01 | ---  | DCNUCU (27,1)  |
| R016 | Saturated zone (cm**3/g)                       | 1.000E+02  | 1.000E+01 | ---  | DCNUCS (27)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 1.183E-03  | ALEACH (27)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (27)    |
| R016 | Distribution coefficients for daughter Ra-226  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 7.130E+02  | 7.000E+01 | ---  | DCNUCC (35)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 7.130E+02  | 7.000E+01 | ---  | DCNUCU (35,1)  |
| R016 | Saturated zone (cm**3/g)                       | 3.100E+03  | 7.000E+01 | ---  | DCNUCS (35)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 3.817E-04  | ALEACH (35)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (35)    |
| R016 | Distribution coefficients for daughter Ra-228  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 7.130E+02  | 7.000E+01 | ---  | DCNUCC (36)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 7.130E+02  | 7.000E+01 | ---  | DCNUCU (36,1)  |
| R016 | Saturated zone (cm**3/g)                       | 3.100E+03  | 7.000E+01 | ---  | DCNUCS (36)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 3.817E-04  | ALEACH (36)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (36)    |
| R016 | Distribution coefficients for daughter Te-125m |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 3.810E+01  | 0.000E+00 | ---  | DCNUCC (41)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 3.810E+01  | 0.000E+00 | ---  | DCNUCU (41,1)  |
| R016 | Saturated zone (cm**3/g)                       | 3.810E+01  | 0.000E+00 | ---  | DCNUCS (41)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 7.111E-03  | ALEACH (41)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (41)    |
| R016 | Distribution coefficients for daughter Th-228  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                    | 1.800E+04  | 6.000E+04 | ---  | DCNUCC (42)    |
| R016 | Unsaturated zone 1 (cm**3/g)                   | 1.800E+04  | 6.000E+04 | ---  | DCNUCU (42,1)  |
| R016 | Saturated zone (cm**3/g)                       | 6.990E+02  | 6.000E+04 | ---  | DCNUCS (42)    |
| R016 | Leach rate (/yr)                               | 0.000E+00  | 0.000E+00 | 1.512E-05  | ALEACH (42)    |
| R016 | Solubility constant                            | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (42)    |

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                     | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|---|------------|-----------|--|----------------|
| R016 | Distribution coefficients for daughter Th-229 |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.800E+04  | 6.000E+04 | ---  | DCNUCC (43)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.800E+04  | 6.000E+04 | ---  | DCNUCU (43,1)  |
| R016 | Saturated zone (cm**3/g)                      | 6.990E+02  | 6.000E+04 | ---  | DCNUCS (43)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 1.512E-05  | ALEACH (43)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (43)    |
| R016 | Distribution coefficients for daughter Th-230 |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.800E+04  | 6.000E+04 | ---  | DCNUCC (44)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.800E+03  | 6.000E+04 | ---  | DCNUCU (44,1)  |
| R016 | Saturated zone (cm**3/g)                      | 6.990E+02  | 6.000E+04 | ---  | DCNUCS (44)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 1.512E-05  | ALEACH (44)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (44)    |
| R016 | Distribution coefficients for daughter Th-232 |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 1.800E+04  | 6.000E+04 | ---  | DCNUCC (45)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.800E+04  | 6.000E+04 | ---  | DCNUCU (45,1)  |
| R016 | Saturated zone (cm**3/g)                      | 6.990E+02  | 6.000E+04 | ---  | DCNUCS (45)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 1.512E-05  | ALEACH (45)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (45)    |
| R016 | Distribution coefficients for daughter U-233  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 3.110E+02  | 5.000E+01 | ---  | DCNUCC (46)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 3.110E+02  | 5.000E+01 | ---  | DCNUCU (46,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.000E+02  | 5.000E+01 | ---  | DCNUCS (46)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 8.749E-04  | ALEACH (46)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (46)    |
| R016 | Distribution coefficients for daughter U-234  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 3.110E+02  | 5.000E+01 | ---  | DCNUCC (47)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 3.110E+02  | 5.000E+01 | ---  | DCNUCU (47,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.100E+02  | 5.000E+01 | ---  | DCNUCS (47)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 8.749E-04  | ALEACH (47)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (47)    |
| R016 | Distribution coefficients for daughter U-235  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 3.110E+02  | 5.000E+01 | ---  | DCNUCC (48)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 3.110E+02  | 5.000E+01 | ---  | DCNUCU (48,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.100E+02  | 5.000E+01 | ---  | DCNUCS (48)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 8.749E-04  | ALEACH (48)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (48)    |
| R016 | Distribution coefficients for daughter U-236  |            |           |  |                |
| R016 | Contaminated zone (cm**3/g)                   | 3.110E+02  | 5.000E+01 | ---  | DCNUCC (49)    |
| R016 | Unsaturated zone 1 (cm**3/g)                  | 1.100E+01  | 5.000E+01 | ---  | DCNUCU (49,1)  |
| R016 | Saturated zone (cm**3/g)                      | 1.100E+02  | 5.000E+01 | ---  | DCNUCS (49)    |
| R016 | Leach rate (/yr)                              | 0.000E+00  | 0.000E+00 | 8.749E-04  | ALEACH (49)    |
| R016 | Solubility constant                           | 0.000E+00  | 0.000E+00 | not used   | SOLUBK (49)    |
| R017 | Inhalation rate (m**3/yr)                     | 8.600E+03  | 8.400E+03 | ---  | INHALR         |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter  | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|-----------|--|----------------|
| R017 | Mass loading for inhalation (g/m**3)             | 2.870E-05  | 1.000E-04 | ---  | MLINH          |
| R017 | Exposure duration                                | 3.000E+01  | 3.000E+01 | ---  | ED             |
| R017 | Shielding factor, inhalation                     | 7.500E-01  | 4.000E-01 | ---  | SHF3           |
| R017 | Shielding factor, external gamma                 | 5.520E-01  | 7.000E-01 | ---  | SHF1           |
| R017 | Fraction of time spent indoors                   | 6.600E-01  | 5.000E-01 | ---  | FIND           |
| R017 | Fraction of time spent outdoors (on site)        | 1.200E-01  | 2.500E-01 | ---  | FOTD           |
| R017 | Shape factor flag, external gamma                | 1.000E+00  | 1.000E+00 | >0 shows circular AREA.                          | FS             |
| R017 | Radii of shape factor array (used if FS = -1):   |            |           |  |                |
| R017 | Outer annular radius (m), ring 1:                | not used   | 5.000E+01 | ---  | RAD_SHAPE ( 1) |
| R017 | Outer annular radius (m), ring 2:                | not used   | 7.071E+01 | ---  | RAD_SHAPE ( 2) |
| R017 | Outer annular radius (m), ring 3:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 3) |
| R017 | Outer annular radius (m), ring 4:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 4) |
| R017 | Outer annular radius (m), ring 5:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 5) |
| R017 | Outer annular radius (m), ring 6:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 6) |
| R017 | Outer annular radius (m), ring 7:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 7) |
| R017 | Outer annular radius (m), ring 8:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 8) |
| R017 | Outer annular radius (m), ring 9:                | not used   | 0.000E+00 | ---  | RAD_SHAPE ( 9) |
| R017 | Outer annular radius (m), ring 10:               | not used   | 0.000E+00 | ---  | RAD_SHAPE (10) |
| R017 | Outer annular radius (m), ring 11:               | not used   | 0.000E+00 | ---  | RAD_SHAPE (11) |
| R017 | Outer annular radius (m), ring 12:               | not used   | 0.000E+00 | ---  | RAD_SHAPE (12) |
| R017 | Fractions of annular areas within AREA:          |            |           |  |                |
| R017 | Ring 1   | not used   | 1.000E+00 | ---  | FRACA ( 1)     |
| R017 | Ring 2   | not used   | 2.732E-01 | ---  | FRACA ( 2)     |
| R017 | Ring 3   | not used   | 0.000E+00 | ---  | FRACA ( 3)     |
| R017 | Ring 4   | not used   | 0.000E+00 | ---  | FRACA ( 4)     |
| R017 | Ring 5   | not used   | 0.000E+00 | ---  | FRACA ( 5)     |
| R017 | Ring 6   | not used   | 0.000E+00 | ---  | FRACA ( 6)     |
| R017 | Ring 7   | not used   | 0.000E+00 | ---  | FRACA ( 7)     |
| R017 | Ring 8   | not used   | 0.000E+00 | ---  | FRACA ( 8)     |
| R017 | Ring 9   | not used   | 0.000E+00 | ---  | FRACA ( 9)     |
| R017 | Ring 10  | not used   | 0.000E+00 | ---  | FRACA (10)     |
| R017 | Ring 11  | not used   | 0.000E+00 | ---  | FRACA (11)     |
| R017 | Ring 12  | not used   | 0.000E+00 | ---  | FRACA (12)     |
| R018 | Fruits, vegetables and grain consumption (kg/yr) | 2.240E+02  | 1.600E+02 | ---  | DIET (1)       |
| R018 | Leafy vegetable consumption (kg/yr)              | 4.280E+01  | 1.400E+01 | ---  | DIET (2)       |
| R018 | Milk consumption (L/yr)                          | 2.330E+02  | 9.200E+01 | ---  | DIET (3)       |
| R018 | Meat and poultry consumption (kg/yr)             | 6.510E+01  | 6.300E+01 | ---  | DIET (4)       |
| R018 | Fish consumption (kg/yr)                         | not used   | 5.400E+00 | ---  | DIET (5)       |
| R018 | Other seafood consumption (kg/yr)                | not used   | 9.000E-01 | ---  | DIET (6)       |
| R018 | Soil ingestion rate (g/yr)                       | 1.830E+01  | 3.650E+01 | ---  | SOIL           |
| R018 | Drinking water intake (L/yr)                     | 4.780E+02  | 5.100E+02 | ---  | DWI            |
| R018 | Contamination fraction of drinking water         | 1.000E+00  | 1.000E+00 | ---  | FDW            |
| R018 | Contamination fraction of household water        | not used   | 1.000E+00 | ---  | FHHW           |
| R018 | Contamination fraction of livestock water        | 1.000E+00  | 1.000E+00 | ---  | FLW            |
| R018 | Contamination fraction of irrigation water       | 1.000E+00  | 1.000E+00 | ---  | FIRW           |
| R018 | Contamination fraction of aquatic food           | not used   | 5.000E-01 | ---  | FR9            |
| R018 | Contamination fraction of plant food             | -1         | -1        | 0.283E-03  | FPLANT         |
| R018 | Contamination fraction of meat                   | -1         | -1        | 0.283E-04  | FMEAT          |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter  | User Input | Default   | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|-----------|--|----------------|
| R018 | Contamination fraction of milk                   | -1         | -1        | 0.283E-04  | FMILK          |
| R019 | Livestock fodder intake for meat (kg/day)        | 2.710E+01  | 6.800E+01 | ---  | LFI5           |
| R019 | Livestock fodder intake for milk (kg/day)        | 6.321E+01  | 5.500E+01 | ---  | LFI6           |
| R019 | Livestock water intake for meat (L/day)          | 5.060E+01  | 5.000E+01 | ---  | LWI5           |
| R019 | Livestock water intake for milk (L/day)          | 6.000E+01  | 1.600E+02 | ---  | LWI6           |
| R019 | Livestock soil intake (kg/day)                   | 7.000E-01  | 5.000E-01 | ---  | LSI            |
| R019 | Mass loading for foliar deposition (g/m**3)      | 4.000E-04  | 1.000E-04 | ---  | MLFD           |
| R019 | Depth of soil mixing layer (m)                   | 2.300E-01  | 1.500E-01 | ---  | DM             |
| R019 | Depth of roots (m)                               | 1.230E+00  | 9.000E-01 | ---  | DROOT          |
| R019 | Drinking water fraction from ground water        | 1.000E+00  | 1.000E+00 | ---  | FGWDW          |
| R019 | Household water fraction from ground water       | not used   | 1.000E+00 | ---  | FGWHH          |
| R019 | Livestock water fraction from ground water       | 1.000E+00  | 1.000E+00 | ---  | FGWLW          |
| R019 | Irrigation fraction from ground water            | 1.000E+00  | 1.000E+00 | ---  | FGWIR          |
| R19B | Wet weight crop yield for Non-Leafy (kg/m**2)    | 1.750E+00  | 7.000E-01 | ---  | YV(1)          |
| R19B | Wet weight crop yield for Leafy (kg/m**2)        | 2.890E+00  | 1.500E+00 | ---  | YV(2)          |
| R19B | Wet weight crop yield for Fodder (kg/m**2)       | 1.890E+00  | 1.100E+00 | ---  | YV(3)          |
| R19B | Growing Season for Non-Leafy (years)             | 2.460E-01  | 1.700E-01 | ---  | TE(1)          |
| R19B | Growing Season for Leafy (years)                 | 1.230E-01  | 2.500E-01 | ---  | TE(2)          |
| R19B | Growing Season for Fodder (years)                | 8.200E-02  | 8.000E-02 | ---  | TE(3)          |
| R19B | Translocation Factor for Non-Leafy               | 1.000E-01  | 1.000E-01 | ---  | TIV(1)         |
| R19B | Translocation Factor for Leafy                   | 1.000E+00  | 1.000E+00 | ---  | TIV(2)         |
| R19B | Translocation Factor for Fodder                  | 1.000E+00  | 1.000E+00 | ---  | TIV(3)         |
| R19B | Dry Foliar Interception Fraction for Non-Leafy   | 3.500E-01  | 2.500E-01 | ---  | RDRY(1)        |
| R19B | Dry Foliar Interception Fraction for Leafy       | 3.500E-01  | 2.500E-01 | ---  | RDRY(2)        |
| R19B | Dry Foliar Interception Fraction for Fodder      | 3.500E-01  | 2.500E-01 | ---  | RDRY(3)        |
| R19B | Wet Foliar Interception Fraction for Non-Leafy   | 3.500E-01  | 2.500E-01 | ---  | RWET(1)        |
| R19B | Wet Foliar Interception Fraction for Leafy       | 5.800E-01  | 2.500E-01 | ---  | RWET(2)        |
| R19B | Wet Foliar Interception Fraction for Fodder      | 3.500E-01  | 2.500E-01 | ---  | RWET(3)        |
| R19B | Weathering Removal Constant for Vegetation       | 3.300E+01  | 2.000E+01 | ---  | WLAM           |
| C14  | C-12 concentration in water (g/cm**3)            | 2.000E-05  | 2.000E-05 | ---  | C12WTR         |
| C14  | C-12 concentration in contaminated soil (g/g)    | 3.000E-02  | 3.000E-02 | ---  | C12CZ          |
| C14  | Fraction of vegetation carbon from soil          | 2.000E-02  | 2.000E-02 | ---  | CSOIL          |
| C14  | Fraction of vegetation carbon from air           | 9.800E-01  | 9.800E-01 | ---  | CAIR           |
| C14  | C-14 evasion layer thickness in soil (m)         | 3.000E-01  | 3.000E-01 | ---  | DMC            |
| C14  | C-14 evasion flux rate from soil (1/sec)         | 7.000E-07  | 7.000E-07 | ---  | EVSN           |
| C14  | C-12 evasion flux rate from soil (1/sec)         | 1.000E-10  | 1.000E-10 | ---  | REVSN          |
| C14  | Fraction of grain in beef cattle feed            | 9.000E-02  | 8.000E-01 | ---  | AVFG4          |
| C14  | Fraction of grain in milk cow feed               | 3.000E-02  | 2.000E-01 | ---  | AVFG5          |
| STOR | Storage times of contaminated foodstuffs (days): |            |           |  |                |
| STOR | Fruits, non-leafy vegetables, and grain          | 1.400E+01  | 1.400E+01 | ---  | STOR_T(1)      |
| STOR | Leafy vegetables                                 | 1.000E+00  | 1.000E+00 | ---  | STOR_T(2)      |
| STOR | Milk   | 1.000E+00  | 1.000E+00 | ---  | STOR_T(3)      |
| STOR | Meat and poultry                                 | 2.000E+01  | 2.000E+01 | ---  | STOR_T(4)      |
| STOR | Fish   | 7.000E+00  | 7.000E+00 | ---  | STOR_T(5)      |
| STOR | Crustacea and mollusks                           | 7.000E+00  | 7.000E+00 | ---  | STOR_T(6)      |
| STOR | Well water                                       | 1.000E+00  | 1.000E+00 | ---  | STOR_T(7)      |

Summary : RESRAD Default Parameters

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## Site-Specific Parameter Summary (continued)

| Menu | Parameter                                      | User Input | Default    | Used by RESRAD<br>(If different from user input) | Parameter Name |
|------|--|------------|------------|--|----------------|
| STOR | Surface water                                  | 1.000E+00  | 1.000E+00  | ---  | STOR_T(8)      |
| STOR | Livestock fodder                               | 4.500E+01  | 4.500E+01  | ---  | STOR_T(9)      |
| R021 | Thickness of building foundation (m)           | not used   | 1.500E-01  | ---  | FLOOR1         |
| R021 | Bulk density of building foundation (g/cm**3)  | not used   | 2.400E+00  | ---  | DENSFL         |
| R021 | Total porosity of the cover material           | not used   | 4.000E-01  | ---  | TPCV           |
| R021 | Total porosity of the building foundation      | not used   | 1.000E-01  | ---  | TPFL           |
| R021 | Volumetric water content of the cover material | not used   | 5.000E-02  | ---  | PH2OCV         |
| R021 | Volumetric water content of the foundation     | not used   | 3.000E-02  | ---  | PH2OFL         |
| R021 | Diffusion coefficient for radon gas (m/sec):   |            |            |  |                |
| R021 | in cover material                              | not used   | 2.000E-06  | ---  | DIFCV          |
| R021 | in foundation material                         | not used   | 3.000E-07  | ---  | DIFFL          |
| R021 | in contaminated zone soil                      | not used   | 2.000E-06  | ---  | DIFCZ          |
| R021 | Radon vertical dimension of mixing (m)         | not used   | 2.000E+00  | ---  | HMIX           |
| R021 | Average building air exchange rate (1/hr)      | not used   | 5.000E-01  | ---  | REXG           |
| R021 | Height of the building (room) (m)              | not used   | 2.500E+00  | ---  | HRM            |
| R021 | Building interior area factor                  | not used   | 0.000E+00  | ---  | FAI            |
| R021 | Building depth below ground surface (m)        | not used   | -1.000E+00 | ---  | DMFL           |
| R021 | Emanating power of Rn-222 gas                  | not used   | 2.500E-01  | ---  | EMANA (1)      |
| R021 | Emanating power of Rn-220 gas                  | not used   | 1.500E-01  | ---  | EMANA (2)      |
| TITL | Number of graphical time points                | 128        | ---        | ---  | NPTS           |
| TITL | Maximum number of integration points for dose  | 17         | ---        | ---  | LYMAX          |
| TITL | Maximum number of integration points for risk  | 1          | ---        | ---  | KYMAX          |

## Summary of Pathway Selections

| Pathway                     | User Selection |
|-----------------------------|----------------|
| 1 -- external gamma         | active         |
| 2 -- inhalation (w/o radon) | active         |
| 3 -- plant ingestion        | active         |
| 4 -- meat ingestion         | active         |
| 5 -- milk ingestion         | active         |
| 6 -- aquatic foods          | suppressed     |
| 7 -- drinking water         | active         |
| 8 -- soil ingestion         | active         |
| 9 -- radon                  | suppressed     |
| Find peak pathway doses     | suppressed     |

Summary : RESRAD Default Parameters

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| Contaminated Zone Dimensions |                    | Initial Soil Concentrations, pCi/g |           |
|------------------------------|--------------------|------------------------------------|-----------|
| Area:                        | 0.57 square meters | Am-241                             | 1.000E+00 |
| Thickness:                   | 0.15 meters        | C-14                               | 1.000E+00 |
| Cover Depth:                 | 0.00 meters        | Ce-144                             | 1.000E+00 |
|                              |                    | Cm-243                             | 1.000E+00 |
|                              |                    | Cm-244                             | 1.000E+00 |
|                              |                    | Co-58                              | 1.000E+00 |
|                              |                    | Co-60                              | 1.000E+00 |
|                              |                    | Cs-134                             | 1.000E+00 |
|                              |                    | Cs-137                             | 1.000E+00 |
|                              |                    | Eu-152                             | 1.000E+00 |
|                              |                    | Eu-154                             | 1.000E+00 |
|                              |                    | Eu-155                             | 1.000E+00 |
|                              |                    | Fe-55                              | 1.000E+00 |
|                              |                    | H-3                                | 1.000E+00 |
|                              |                    | Ni-59                              | 1.000E+00 |
|                              |                    | Ni-63                              | 1.000E+00 |
|                              |                    | Np-237                             | 1.000E+00 |
|                              |                    | Pu-238                             | 1.000E+00 |
|                              |                    | Pu-239                             | 1.000E+00 |
|                              |                    | Pu-240                             | 1.000E+00 |
|                              |                    | Pu-241                             | 1.000E+00 |
|                              |                    | Sb-125                             | 1.000E+00 |
|                              |                    | Sr-90                              | 1.000E+00 |
|                              |                    | Tc-99                              | 1.000E+00 |

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

| t (years): | 0.000E+00 | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| TDOSE(t):  | 9.648E-01 | 8.095E-01 | 6.304E-01 | 3.288E-01 | 1.018E-01 | 1.091E-02 | 2.542E-09 | 1.203E-05 |
| M(t):      | 3.859E-02 | 3.238E-02 | 2.522E-02 | 1.315E-02 | 4.073E-03 | 4.365E-04 | 1.017E-10 | 4.812E-07 |

Maximum TDOSE(t): 9.648E-01 mrem/yr at t = 0.000E+00 years

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.505E-03 | 0.0016 | 2.041E-03  | 0.0021 | 0.000E+00 | 0.0000 | 6.125E-05 | 0.0001 | 1.775E-07 | 0.0000 | 3.671E-08 | 0.0000 | 1.911E-05 | 0.0000 |
| C-14              | 2.185E-08 | 0.0000 | 6.604E-08  | 0.0000 | 0.000E+00 | 0.0000 | 4.830E-07 | 0.0000 | 2.750E-08 | 0.0000 | 1.533E-08 | 0.0000 | 5.059E-10 | 0.0000 |
| Ce-144            | 4.555E-03 | 0.0047 | 1.140E-06  | 0.0000 | 0.000E+00 | 0.0000 | 5.066E-07 | 0.0000 | 4.575E-10 | 0.0000 | 2.168E-09 | 0.0000 | 7.350E-08 | 0.0000 |
| Cm-243            | 1.491E-02 | 0.0155 | 1.396E-03  | 0.0014 | 0.000E+00 | 0.0000 | 4.176E-05 | 0.0000 | 8.604E-08 | 0.0000 | 2.918E-08 | 0.0000 | 1.303E-05 | 0.0000 |
| Cm-244            | 5.682E-06 | 0.0000 | 1.120E-03  | 0.0012 | 0.000E+00 | 0.0000 | 3.338E-05 | 0.0000 | 6.878E-08 | 0.0000 | 2.332E-08 | 0.0000 | 1.042E-05 | 0.0000 |
| Co-58             | 3.390E-02 | 0.0351 | 1.365E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.308E-06 | 0.0000 | 1.006E-07 | 0.0000 | 3.266E-08 | 0.0000 | 5.121E-09 | 0.0000 |
| Co-60             | 2.902E-01 | 0.3008 | 9.444E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.381E-05 | 0.0000 | 2.603E-06 | 0.0000 | 8.449E-07 | 0.0000 | 1.325E-07 | 0.0000 |
| Cs-134            | 1.697E-01 | 0.1759 | 1.806E-07  | 0.0000 | 0.000E+00 | 0.0000 | 4.478E-05 | 0.0000 | 5.371E-06 | 0.0000 | 5.950E-06 | 0.0000 | 3.272E-07 | 0.0000 |
| Cs-137            | 7.156E-02 | 0.0742 | 1.451E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.555E-05 | 0.0000 | 4.264E-06 | 0.0000 | 4.723E-06 | 0.0000 | 2.598E-07 | 0.0000 |
| Eu-152            | 1.371E-01 | 0.1421 | 9.911E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.444E-07 | 0.0000 | 2.195E-08 | 0.0000 | 2.275E-09 | 0.0000 | 3.319E-08 | 0.0000 |
| Eu-154            | 1.459E-01 | 0.1513 | 1.266E-06  | 0.0000 | 0.000E+00 | 0.0000 | 3.554E-07 | 0.0000 | 3.193E-08 | 0.0000 | 3.309E-09 | 0.0000 | 4.827E-08 | 0.0000 |
| Eu-155            | 5.241E-03 | 0.0054 | 1.778E-07  | 0.0000 | 0.000E+00 | 0.0000 | 5.527E-08 | 0.0000 | 4.964E-09 | 0.0000 | 5.145E-10 | 0.0000 | 7.505E-09 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 1.092E-08  | 0.0000 | 0.000E+00 | 0.0000 | 9.016E-09 | 0.0000 | 1.794E-08 | 0.0000 | 7.923E-10 | 0.0000 | 2.813E-09 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 1.997E-07  | 0.0000 | 0.000E+00 | 0.0000 | 4.249E-07 | 0.0000 | 3.728E-09 | 0.0000 | 2.468E-08 | 0.0000 | 6.426E-11 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 1.242E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.760E-07 | 0.0000 | 2.709E-09 | 0.0000 | 5.111E-08 | 0.0000 | 1.103E-09 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 2.884E-08  | 0.0000 | 0.000E+00 | 0.0000 | 4.821E-07 | 0.0000 | 7.421E-09 | 0.0000 | 1.400E-07 | 0.0000 | 3.021E-09 | 0.0000 |
| Np-237            | 2.663E-02 | 0.0276 | 2.449E-03  | 0.0025 | 0.000E+00 | 0.0000 | 1.478E-03 | 0.0015 | 7.411E-06 | 0.0000 | 3.434E-07 | 0.0000 | 2.301E-05 | 0.0000 |
| Pu-238            | 6.466E-06 | 0.0000 | 1.797E-03  | 0.0019 | 0.000E+00 | 0.0000 | 5.367E-05 | 0.0001 | 3.089E-07 | 0.0000 | 1.372E-08 | 0.0000 | 1.675E-05 | 0.0000 |
| Pu-239            | 8.133E-06 | 0.0000 | 1.974E-03  | 0.0020 | 0.000E+00 | 0.0000 | 5.961E-05 | 0.0001 | 3.431E-07 | 0.0000 | 1.523E-08 | 0.0000 | 1.860E-05 | 0.0000 |
| Pu-240            | 5.908E-06 | 0.0000 | 1.974E-03  | 0.0020 | 0.000E+00 | 0.0000 | 5.961E-05 | 0.0001 | 3.431E-07 | 0.0000 | 1.523E-08 | 0.0000 | 1.860E-05 | 0.0000 |
| Pu-241            | 1.695E-06 | 0.0000 | 3.867E-05  | 0.0000 | 0.000E+00 | 0.0000 | 1.173E-06 | 0.0000 | 6.626E-09 | 0.0000 | 3.163E-10 | 0.0000 | 3.660E-07 | 0.0000 |
| Sb-125            | 4.712E-02 | 0.0488 | 5.496E-08  | 0.0000 | 0.000E+00 | 0.0000 | 3.223E-06 | 0.0000 | 1.364E-08 | 0.0000 | 6.941E-09 | 0.0000 | 1.612E-08 | 0.0000 |
| Sr-90             | 5.331E-04 | 0.0006 | 5.946E-06  | 0.0000 | 0.000E+00 | 0.0000 | 8.177E-04 | 0.0008 | 8.748E-06 | 0.0000 | 1.372E-05 | 0.0000 | 7.929E-07 | 0.0000 |
| Tc-99             | 2.498E-06 | 0.0000 | 2.618E-08  | 0.0000 | 0.000E+00 | 0.0000 | 8.592E-05 | 0.0001 | 1.009E-08 | 0.0000 | 8.070E-07 | 0.0000 | 5.247E-09 | 0.0000 |
| Total             | 9.490E-01 | 0.9836 | 1.280E-02  | 0.0133 | 0.000E+00 | 0.0000 | 2.813E-03 | 0.0029 | 2.997E-05 | 0.0000 | 2.680E-05 | 0.0000 | 1.216E-04 | 0.0001 |



Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.627E-03     | 0.0038 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.142E-07     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.556E-03     | 0.0047 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.636E-02     | 0.0170 |
| Cm-244            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.169E-03     | 0.0012 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.390E-02     | 0.0351 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.902E-01     | 0.3008 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.698E-01     | 0.1760 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.161E-02     | 0.0742 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.371E-01     | 0.1421 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.460E-01     | 0.1513 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.241E-03     | 0.0054 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.148E-08     | 0.0000 |
| H-3               | 1.921E-07 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.721E-11 | 0.0000 | 3.369E-13 | 0.0000 | 1.560E-12 | 0.0000 | 8.452E-07     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.433E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.613E-07     | 0.0000 |
| Np-237            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.059E-02     | 0.0317 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.874E-03     | 0.0019 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.061E-03     | 0.0021 |
| Pu-240            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.058E-03     | 0.0021 |
| Pu-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.191E-05     | 0.0000 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.713E-02     | 0.0488 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.380E-03     | 0.0014 |
| Tc-99             | 7.865E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.540E-09 | 0.0000 | 3.711E-13 | 0.0000 | 2.309E-11 | 0.0000 | 9.713E-05     | 0.0001 |
| Total             | 8.057E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.557E-09 | 0.0000 | 7.080E-13 | 0.0000 | 2.465E-11 | 0.0000 | 9.648E-01     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.501E-03 | 0.0019 | 2.027E-03  | 0.0025 | 0.000E+00 | 0.0000 | 6.083E-05 | 0.0001 | 1.763E-07 | 0.0000 | 3.646E-08 | 0.0000 | 1.898E-05 | 0.0000 |
| C-14              | 5.389E-18 | 0.0000 | 1.621E-17  | 0.0000 | 0.000E+00 | 0.0000 | 2.983E-16 | 0.0000 | 1.025E-16 | 0.0000 | 3.254E-17 | 0.0000 | 1.242E-19 | 0.0000 |
| Ce-144            | 1.862E-03 | 0.0023 | 4.655E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.069E-07 | 0.0000 | 1.868E-10 | 0.0000 | 8.854E-10 | 0.0000 | 3.001E-08 | 0.0000 |
| Cm-243            | 1.450E-02 | 0.0179 | 1.355E-03  | 0.0017 | 0.000E+00 | 0.0000 | 4.056E-05 | 0.0001 | 8.356E-08 | 0.0000 | 2.833E-08 | 0.0000 | 1.266E-05 | 0.0000 |
| Cm-244            | 5.469E-06 | 0.0000 | 1.073E-03  | 0.0013 | 0.000E+00 | 0.0000 | 3.197E-05 | 0.0000 | 6.590E-08 | 0.0000 | 2.233E-08 | 0.0000 | 9.977E-06 | 0.0000 |
| Co-58             | 9.453E-04 | 0.0012 | 3.802E-10  | 0.0000 | 0.000E+00 | 0.0000 | 3.644E-08 | 0.0000 | 2.803E-09 | 0.0000 | 9.097E-10 | 0.0000 | 1.426E-10 | 0.0000 |
| Co-60             | 2.534E-01 | 0.3130 | 8.238E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.949E-05 | 0.0000 | 2.270E-06 | 0.0000 | 7.371E-07 | 0.0000 | 1.156E-07 | 0.0000 |
| Cs-134            | 1.208E-01 | 0.1492 | 1.284E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.183E-05 | 0.0000 | 3.818E-06 | 0.0000 | 4.230E-06 | 0.0000 | 2.326E-07 | 0.0000 |
| Cs-137            | 6.967E-02 | 0.0861 | 1.411E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.456E-05 | 0.0000 | 4.146E-06 | 0.0000 | 4.592E-06 | 0.0000 | 2.525E-07 | 0.0000 |
| Eu-152            | 1.297E-01 | 0.1602 | 9.361E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.308E-07 | 0.0000 | 2.073E-08 | 0.0000 | 2.149E-09 | 0.0000 | 3.134E-08 | 0.0000 |
| Eu-154            | 1.344E-01 | 0.1660 | 1.164E-06  | 0.0000 | 0.000E+00 | 0.0000 | 3.269E-07 | 0.0000 | 2.936E-08 | 0.0000 | 3.043E-09 | 0.0000 | 4.438E-08 | 0.0000 |
| Eu-155            | 4.545E-03 | 0.0056 | 1.538E-07  | 0.0000 | 0.000E+00 | 0.0000 | 4.782E-08 | 0.0000 | 4.295E-09 | 0.0000 | 4.451E-10 | 0.0000 | 6.493E-09 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 8.401E-09  | 0.0000 | 0.000E+00 | 0.0000 | 6.937E-09 | 0.0000 | 1.380E-08 | 0.0000 | 6.096E-10 | 0.0000 | 2.165E-09 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 1.080E-09  | 0.0000 | 0.000E+00 | 0.0000 | 2.514E-09 | 0.0000 | 2.965E-11 | 0.0000 | 1.792E-10 | 0.0000 | 3.475E-13 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 1.233E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.748E-07 | 0.0000 | 2.692E-09 | 0.0000 | 5.078E-08 | 0.0000 | 1.096E-09 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 2.847E-08  | 0.0000 | 0.000E+00 | 0.0000 | 4.759E-07 | 0.0000 | 7.327E-09 | 0.0000 | 1.382E-07 | 0.0000 | 2.982E-09 | 0.0000 |
| Np-237            | 2.577E-02 | 0.0318 | 2.366E-03  | 0.0029 | 0.000E+00 | 0.0000 | 1.428E-03 | 0.0018 | 7.162E-06 | 0.0000 | 3.318E-07 | 0.0000 | 2.223E-05 | 0.0000 |
| Pu-238            | 6.412E-06 | 0.0000 | 1.773E-03  | 0.0022 | 0.000E+00 | 0.0000 | 5.297E-05 | 0.0001 | 3.049E-07 | 0.0000 | 1.354E-08 | 0.0000 | 1.653E-05 | 0.0000 |
| Pu-239            | 8.108E-06 | 0.0000 | 1.963E-03  | 0.0024 | 0.000E+00 | 0.0000 | 5.929E-05 | 0.0001 | 3.413E-07 | 0.0000 | 1.515E-08 | 0.0000 | 1.850E-05 | 0.0000 |
| Pu-240            | 5.902E-06 | 0.0000 | 1.963E-03  | 0.0024 | 0.000E+00 | 0.0000 | 5.928E-05 | 0.0001 | 3.412E-07 | 0.0000 | 1.515E-08 | 0.0000 | 1.850E-05 | 0.0000 |
| Pu-241            | 3.964E-06 | 0.0000 | 3.984E-05  | 0.0000 | 0.000E+00 | 0.0000 | 1.207E-06 | 0.0000 | 6.559E-09 | 0.0000 | 3.569E-10 | 0.0000 | 3.767E-07 | 0.0000 |
| Sb-125            | 3.650E-02 | 0.0451 | 4.388E-08  | 0.0000 | 0.000E+00 | 0.0000 | 3.268E-06 | 0.0000 | 1.398E-08 | 0.0000 | 7.330E-09 | 0.0000 | 1.326E-08 | 0.0000 |
| Sr-90             | 5.180E-04 | 0.0006 | 5.767E-06  | 0.0000 | 0.000E+00 | 0.0000 | 7.932E-04 | 0.0010 | 8.487E-06 | 0.0000 | 1.331E-05 | 0.0000 | 7.691E-07 | 0.0000 |
| Tc-99             | 1.101E-06 | 0.0000 | 1.152E-08  | 0.0000 | 0.000E+00 | 0.0000 | 3.801E-05 | 0.0000 | 4.563E-09 | 0.0000 | 3.622E-07 | 0.0000 | 2.309E-09 | 0.0000 |
| Total             | 7.941E-01 | 0.9810 | 1.257E-02  | 0.0155 | 0.000E+00 | 0.0000 | 2.666E-03 | 0.0033 | 2.730E-05 | 0.0000 | 2.389E-05 | 0.0000 | 1.193E-04 | 0.0001 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.608E-03     | 0.0045 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.550E-16     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.863E-03     | 0.0023 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.591E-02     | 0.0197 |
| Cm-244            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.120E-03     | 0.0014 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.453E-04     | 0.0012 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.534E-01     | 0.3131 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.208E-01     | 0.1493 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.971E-02     | 0.0861 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.297E-01     | 0.1602 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.344E-01     | 0.1660 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.545E-03     | 0.0056 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.191E-08     | 0.0000 |
| H-3               | 4.096E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.513E-13 | 0.0000 | 1.081E-14 | 0.0000 | 3.984E-14 | 0.0000 | 7.899E-09     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.417E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.529E-07     | 0.0000 |
| Np-237            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.959E-02     | 0.0366 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.849E-03     | 0.0023 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.050E-03     | 0.0025 |
| Pu-240            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.047E-03     | 0.0025 |
| Pu-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.539E-05     | 0.0001 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.651E-02     | 0.0451 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.340E-03     | 0.0017 |
| Tc-99             | 6.435E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.337E-09 | 0.0000 | 3.811E-13 | 0.0000 | 2.228E-11 | 0.0000 | 4.592E-05     | 0.0001 |
| Total             | 6.439E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.338E-09 | 0.0000 | 3.919E-13 | 0.0000 | 2.232E-11 | 0.0000 | 8.095E-01     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.493E-03 | 0.0024 | 1.999E-03  | 0.0032 | 0.000E+00 | 0.0000 | 5.999E-05 | 0.0001 | 1.739E-07 | 0.0000 | 3.595E-08 | 0.0000 | 1.872E-05 | 0.0000 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144            | 3.114E-04 | 0.0005 | 7.761E-08  | 0.0000 | 0.000E+00 | 0.0000 | 3.449E-08 | 0.0000 | 3.115E-11 | 0.0000 | 1.476E-10 | 0.0000 | 5.004E-09 | 0.0000 |
| Cm-243            | 1.371E-02 | 0.0218 | 1.278E-03  | 0.0020 | 0.000E+00 | 0.0000 | 3.824E-05 | 0.0001 | 7.880E-08 | 0.0000 | 2.671E-08 | 0.0000 | 1.193E-05 | 0.0000 |
| Cm-244            | 5.067E-06 | 0.0000 | 9.837E-04  | 0.0016 | 0.000E+00 | 0.0000 | 2.932E-05 | 0.0000 | 6.048E-08 | 0.0000 | 2.048E-08 | 0.0000 | 9.151E-06 | 0.0000 |
| Co-58             | 7.349E-07 | 0.0000 | 2.948E-13  | 0.0000 | 0.000E+00 | 0.0000 | 2.826E-11 | 0.0000 | 2.173E-12 | 0.0000 | 7.054E-13 | 0.0000 | 1.106E-13 | 0.0000 |
| Co-60             | 1.932E-01 | 0.3065 | 6.268E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.244E-05 | 0.0000 | 1.727E-06 | 0.0000 | 5.608E-07 | 0.0000 | 8.792E-08 | 0.0000 |
| Cs-134            | 6.120E-02 | 0.0971 | 6.486E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.608E-05 | 0.0000 | 1.929E-06 | 0.0000 | 2.137E-06 | 0.0000 | 1.175E-07 | 0.0000 |
| Cs-137            | 6.601E-02 | 0.1047 | 1.333E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.266E-05 | 0.0001 | 3.917E-06 | 0.0000 | 4.339E-06 | 0.0000 | 2.386E-07 | 0.0000 |
| Eu-152            | 1.159E-01 | 0.1839 | 8.349E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.059E-07 | 0.0000 | 1.849E-08 | 0.0000 | 1.917E-09 | 0.0000 | 2.796E-08 | 0.0000 |
| Eu-154            | 1.139E-01 | 0.1806 | 9.840E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.763E-07 | 0.0000 | 2.482E-08 | 0.0000 | 2.573E-09 | 0.0000 | 3.752E-08 | 0.0000 |
| Eu-155            | 3.418E-03 | 0.0054 | 1.151E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.579E-08 | 0.0000 | 3.214E-09 | 0.0000 | 3.331E-10 | 0.0000 | 4.859E-09 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 4.973E-09  | 0.0000 | 0.000E+00 | 0.0000 | 4.107E-09 | 0.0000 | 8.170E-09 | 0.0000 | 3.609E-10 | 0.0000 | 1.281E-09 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 3.157E-14  | 0.0000 | 0.000E+00 | 0.0000 | 7.349E-14 | 0.0000 | 8.669E-16 | 0.0000 | 5.240E-15 | 0.0000 | 1.016E-17 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 1.217E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.725E-07 | 0.0000 | 2.656E-09 | 0.0000 | 5.011E-08 | 0.0000 | 1.081E-09 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 2.775E-08  | 0.0000 | 0.000E+00 | 0.0000 | 4.639E-07 | 0.0000 | 7.141E-09 | 0.0000 | 1.347E-07 | 0.0000 | 2.907E-09 | 0.0000 |
| Np-237            | 2.412E-02 | 0.0383 | 2.208E-03  | 0.0035 | 0.000E+00 | 0.0000 | 1.332E-03 | 0.0021 | 6.683E-06 | 0.0000 | 3.097E-07 | 0.0000 | 2.075E-05 | 0.0000 |
| Pu-238            | 6.304E-06 | 0.0000 | 1.726E-03  | 0.0027 | 0.000E+00 | 0.0000 | 5.158E-05 | 0.0001 | 2.969E-07 | 0.0000 | 1.319E-08 | 0.0000 | 1.609E-05 | 0.0000 |
| Pu-239            | 8.056E-06 | 0.0000 | 1.942E-03  | 0.0031 | 0.000E+00 | 0.0000 | 5.865E-05 | 0.0001 | 3.376E-07 | 0.0000 | 1.499E-08 | 0.0000 | 1.830E-05 | 0.0000 |
| Pu-240            | 5.890E-06 | 0.0000 | 1.942E-03  | 0.0031 | 0.000E+00 | 0.0000 | 5.863E-05 | 0.0001 | 3.375E-07 | 0.0000 | 1.498E-08 | 0.0000 | 1.830E-05 | 0.0000 |
| Pu-241            | 8.162E-06 | 0.0000 | 4.191E-05  | 0.0001 | 0.000E+00 | 0.0000 | 1.268E-06 | 0.0000 | 6.426E-09 | 0.0000 | 4.308E-10 | 0.0000 | 3.958E-07 | 0.0000 |
| Sb-125            | 2.187E-02 | 0.0347 | 2.623E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.961E-06 | 0.0000 | 8.401E-09 | 0.0000 | 4.405E-09 | 0.0000 | 7.932E-09 | 0.0000 |
| Sr-90             | 4.891E-04 | 0.0008 | 5.425E-06  | 0.0000 | 0.000E+00 | 0.0000 | 7.462E-04 | 0.0012 | 7.984E-06 | 0.0000 | 1.252E-05 | 0.0000 | 7.235E-07 | 0.0000 |
| Tc-99             | 2.140E-07 | 0.0000 | 2.230E-09  | 0.0000 | 0.000E+00 | 0.0000 | 7.357E-06 | 0.0000 | 8.833E-10 | 0.0000 | 7.011E-08 | 0.0000 | 4.469E-10 | 0.0000 |
| Total             | 6.157E-01 | 0.9766 | 1.213E-02  | 0.0192 | 0.000E+00 | 0.0000 | 2.458E-03 | 0.0039 | 2.361E-05 | 0.0000 | 2.026E-05 | 0.0000 | 1.149E-04 | 0.0002 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.571E-03     | 0.0057 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.115E-04     | 0.0005 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.504E-02     | 0.0239 |
| Cm-244            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.027E-03     | 0.0016 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.349E-07     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.932E-01     | 0.3065 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.122E-02     | 0.0971 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.606E-02     | 0.1048 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.159E-01     | 0.1839 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.139E-01     | 0.1806 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.418E-03     | 0.0054 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.889E-08     | 0.0000 |
| H-3               | 1.198E-13 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.319E-17 | 0.0000 | 3.159E-19 | 0.0000 | 1.165E-18 | 0.0000 | 2.310E-13     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.386E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.364E-07     | 0.0000 |
| Np-237            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.769E-02     | 0.0439 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.801E-03     | 0.0029 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.027E-03     | 0.0032 |
| Pu-240            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.025E-03     | 0.0032 |
| Pu-241            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.175E-05     | 0.0001 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.187E-02     | 0.0347 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.262E-03     | 0.0020 |
| Tc-99             | 1.246E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.588E-10 | 0.0000 | 7.378E-14 | 0.0000 | 4.313E-12 | 0.0000 | 8.890E-06     | 0.0000 |
| Total             | 1.246E-06 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.588E-10 | 0.0000 | 7.378E-14 | 0.0000 | 4.313E-12 | 0.0000 | 6.304E-01     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.466E-03 | 0.0045 | 1.903E-03  | 0.0058 | 0.000E+00 | 0.0000 | 5.710E-05 | 0.0002 | 1.655E-07 | 0.0000 | 3.422E-08 | 0.0000 | 1.782E-05 | 0.0001 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144            | 5.945E-07 | 0.0000 | 1.467E-10  | 0.0000 | 0.000E+00 | 0.0000 | 6.520E-11 | 0.0000 | 5.889E-14 | 0.0000 | 2.791E-13 | 0.0000 | 9.459E-12 | 0.0000 |
| Cm-243            | 1.127E-02 | 0.0343 | 1.039E-03  | 0.0032 | 0.000E+00 | 0.0000 | 3.110E-05 | 0.0001 | 6.412E-08 | 0.0000 | 2.172E-08 | 0.0000 | 9.704E-06 | 0.0000 |
| Cm-244            | 3.880E-06 | 0.0000 | 7.265E-04  | 0.0022 | 0.000E+00 | 0.0000 | 2.166E-05 | 0.0001 | 4.481E-08 | 0.0000 | 1.511E-08 | 0.0000 | 6.758E-06 | 0.0000 |
| Co-58             | 9.621E-18 | 0.0000 | 3.825E-24  | 0.0000 | 0.000E+00 | 0.0000 | 3.666E-22 | 0.0000 | 2.820E-23 | 0.0000 | 9.152E-24 | 0.0000 | 1.435E-24 | 0.0000 |
| Co-60             | 7.473E-02 | 0.2273 | 2.406E-07  | 0.0000 | 0.000E+00 | 0.0000 | 8.611E-06 | 0.0000 | 6.630E-07 | 0.0000 | 2.152E-07 | 0.0000 | 3.374E-08 | 0.0000 |
| Cs-134            | 5.660E-03 | 0.0172 | 5.941E-09  | 0.0000 | 0.000E+00 | 0.0000 | 1.473E-06 | 0.0000 | 1.767E-07 | 0.0000 | 1.957E-07 | 0.0000 | 1.076E-08 | 0.0000 |
| Cs-137            | 5.464E-02 | 0.1662 | 1.093E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.677E-05 | 0.0001 | 3.211E-06 | 0.0000 | 3.556E-06 | 0.0000 | 1.956E-07 | 0.0000 |
| Eu-152            | 7.829E-02 | 0.2381 | 5.591E-07  | 0.0000 | 0.000E+00 | 0.0000 | 1.379E-07 | 0.0000 | 1.239E-08 | 0.0000 | 1.284E-09 | 0.0000 | 1.872E-08 | 0.0000 |
| Eu-154            | 6.378E-02 | 0.1940 | 5.464E-07  | 0.0000 | 0.000E+00 | 0.0000 | 1.534E-07 | 0.0000 | 1.378E-08 | 0.0000 | 1.428E-09 | 0.0000 | 2.083E-08 | 0.0000 |
| Eu-155            | 1.260E-03 | 0.0038 | 4.172E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.297E-08 | 0.0000 | 1.165E-09 | 0.0000 | 1.207E-10 | 0.0000 | 1.761E-09 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 7.930E-10  | 0.0000 | 0.000E+00 | 0.0000 | 6.549E-10 | 0.0000 | 1.303E-09 | 0.0000 | 5.755E-11 | 0.0000 | 2.044E-10 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 4.262E-30  | 0.0000 | 0.000E+00 | 0.0000 | 9.923E-30 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 1.161E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.645E-07 | 0.0000 | 2.533E-09 | 0.0000 | 4.779E-08 | 0.0000 | 1.031E-09 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 2.534E-08  | 0.0000 | 0.000E+00 | 0.0000 | 4.236E-07 | 0.0000 | 6.521E-09 | 0.0000 | 1.230E-07 | 0.0000 | 2.654E-09 | 0.0000 |
| Np-237            | 1.914E-02 | 0.0582 | 1.731E-03  | 0.0053 | 0.000E+00 | 0.0000 | 1.045E-03 | 0.0032 | 5.241E-06 | 0.0000 | 2.429E-07 | 0.0000 | 1.627E-05 | 0.0000 |
| Pu-238            | 5.940E-06 | 0.0000 | 1.572E-03  | 0.0048 | 0.000E+00 | 0.0000 | 4.695E-05 | 0.0001 | 2.702E-07 | 0.0000 | 1.201E-08 | 0.0000 | 1.465E-05 | 0.0000 |
| Pu-239            | 7.876E-06 | 0.0000 | 1.868E-03  | 0.0057 | 0.000E+00 | 0.0000 | 5.641E-05 | 0.0002 | 3.247E-07 | 0.0000 | 1.442E-08 | 0.0000 | 1.760E-05 | 0.0001 |
| Pu-240            | 5.847E-06 | 0.0000 | 1.866E-03  | 0.0057 | 0.000E+00 | 0.0000 | 5.636E-05 | 0.0002 | 3.244E-07 | 0.0000 | 1.440E-08 | 0.0000 | 1.759E-05 | 0.0001 |
| Pu-241            | 1.982E-05 | 0.0001 | 4.702E-05  | 0.0001 | 0.000E+00 | 0.0000 | 1.418E-06 | 0.0000 | 5.999E-09 | 0.0000 | 6.236E-10 | 0.0000 | 4.425E-07 | 0.0000 |
| Sb-125            | 3.640E-03 | 0.0111 | 4.322E-09  | 0.0000 | 0.000E+00 | 0.0000 | 3.231E-07 | 0.0000 | 1.384E-09 | 0.0000 | 7.258E-10 | 0.0000 | 1.307E-09 | 0.0000 |
| Sr-90             | 3.998E-04 | 0.0012 | 4.377E-06  | 0.0000 | 0.000E+00 | 0.0000 | 6.020E-04 | 0.0018 | 6.442E-06 | 0.0000 | 1.010E-05 | 0.0000 | 5.838E-07 | 0.0000 |
| Tc-99             | 6.923E-10 | 0.0000 | 7.110E-12  | 0.0000 | 0.000E+00 | 0.0000 | 2.346E-08 | 0.0000 | 2.816E-12 | 0.0000 | 2.236E-10 | 0.0000 | 1.425E-12 | 0.0000 |
| Total             | 3.143E-01 | 0.9559 | 1.076E-02  | 0.0327 | 0.000E+00 | 0.0000 | 1.956E-03 | 0.0059 | 1.697E-05 | 0.0001 | 1.460E-05 | 0.0000 | 1.017E-04 | 0.0003 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 9.023E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.000E-14 | 0.0000 | 4.043E-16 | 0.0000 | 2.369E-17 | 0.0000 | 3.444E-03     | 0.0105 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.947E-07     | 0.0000 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.235E-02     | 0.0376 |
| Cm-244            | 1.433E-20 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.891E-25 | 0.0000 | 9.157E-28 | 0.0000 | 1.090E-26 | 0.0000 | 7.589E-04     | 0.0023 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.622E-18     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.474E-02     | 0.2273 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.662E-03     | 0.0172 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.467E-02     | 0.1663 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.829E-02     | 0.2381 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.378E-02     | 0.1940 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.260E-03     | 0.0038 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.013E-09     | 0.0000 |
| H-3               | 1.617E-29 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.036E-29     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.275E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.811E-07     | 0.0000 |
| Np-237            | 1.656E-03 | 0.0050 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.413E-08 | 0.0000 | 7.903E-10 | 0.0000 | 4.535E-11 | 0.0000 | 2.359E-02     | 0.0717 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.639E-03     | 0.0050 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.950E-03     | 0.0059 |
| Pu-240            | 6.349E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.650E-20 | 0.0000 | 4.467E-23 | 0.0000 | 5.106E-22 | 0.0000 | 1.947E-03     | 0.0059 |
| Pu-241            | 1.256E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.523E-17 | 0.0000 | 5.345E-19 | 0.0000 | 3.187E-20 | 0.0000 | 6.870E-05     | 0.0002 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.640E-03     | 0.0111 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.023E-03     | 0.0031 |
| Tc-99             | 3.972E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.253E-13 | 0.0000 | 2.352E-16 | 0.0000 | 1.375E-14 | 0.0000 | 2.836E-08     | 0.0000 |
| Total             | 1.656E-03 | 0.0050 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.413E-08 | 0.0000 | 7.903E-10 | 0.0000 | 4.536E-11 | 0.0000 | 3.288E-01     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.390E-03 | 0.0136 | 1.639E-03  | 0.0161 | 0.000E+00 | 0.0000 | 4.918E-05 | 0.0005 | 1.425E-07 | 0.0000 | 2.947E-08 | 0.0000 | 1.534E-05 | 0.0002 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144            | 1.006E-14 | 0.0000 | 2.409E-18  | 0.0000 | 0.000E+00 | 0.0000 | 1.070E-18 | 0.0000 | 9.667E-22 | 0.0000 | 4.581E-21 | 0.0000 | 1.553E-19 | 0.0000 |
| Cm-243            | 6.400E-03 | 0.0629 | 5.713E-04  | 0.0056 | 0.000E+00 | 0.0000 | 1.709E-05 | 0.0002 | 3.533E-08 | 0.0000 | 1.193E-08 | 0.0000 | 5.334E-06 | 0.0001 |
| Cm-244            | 1.812E-06 | 0.0000 | 3.042E-04  | 0.0030 | 0.000E+00 | 0.0000 | 9.068E-06 | 0.0001 | 1.904E-08 | 0.0000 | 6.293E-09 | 0.0000 | 2.830E-06 | 0.0000 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60             | 4.917E-03 | 0.0483 | 1.547E-08  | 0.0000 | 0.000E+00 | 0.0000 | 5.538E-07 | 0.0000 | 4.264E-08 | 0.0000 | 1.384E-08 | 0.0000 | 2.170E-09 | 0.0000 |
| Cs-134            | 6.246E-06 | 0.0001 | 6.373E-12  | 0.0000 | 0.000E+00 | 0.0000 | 1.580E-09 | 0.0000 | 1.896E-10 | 0.0000 | 2.100E-10 | 0.0000 | 1.155E-11 | 0.0000 |
| Cs-137            | 3.160E-02 | 0.3104 | 6.137E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.504E-05 | 0.0001 | 1.804E-06 | 0.0000 | 1.998E-06 | 0.0000 | 1.099E-07 | 0.0000 |
| Eu-152            | 2.532E-02 | 0.2487 | 1.764E-07  | 0.0000 | 0.000E+00 | 0.0000 | 4.350E-08 | 0.0000 | 3.907E-09 | 0.0000 | 4.049E-10 | 0.0000 | 5.906E-09 | 0.0000 |
| Eu-154            | 1.209E-02 | 0.1187 | 1.009E-07  | 0.0000 | 0.000E+00 | 0.0000 | 2.834E-08 | 0.0000 | 2.546E-09 | 0.0000 | 2.638E-10 | 0.0000 | 3.848E-09 | 0.0000 |
| Eu-155            | 7.259E-05 | 0.0007 | 2.275E-09  | 0.0000 | 0.000E+00 | 0.0000 | 7.072E-10 | 0.0000 | 6.353E-11 | 0.0000 | 6.584E-12 | 0.0000 | 9.603E-11 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 4.147E-12  | 0.0000 | 0.000E+00 | 0.0000 | 3.424E-12 | 0.0000 | 6.813E-12 | 0.0000 | 3.009E-13 | 0.0000 | 1.069E-12 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 1.005E-08  | 0.0000 | 0.000E+00 | 0.0000 | 1.425E-07 | 0.0000 | 2.195E-09 | 0.0000 | 4.140E-08 | 0.0000 | 8.931E-10 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 1.939E-08  | 0.0000 | 0.000E+00 | 0.0000 | 3.241E-07 | 0.0000 | 4.990E-09 | 0.0000 | 9.413E-08 | 0.0000 | 2.031E-09 | 0.0000 |
| Np-237            | 9.811E-03 | 0.0964 | 8.576E-04  | 0.0084 | 0.000E+00 | 0.0000 | 5.175E-04 | 0.0051 | 2.596E-06 | 0.0000 | 1.203E-07 | 0.0000 | 8.059E-06 | 0.0001 |
| Pu-238            | 5.011E-06 | 0.0000 | 1.192E-03  | 0.0117 | 0.000E+00 | 0.0000 | 3.560E-05 | 0.0003 | 2.049E-07 | 0.0000 | 9.131E-09 | 0.0000 | 1.111E-05 | 0.0001 |
| Pu-239            | 7.350E-06 | 0.0001 | 1.658E-03  | 0.0163 | 0.000E+00 | 0.0000 | 5.007E-05 | 0.0005 | 2.882E-07 | 0.0000 | 1.279E-08 | 0.0000 | 1.562E-05 | 0.0002 |
| Pu-240            | 5.727E-06 | 0.0001 | 1.654E-03  | 0.0162 | 0.000E+00 | 0.0000 | 4.995E-05 | 0.0005 | 2.875E-07 | 0.0000 | 1.276E-08 | 0.0000 | 1.559E-05 | 0.0002 |
| Pu-241            | 3.639E-05 | 0.0004 | 5.013E-05  | 0.0005 | 0.000E+00 | 0.0000 | 1.507E-06 | 0.0000 | 5.008E-09 | 0.0000 | 8.263E-10 | 0.0000 | 4.701E-07 | 0.0000 |
| Sb-125            | 2.152E-05 | 0.0002 | 2.481E-11  | 0.0000 | 0.000E+00 | 0.0000 | 1.855E-09 | 0.0000 | 7.947E-12 | 0.0000 | 4.167E-12 | 0.0000 | 7.503E-12 | 0.0000 |
| Sr-90             | 2.234E-04 | 0.0022 | 2.351E-06  | 0.0000 | 0.000E+00 | 0.0000 | 3.234E-04 | 0.0032 | 3.460E-06 | 0.0000 | 5.425E-06 | 0.0001 | 3.136E-07 | 0.0000 |
| Tc-99             | 5.296E-17 | 0.0000 | 5.196E-19  | 0.0000 | 0.000E+00 | 0.0000 | 1.714E-15 | 0.0000 | 2.059E-19 | 0.0000 | 1.634E-17 | 0.0000 | 1.041E-19 | 0.0000 |
| Total             | 9.191E-02 | 0.9026 | 7.928E-03  | 0.0779 | 0.000E+00 | 0.0000 | 1.069E-03 | 0.0105 | 8.900E-06 | 0.0001 | 7.777E-06 | 0.0001 | 7.479E-05 | 0.0007 |



Summary : RESRAD Default Parameters

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 7.994E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.575E-13 | 0.0000 | 3.792E-15 | 0.0000 | 2.180E-16 | 0.0000 | 3.093E-03     | 0.0304 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.006E-14     | 0.0000 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.994E-03     | 0.0687 |
| Cm-244            | 8.403E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.697E-20 | 0.0000 | 8.432E-23 | 0.0000 | 8.474E-22 | 0.0000 | 3.179E-04     | 0.0031 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.917E-03     | 0.0483 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.248E-06     | 0.0001 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.162E-02     | 0.3106 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.532E-02     | 0.2487 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.209E-02     | 0.1187 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 7.259E-05     | 0.0007 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.575E-11     | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.971E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.447E-07     | 0.0000 |
| Np-237            | 8.248E-04 | 0.0081 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.692E-08 | 0.0000 | 3.936E-10 | 0.0000 | 2.258E-11 | 0.0000 | 1.202E-02     | 0.1181 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.244E-03     | 0.0122 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.731E-03     | 0.0170 |
| Pu-240            | 1.371E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.035E-17 | 0.0000 | 1.382E-19 | 0.0000 | 1.387E-18 | 0.0000 | 1.726E-03     | 0.0169 |
| Pu-241            | 1.113E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.973E-15 | 0.0000 | 5.260E-17 | 0.0000 | 3.027E-18 | 0.0000 | 8.851E-05     | 0.0009 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.152E-05     | 0.0002 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.584E-04     | 0.0055 |
| Tc-99             | 2.903E-16 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.033E-20 | 0.0000 | 1.720E-23 | 0.0000 | 1.005E-21 | 0.0000 | 2.075E-15     | 0.0000 |
| Total             | 8.248E-04 | 0.0081 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.692E-08 | 0.0000 | 3.936E-10 | 0.0000 | 2.258E-11 | 0.0000 | 1.018E-01     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

## Water Independent Pathways (Inhalation excludes radon)

| Radio-<br>Nuclide | Ground    |        | Inhalation |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | Soil      |        |
|-------------------|-----------|--------|------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
|                   | mrem/yr   | fract. | mrem/yr    | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. |
| Am-241            | 1.128E-03 | 0.1034 | 8.384E-04  | 0.0768 | 0.000E+00 | 0.0000 | 2.516E-05 | 0.0023 | 7.296E-08 | 0.0000 | 1.508E-08 | 0.0000 | 7.849E-06 | 0.0007 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Cm-243            | 7.806E-04 | 0.0715 | 6.137E-05  | 0.0056 | 0.000E+00 | 0.0000 | 1.837E-06 | 0.0002 | 3.899E-09 | 0.0000 | 1.269E-09 | 0.0000 | 5.731E-07 | 0.0001 |
| Cm-244            | 1.380E-07 | 0.0000 | 1.455E-05  | 0.0013 | 0.000E+00 | 0.0000 | 4.348E-07 | 0.0000 | 1.181E-09 | 0.0000 | 2.695E-10 | 0.0000 | 1.357E-07 | 0.0000 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Co-60             | 3.146E-07 | 0.0000 | 9.003E-13  | 0.0000 | 0.000E+00 | 0.0000 | 3.223E-11 | 0.0000 | 2.483E-12 | 0.0000 | 8.059E-13 | 0.0000 | 1.263E-13 | 0.0000 |
| Cs-134            | 2.448E-16 | 0.0000 | 2.224E-22  | 0.0000 | 0.000E+00 | 0.0000 | 5.515E-20 | 0.0000 | 6.617E-21 | 0.0000 | 7.329E-21 | 0.0000 | 4.029E-22 | 0.0000 |
| Cs-137            | 4.087E-03 | 0.3745 | 7.039E-09  | 0.0000 | 0.000E+00 | 0.0000 | 1.725E-06 | 0.0002 | 2.070E-07 | 0.0000 | 2.292E-07 | 0.0000 | 1.260E-08 | 0.0000 |
| Eu-152            | 4.282E-04 | 0.0392 | 2.684E-09  | 0.0000 | 0.000E+00 | 0.0000 | 6.620E-10 | 0.0000 | 5.947E-11 | 0.0000 | 6.162E-12 | 0.0000 | 8.988E-11 | 0.0000 |
| Eu-154            | 3.147E-05 | 0.0029 | 2.358E-10  | 0.0000 | 0.000E+00 | 0.0000 | 6.623E-11 | 0.0000 | 5.950E-12 | 0.0000 | 6.165E-13 | 0.0000 | 8.992E-12 | 0.0000 |
| Eu-155            | 3.070E-09 | 0.0000 | 7.444E-14  | 0.0000 | 0.000E+00 | 0.0000 | 2.314E-14 | 0.0000 | 2.079E-15 | 0.0000 | 2.154E-16 | 0.0000 | 3.142E-15 | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 3.700E-20  | 0.0000 | 0.000E+00 | 0.0000 | 3.056E-20 | 0.0000 | 6.081E-20 | 0.0000 | 2.685E-21 | 0.0000 | 9.535E-21 | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 5.251E-09  | 0.0000 | 0.000E+00 | 0.0000 | 7.444E-08 | 0.0000 | 1.146E-09 | 0.0000 | 2.162E-08 | 0.0000 | 4.664E-10 | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 6.558E-09  | 0.0000 | 0.000E+00 | 0.0000 | 1.096E-07 | 0.0000 | 1.689E-09 | 0.0000 | 3.185E-08 | 0.0000 | 6.870E-10 | 0.0000 |
| Np-237            | 8.390E-04 | 0.0769 | 6.336E-05  | 0.0058 | 0.000E+00 | 0.0000 | 3.821E-05 | 0.0035 | 1.918E-07 | 0.0000 | 8.919E-09 | 0.0000 | 5.951E-07 | 0.0001 |
| Pu-238            | 2.725E-06 | 0.0002 | 3.905E-04  | 0.0358 | 0.000E+00 | 0.0000 | 1.167E-05 | 0.0011 | 6.717E-08 | 0.0000 | 3.029E-09 | 0.0000 | 3.640E-06 | 0.0003 |
| Pu-239            | 5.328E-06 | 0.0005 | 9.425E-04  | 0.0864 | 0.000E+00 | 0.0000 | 2.847E-05 | 0.0026 | 1.639E-07 | 0.0000 | 7.274E-09 | 0.0000 | 8.882E-06 | 0.0008 |
| Pu-240            | 5.309E-06 | 0.0005 | 9.352E-04  | 0.0857 | 0.000E+00 | 0.0000 | 2.825E-05 | 0.0026 | 1.626E-07 | 0.0000 | 7.218E-09 | 0.0000 | 8.813E-06 | 0.0008 |
| Pu-241            | 3.848E-05 | 0.0035 | 2.873E-05  | 0.0026 | 0.000E+00 | 0.0000 | 8.624E-07 | 0.0001 | 2.513E-09 | 0.0000 | 5.152E-10 | 0.0000 | 2.690E-07 | 0.0000 |
| Sb-125            | 3.010E-13 | 0.0000 | 3.070E-19  | 0.0000 | 0.000E+00 | 0.0000 | 2.295E-17 | 0.0000 | 9.839E-20 | 0.0000 | 5.158E-20 | 0.0000 | 9.284E-20 | 0.0000 |
| Sr-90             | 2.596E-05 | 0.0024 | 2.305E-07  | 0.0000 | 0.000E+00 | 0.0000 | 3.171E-05 | 0.0029 | 3.395E-07 | 0.0000 | 5.322E-07 | 0.0000 | 3.075E-08 | 0.0000 |
| Tc-99             | 0.000E+00 | 0.0000 | 0.000E+00  | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 |
| Total             | 7.373E-03 | 0.6756 | 3.275E-03  | 0.3001 | 0.000E+00 | 0.0000 | 1.685E-04 | 0.0154 | 1.215E-06 | 0.0001 | 8.585E-07 | 0.0001 | 3.080E-05 | 0.0028 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 8.828E-09 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.950E-13 | 0.0000 | 4.202E-15 | 0.0000 | 2.413E-16 | 0.0000 | 2.000E-03     | 0.1833 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cm-243            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 8.444E-04     | 0.0774 |
| Cm-244            | 1.197E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.276E-19 | 0.0000 | 1.216E-21 | 0.0000 | 1.217E-20 | 0.0000 | 1.526E-05     | 0.0014 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.146E-07     | 0.0000 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.449E-16     | 0.0000 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.089E-03     | 0.3747 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.282E-04     | 0.0392 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.147E-05     | 0.0029 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.070E-09     | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.406E-19     | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.029E-07     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.504E-07     | 0.0000 |
| Np-237            | 6.311E-05 | 0.0058 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.825E-09 | 0.0000 | 3.013E-11 | 0.0000 | 1.729E-12 | 0.0000 | 1.005E-03     | 0.0921 |
| Pu-238            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.086E-04     | 0.0374 |
| Pu-239            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.854E-04     | 0.0903 |
| Pu-240            | 6.232E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.747E-16 | 0.0000 | 6.331E-19 | 0.0000 | 6.337E-18 | 0.0000 | 9.778E-04     | 0.0896 |
| Pu-241            | 2.738E-10 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.225E-14 | 0.0000 | 1.303E-16 | 0.0000 | 7.484E-18 | 0.0000 | 6.834E-05     | 0.0063 |
| Sb-125            | 8.432E-22 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.166E-26 | 0.0000 | 1.024E-27 | 0.0000 | 5.140E-28 | 0.0000 | 3.010E-13     | 0.0000 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.880E-05     | 0.0054 |
| Tc-99             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Total             | 6.312E-05 | 0.0058 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.825E-09 | 0.0000 | 3.013E-11 | 0.0000 | 1.729E-12 | 0.0000 | 1.091E-02     | 1.0000 |

\*Sum of all water independent and dependent pathways.



Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)  
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 2.571E-10 | 0.1011 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.150E-14 | 0.0000 | 1.223E-16 | 0.0000 | 7.035E-18 | 0.0000 | 2.571E-10     | 0.1011 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cm-243            | 5.491E-18 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.415E-22 | 0.0000 | 6.289E-25 | 0.0000 | 5.458E-24 | 0.0000 | 5.491E-18     | 0.0000 |
| Cm-244            | 6.413E-15 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.827E-19 | 0.0000 | 6.519E-22 | 0.0000 | 6.524E-21 | 0.0000 | 6.413E-15     | 0.0000 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Eu-152            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ni-59             | 1.252E-09 | 0.4924 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.730E-14 | 0.0000 | 3.475E-15 | 0.0000 | 6.789E-14 | 0.0000 | 1.252E-09     | 0.4924 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Np-237            | 3.768E-10 | 0.1483 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.661E-14 | 0.0000 | 3.809E-17 | 0.0000 | 3.802E-16 | 0.0000 | 3.769E-10     | 0.1483 |
| Pu-238            | 1.045E-10 | 0.0411 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.598E-15 | 0.0000 | 1.050E-17 | 0.0000 | 1.055E-16 | 0.0000 | 1.045E-10     | 0.0411 |
| Pu-239            | 3.719E-14 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.637E-18 | 0.0000 | 4.430E-21 | 0.0000 | 3.698E-20 | 0.0000 | 3.719E-14     | 0.0000 |
| Pu-240            | 2.948E-12 | 0.0012 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.300E-16 | 0.0000 | 2.997E-19 | 0.0000 | 2.999E-18 | 0.0000 | 2.948E-12     | 0.0012 |
| Pu-241            | 9.389E-12 | 0.0037 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 4.200E-16 | 0.0000 | 4.466E-18 | 0.0000 | 2.568E-19 | 0.0000 | 9.389E-12     | 0.0037 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Sr-90             | 5.394E-10 | 0.2122 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.982E-14 | 0.0000 | 2.137E-15 | 0.0000 | 2.562E-15 | 0.0000 | 5.395E-10     | 0.2122 |
| Tc-99             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Total             | 2.542E-09 | 0.9999 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.204E-13 | 0.0000 | 5.787E-15 | 0.0000 | 7.095E-14 | 0.0000 | 2.542E-09     | 1.0000 |

\*Sum of all water independent and dependent pathways.



Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

## Water Dependent Pathways

| Radio-<br>Nuclide | Water     |        | Fish      |        | Radon     |        | Plant     |        | Meat      |        | Milk      |        | All Pathways* |        |
|-------------------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------------|--------|
|                   | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr   | fract. | mrem/yr       | fract. |
| Am-241            | 8.297E-11 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.712E-15 | 0.0000 | 3.947E-17 | 0.0000 | 2.267E-18 | 0.0000 | 8.298E-11     | 0.0000 |
| C-14              | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ce-144            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cm-243            | 6.808E-09 | 0.0006 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 3.001E-13 | 0.0000 | 2.322E-16 | 0.0000 | 1.605E-17 | 0.0000 | 6.808E-09     | 0.0006 |
| Cm-244            | 1.577E-08 | 0.0013 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 6.952E-13 | 0.0000 | 5.380E-16 | 0.0000 | 3.719E-17 | 0.0000 | 1.577E-08     | 0.0013 |
| Co-58             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Co-60             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cs-134            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Cs-137            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Eu-152            | 2.993E-21 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.320E-25 | 0.0000 | 1.794E-27 | 0.0000 | 1.017E-28 | 0.0000 | 2.993E-21     | 0.0000 |
| Eu-154            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Eu-155            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Fe-55             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| H-3               | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ni-59             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Ni-63             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Np-237            | 3.346E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.474E-16 | 0.0000 | 1.000E-19 | 0.0000 | 2.836E-20 | 0.0000 | 3.346E-12     | 0.0000 |
| Pu-238            | 2.145E-09 | 0.0002 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 9.454E-14 | 0.0000 | 7.608E-17 | 0.0000 | 6.903E-18 | 0.0000 | 2.145E-09     | 0.0002 |
| Pu-239            | 6.234E-06 | 0.5182 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.748E-10 | 0.0000 | 2.127E-13 | 0.0000 | 1.470E-14 | 0.0000 | 6.234E-06     | 0.5182 |
| Pu-240            | 5.770E-06 | 0.4797 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 2.544E-10 | 0.0000 | 1.969E-13 | 0.0000 | 1.361E-14 | 0.0000 | 5.770E-06     | 0.4797 |
| Pu-241            | 3.031E-12 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 1.356E-16 | 0.0000 | 1.442E-18 | 0.0000 | 8.280E-20 | 0.0000 | 3.031E-12     | 0.0000 |
| Sb-125            | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Sr-90             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Tc-99             | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 0.000E+00     | 0.0000 |
| Total             | 1.203E-05 | 1.0000 | 0.000E+00 | 0.0000 | 0.000E+00 | 0.0000 | 5.302E-10 | 0.0000 | 4.104E-13 | 0.0000 | 2.837E-14 | 0.0000 | 1.203E-05     | 1.0000 |

\*Sum of all water independent and dependent pathways.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Dose/Source Ratios Summed Over All Pathways  
Parent and Progeny Principal Radionuclide Contributions Indicated

| Parent<br>(i) | Product<br>(j) | Thread<br>Fraction | DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) |           |           |           |           |           |           |           |  |
|---------------|----------------|--------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
|               |                |                    | 0.000E+00                                   | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |  |
| Am-241        | Am-241         | 1.000E+00          | 3.627E-03                                   | 3.608E-03 | 3.571E-03 | 3.444E-03 | 3.093E-03 | 2.000E-03 | 0.000E+00 | 0.000E+00 |  |
| Am-241        | Np-237+D       | 1.000E+00          | 4.960E-09                                   | 1.465E-08 | 3.293E-08 | 8.743E-08 | 1.816E-07 | 1.754E-07 | 2.571E-10 | 8.298E-11 |  |
| Am-241        | U-233          | 1.000E+00          | 1.581E-16                                   | 1.084E-15 | 5.543E-15 | 4.443E-14 | 2.761E-13 | 9.916E-13 | 1.149E-14 | 7.048E-17 |  |
| Am-241        | Th-229+D       | 1.000E+00          | 2.637E-19                                   | 3.914E-18 | 4.463E-17 | 1.090E-15 | 2.106E-14 | 3.147E-13 | 7.827E-17 | 8.509E-17 |  |
| Am-241        | ΣDSR (j)       |                    | 3.627E-03                                   | 3.608E-03 | 3.571E-03 | 3.444E-03 | 3.093E-03 | 2.000E-03 | 2.571E-10 | 8.298E-11 |  |
| C-14          | C-14           | 1.000E+00          | 6.142E-07                                   | 4.550E-16 | 2.741E-35 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |  |
| Ce-144+D      | Ce-144+D       | 1.000E+00          | 4.556E-03                                   | 1.863E-03 | 3.115E-04 | 5.947E-07 | 1.006E-14 | 5.614E-42 | 0.000E+00 | 0.000E+00 |  |
| Cm-243        | Cm-243         | 2.400E-03          | 3.927E-05                                   | 3.818E-05 | 3.610E-05 | 2.965E-05 | 1.678E-05 | 2.024E-06 | 0.000E+00 | 0.000E+00 |  |
| Cm-243        | Am-243+D       | 2.400E-03          | 2.964E-09                                   | 8.770E-09 | 1.985E-08 | 5.351E-08 | 1.153E-07 | 1.390E-07 | 0.000E+00 | 0.000E+00 |  |
| Cm-243        | Pu-239         | 2.400E-03          | 2.214E-15                                   | 1.532E-14 | 7.891E-14 | 6.435E-13 | 4.162E-12 | 1.677E-11 | 0.000E+00 | 1.530E-13 |  |
| Cm-243        | U-235+D        | 2.400E-03          | 5.405E-24                                   | 8.039E-23 | 9.200E-22 | 2.276E-20 | 4.554E-19 | 7.535E-18 | 5.550E-24 | 4.849E-21 |  |
| Cm-243        | Pa-231         | 2.400E-03          | 1.274E-29                                   | 3.935E-28 | 9.760E-27 | 7.138E-25 | 4.147E-23 | 2.204E-21 | 1.220E-23 | 5.081E-22 |  |
| Cm-243        | Ac-227+D       | 2.400E-03          | 4.749E-31                                   | 2.953E-29 | 1.536E-27 | 3.197E-25 | 4.975E-23 | 6.877E-21 | 7.410E-24 | 3.088E-22 |  |
| Cm-243        | ΣDSR (j)       |                    | 3.927E-05                                   | 3.819E-05 | 3.612E-05 | 2.970E-05 | 1.690E-05 | 2.163E-06 | 2.516E-23 | 1.530E-13 |  |
| Cm-243        | Cm-243         | 9.976E-01          | 1.632E-02                                   | 1.587E-02 | 1.501E-02 | 1.232E-02 | 6.976E-03 | 8.411E-04 | 0.000E+00 | 0.000E+00 |  |
| Cm-243        | Pu-239         | 9.976E-01          | 2.934E-08                                   | 8.669E-08 | 1.955E-07 | 5.200E-07 | 1.076E-06 | 1.073E-06 | 0.000E+00 | 6.808E-09 |  |
| Cm-243        | U-235+D        | 9.976E-01          | 9.558E-17                                   | 6.622E-16 | 3.419E-15 | 2.813E-14 | 1.868E-13 | 8.448E-13 | 5.424E-18 | 3.885E-17 |  |
| Cm-243        | Pa-231         | 9.976E-01          | 2.822E-22                                   | 4.211E-21 | 4.821E-20 | 1.185E-18 | 2.321E-17 | 3.503E-16 | 5.942E-20 | 8.203E-19 |  |
| Cm-243        | Ac-227+D       | 9.976E-01          | 1.259E-23                                   | 3.847E-22 | 9.400E-21 | 6.585E-19 | 3.413E-17 | 1.288E-15 | 7.732E-21 | 5.063E-19 |  |
| Cm-243        | ΣDSR (j)       |                    | 1.632E-02                                   | 1.587E-02 | 1.501E-02 | 1.232E-02 | 6.977E-03 | 8.422E-04 | 5.491E-18 | 6.808E-09 |  |
| Cm-244        | Cm-244         | 1.350E-06          | 1.579E-09                                   | 1.512E-09 | 1.386E-09 | 1.022E-09 | 4.247E-10 | 1.699E-11 | 0.000E+00 | 0.000E+00 |  |
| Cm-244        | Cm-244         | 4.950E-08          | 5.788E-11                                   | 5.543E-11 | 5.082E-11 | 3.748E-11 | 1.557E-11 | 6.230E-13 | 0.000E+00 | 0.000E+00 |  |
| Cm-244        | Pu-240         | 4.950E-08          | 5.330E-15                                   | 1.565E-14 | 3.482E-14 | 8.849E-14 | 1.638E-13 | 1.324E-13 | 0.000E+00 | 7.807E-16 |  |
| Cm-244        | ΣDSR (j)       |                    | 5.789E-11                                   | 5.544E-11 | 5.085E-11 | 3.757E-11 | 1.574E-11 | 7.554E-13 | 0.000E+00 | 7.807E-16 |  |
| Cm-244        | Cm-244         | 1.000E+00          | 1.169E-03                                   | 1.120E-03 | 1.027E-03 | 7.571E-04 | 3.146E-04 | 1.259E-05 | 0.000E+00 | 0.000E+00 |  |
| Cm-244        | Pu-240         | 1.000E+00          | 1.077E-07                                   | 3.161E-07 | 7.034E-07 | 1.788E-06 | 3.308E-06 | 2.675E-06 | 0.000E+00 | 1.577E-08 |  |
| Cm-244        | U-236          | 1.000E+00          | 3.055E-16                                   | 2.106E-15 | 1.075E-14 | 8.497E-14 | 5.083E-13 | 1.725E-12 | 6.413E-15 | 2.249E-16 |  |
| Cm-244        | Th-232         | 1.000E+00          | 4.863E-26                                   | 7.201E-25 | 8.163E-24 | 1.954E-22 | 3.576E-21 | 4.524E-20 | 8.721E-25 | 1.438E-24 |  |
| Cm-244        | Ra-228+D       | 1.000E+00          | 1.804E-26                                   | 5.425E-25 | 1.279E-23 | 7.911E-22 | 3.067E-20 | 6.699E-19 | 6.676E-24 | 1.086E-23 |  |
| Cm-244        | Th-228+D       | 1.000E+00          | 1.615E-27                                   | 9.422E-26 | 4.288E-24 | 5.767E-22 | 3.574E-20 | 9.502E-19 | 2.592E-25 | 4.212E-25 |  |
| Cm-244        | ΣDSR (j)       |                    | 1.169E-03                                   | 1.120E-03 | 1.027E-03 | 7.589E-04 | 3.179E-04 | 1.526E-05 | 6.413E-15 | 1.577E-08 |  |
| Co-58         | Co-58          | 1.000E+00          | 3.390E-02                                   | 9.453E-04 | 7.349E-07 | 9.622E-18 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |  |
| Co-60         | Co-60          | 1.000E+00          | 2.902E-01                                   | 2.534E-01 | 1.932E-01 | 7.474E-02 | 4.917E-03 | 3.146E-07 | 0.000E+00 | 0.000E+00 |  |
| Cs-134        | Cs-134         | 1.000E+00          | 1.698E-01                                   | 1.208E-01 | 6.122E-02 | 5.662E-03 | 6.248E-06 | 2.449E-16 | 0.000E+00 | 0.000E+00 |  |
| Cs-137+D      | Cs-137+D       | 1.000E+00          | 7.161E-02                                   | 6.971E-02 | 6.606E-02 | 5.467E-02 | 3.162E-02 | 4.089E-03 | 0.000E+00 | 0.000E+00 |  |



Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Dose/Source Ratios Summed Over All Pathways  
Parent and Progeny Principal Radionuclide Contributions Indicated

| Parent<br>(i) | Product<br>(j) | Thread<br>Fraction | DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) |           |           |           |           |           |           |           |
|---------------|----------------|--------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|               |                |                    | 0.000E+00                                   | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Eu-152        | Eu-152         | 7.208E-01          | 9.884E-02                                   | 9.346E-02 | 8.356E-02 | 5.643E-02 | 1.825E-02 | 3.086E-04 | 0.000E+00 | 0.000E+00 |
| Eu-152        | Eu-152         | 2.792E-01          | 3.828E-02                                   | 3.620E-02 | 3.237E-02 | 2.186E-02 | 7.070E-03 | 1.195E-04 | 0.000E+00 | 0.000E+00 |
| Eu-152        | Gd-152         | 2.792E-01          | 9.883E-19                                   | 2.884E-18 | 6.334E-18 | 1.542E-17 | 2.592E-17 | 1.845E-17 | 0.000E+00 | 2.993E-21 |
| Eu-152        | ΣDSR (j)       |                    | 3.828E-02                                   | 3.620E-02 | 3.237E-02 | 2.186E-02 | 7.070E-03 | 1.195E-04 | 0.000E+00 | 2.993E-21 |
| Eu-154        | Eu-154         | 1.000E+00          | 1.460E-01                                   | 1.344E-01 | 1.139E-01 | 6.378E-02 | 1.209E-02 | 3.147E-05 | 0.000E+00 | 0.000E+00 |
| Eu-155        | Eu-155         | 1.000E+00          | 5.241E-03                                   | 4.545E-03 | 3.418E-03 | 1.260E-03 | 7.259E-05 | 3.070E-09 | 0.000E+00 | 0.000E+00 |
| Fe-55         | Fe-55          | 1.000E+00          | 4.148E-08                                   | 3.191E-08 | 1.889E-08 | 3.013E-09 | 1.575E-11 | 1.406E-19 | 0.000E+00 | 0.000E+00 |
| H-3           | H-3            | 1.000E+00          | 8.452E-07                                   | 7.899E-09 | 2.310E-13 | 3.119E-29 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ni-59         | Ni-59          | 1.000E+00          | 2.433E-07                                   | 2.417E-07 | 2.386E-07 | 2.275E-07 | 1.971E-07 | 1.029E-07 | 1.252E-09 | 0.000E+00 |
| Ni-63         | Ni-63          | 1.000E+00          | 6.613E-07                                   | 6.529E-07 | 6.364E-07 | 5.811E-07 | 4.447E-07 | 1.504E-07 | 0.000E+00 | 0.000E+00 |
| Np-237+D      | Np-237+D       | 1.000E+00          | 3.059E-02                                   | 2.959E-02 | 2.769E-02 | 2.359E-02 | 1.202E-02 | 1.004E-03 | 0.000E+00 | 0.000E+00 |
| Np-237+D      | U-233          | 1.000E+00          | 1.455E-09                                   | 4.267E-09 | 9.555E-09 | 2.496E-08 | 4.945E-08 | 4.453E-08 | 3.738E-10 | 0.000E+00 |
| Np-237+D      | Th-229+D       | 1.000E+00          | 3.253E-12                                   | 2.249E-11 | 1.157E-10 | 9.401E-10 | 6.043E-09 | 2.526E-08 | 3.035E-12 | 3.346E-12 |
| Np-237+D      | ΣDSR (j)       |                    | 3.059E-02                                   | 2.959E-02 | 2.769E-02 | 2.359E-02 | 1.202E-02 | 1.005E-03 | 3.769E-10 | 3.346E-12 |
| Pu-238        | Pu-238         | 1.840E-09          | 3.448E-12                                   | 3.403E-12 | 3.313E-12 | 3.016E-12 | 2.288E-12 | 7.517E-13 | 0.000E+00 | 3.941E-18 |
| Pu-238        | Pu-238         | 1.000E+00          | 1.874E-03                                   | 1.849E-03 | 1.801E-03 | 1.639E-03 | 1.244E-03 | 4.086E-04 | 0.000E+00 | 2.142E-09 |
| Pu-238        | U-234          | 1.000E+00          | 8.880E-10                                   | 2.642E-09 | 6.049E-09 | 1.696E-08 | 4.032E-08 | 5.790E-08 | 1.045E-10 | 4.533E-14 |
| Pu-238        | Th-230         | 1.000E+00          | 6.551E-15                                   | 4.553E-14 | 2.369E-13 | 2.002E-12 | 1.423E-11 | 7.436E-11 | 2.209E-15 | 2.323E-13 |
| Pu-238        | Ra-226+D       | 1.000E+00          | 9.894E-17                                   | 1.476E-15 | 1.701E-14 | 4.313E-13 | 9.203E-12 | 1.806E-10 | 2.392E-17 | 3.221E-13 |
| Pu-238        | Pb-210+D       | 1.000E+00          | 2.771E-21                                   | 7.662E-20 | 1.765E-18 | 1.212E-16 | 6.596E-15 | 3.086E-13 | 3.558E-18 | 1.622E-13 |
| Pu-238        | Po-210         | 1.000E+00          | 8.532E-23                                   | 3.675E-21 | 1.240E-19 | 1.161E-17 | 7.046E-16 | 3.114E-14 | 6.266E-17 | 2.275E-12 |
| Pu-238        | ΣDSR (j)       |                    | 1.874E-03                                   | 1.849E-03 | 1.801E-03 | 1.639E-03 | 1.244E-03 | 4.086E-04 | 1.045E-10 | 2.145E-09 |
| Pu-239        | Pu-239         | 1.000E+00          | 2.061E-03                                   | 2.050E-03 | 2.027E-03 | 1.950E-03 | 1.731E-03 | 9.854E-04 | 0.000E+00 | 6.234E-06 |
| Pu-239        | U-235+D        | 1.000E+00          | 1.004E-11                                   | 3.001E-11 | 6.945E-11 | 2.021E-10 | 5.351E-10 | 1.127E-09 | 3.662E-14 | 3.383E-14 |
| Pu-239        | Pa-231         | 1.000E+00          | 3.956E-17                                   | 2.767E-16 | 1.450E-15 | 1.252E-14 | 9.427E-14 | 6.015E-13 | 5.121E-16 | 7.038E-16 |
| Pu-239        | Ac-227+D       | 1.000E+00          | 2.197E-18                                   | 3.257E-17 | 3.708E-16 | 9.009E-15 | 1.719E-13 | 2.477E-12 | 6.350E-17 | 4.342E-16 |
| Pu-239        | ΣDSR (j)       |                    | 2.061E-03                                   | 2.050E-03 | 2.027E-03 | 1.950E-03 | 1.731E-03 | 9.854E-04 | 3.719E-14 | 6.234E-06 |
| Pu-240        | Pu-240         | 4.950E-08          | 1.019E-10                                   | 1.013E-10 | 1.002E-10 | 9.636E-11 | 8.541E-11 | 4.840E-11 | 0.000E+00 | 2.856E-13 |
| Pu-240        | Pu-240         | 1.000E+00          | 2.058E-03                                   | 2.047E-03 | 2.025E-03 | 1.947E-03 | 1.726E-03 | 9.778E-04 | 0.000E+00 | 5.770E-06 |
| Pu-240        | U-236          | 1.000E+00          | 8.735E-12                                   | 2.608E-11 | 6.017E-11 | 1.733E-10 | 4.458E-10 | 8.266E-10 | 2.948E-12 | 8.096E-14 |
| Pu-240        | Th-232         | 1.000E+00          | 1.849E-21                                   | 1.288E-20 | 6.733E-20 | 5.790E-19 | 4.324E-18 | 2.651E-17 | 4.505E-22 | 7.098E-22 |
| Pu-240        | Ra-228+D       | 1.000E+00          | 8.527E-22                                   | 1.243E-20 | 1.361E-19 | 2.909E-18 | 4.224E-17 | 4.060E-16 | 3.452E-21 | 5.369E-21 |
| Pu-240        | Th-228+D       | 1.000E+00          | 9.086E-23                                   | 2.591E-21 | 5.473E-20 | 2.428E-18 | 5.251E-17 | 5.835E-16 | 1.340E-22 | 2.083E-22 |
| Pu-240        | ΣDSR (j)       |                    | 2.058E-03                                   | 2.047E-03 | 2.025E-03 | 1.947E-03 | 1.726E-03 | 9.778E-04 | 2.948E-12 | 5.770E-06 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Dose/Source Ratios Summed Over All Pathways  
Parent and Progeny Principal Radionuclide Contributions Indicated

| Parent<br>(i) | Product<br>(j) | Thread<br>Fraction | DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) |           |           |           |           |           |           |           |  |
|---------------|----------------|--------------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
|               |                |                    | 0.000E+00                                   | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |  |
| Pu-241        | Pu-241         | 1.000E+00          | 3.871E-05                                   | 3.670E-05 | 3.297E-05 | 2.265E-05 | 7.681E-06 | 1.507E-07 | 0.000E+00 | 1.507E-28 |  |
| Pu-241        | Am-241         | 1.000E+00          | 2.861E-06                                   | 8.371E-06 | 1.848E-05 | 4.585E-05 | 8.075E-05 | 6.818E-05 | 0.000E+00 | 1.258E-19 |  |
| Pu-241        | Np-237+D       | 1.000E+00          | 2.621E-12                                   | 1.792E-11 | 8.946E-11 | 6.520E-10 | 3.196E-09 | 5.534E-09 | 9.389E-12 | 3.031E-12 |  |
| Pu-241        | U-233          | 1.000E+00          | 6.307E-20                                   | 9.188E-19 | 1.017E-17 | 2.266E-16 | 3.431E-15 | 2.450E-14 | 3.157E-16 | 2.531E-18 |  |
| Pu-241        | Th-229+D       | 1.000E+00          | 8.398E-23                                   | 2.558E-21 | 6.206E-20 | 4.234E-18 | 2.044E-16 | 6.536E-15 | 2.067E-18 | 2.279E-18 |  |
| Pu-241        | ΣDSR (j)       |                    | 4.157E-05                                   | 4.507E-05 | 5.145E-05 | 6.850E-05 | 8.843E-05 | 6.834E-05 | 9.389E-12 | 3.031E-12 |  |
| Pu-241+D      | Pu-241+D       | 2.450E-05          | 3.418E-07                                   | 3.246E-07 | 2.927E-07 | 2.037E-07 | 7.192E-08 | 1.685E-09 | 0.000E+00 | 3.863E-33 |  |
| Pu-241+D      | Np-237+D       | 2.450E-05          | 1.196E-13                                   | 3.462E-13 | 7.432E-13 | 1.678E-12 | 2.175E-12 | 3.574E-13 | 9.470E-21 | 3.065E-36 |  |
| Pu-241+D      | U-233          | 2.450E-05          | 3.828E-21                                   | 2.591E-20 | 1.286E-19 | 9.271E-19 | 4.321E-18 | 6.854E-18 | 5.796E-20 | 8.436E-43 |  |
| Pu-241+D      | Th-229+D       | 2.450E-05          | 6.400E-24                                   | 9.407E-23 | 1.049E-21 | 2.369E-20 | 3.704E-19 | 3.057E-18 | 4.500E-22 | 4.730E-22 |  |
| Pu-241+D      | ΣDSR (j)       |                    | 3.418E-07                                   | 3.246E-07 | 2.927E-07 | 2.037E-07 | 7.192E-08 | 1.685E-09 | 6.788E-20 | 4.730E-22 |  |
| Sb-125        | Sb-125         | 7.720E-01          | 3.631E-02                                   | 2.810E-02 | 1.684E-02 | 2.802E-03 | 1.656E-05 | 2.313E-13 | 7.147E-42 | 0.000E+00 |  |
| Sb-125        | Sb-125         | 2.280E-01          | 1.072E-02                                   | 8.300E-03 | 4.973E-03 | 8.275E-04 | 4.892E-06 | 6.832E-14 | 2.110E-42 | 0.000E+00 |  |
| Sb-125        | Te-125m        | 2.280E-01          | 9.744E-05                                   | 1.013E-04 | 6.135E-05 | 1.046E-05 | 6.674E-08 | 1.387E-15 | 4.151E-42 | 0.000E+00 |  |
| Sb-125        | ΣDSR (j)       |                    | 1.082E-02                                   | 8.401E-03 | 5.035E-03 | 8.380E-04 | 4.958E-06 | 6.970E-14 | 6.261E-42 | 0.000E+00 |  |
| Sr-90+D       | Sr-90+D        | 1.000E+00          | 1.380E-03                                   | 1.340E-03 | 1.262E-03 | 1.023E-03 | 5.584E-04 | 5.880E-05 | 5.395E-10 | 0.000E+00 |  |
| Tc-99         | Tc-99          | 1.000E+00          | 9.713E-05                                   | 4.592E-05 | 8.890E-06 | 2.836E-08 | 2.075E-15 | 1.903E-40 | 0.000E+00 | 0.000E+00 |  |

The DSR includes contributions from associated (half-life ≤ 30 days) daughters.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

## Single Radionuclide Soil Guidelines G(i,t) in pCi/g

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

| Nuclide<br>(i) | t= 0.000E+00 | 1.000E+00  | 3.000E+00  | 1.000E+01  | 3.000E+01  | 1.000E+02  | 3.000E+02  | 1.000E+03  |
|----------------|--------------|------------|------------|------------|------------|------------|------------|------------|
| Am-241         | 6.893E+03    | 6.929E+03  | 7.000E+03  | 7.259E+03  | 8.082E+03  | 1.250E+04  | 9.724E+10  | 3.013E+11  |
| C-14           | 4.070E+07    | *4.455E+12 | *4.455E+12 | *4.455E+12 | *4.455E+12 | *4.455E+12 | *4.455E+12 | *4.455E+12 |
| Ce-144         | 5.487E+03    | 1.342E+04  | 8.026E+04  | 4.204E+07  | 2.485E+15  | *3.191E+15 | *3.191E+15 | *3.191E+15 |
| Cm-243         | 1.528E+03    | 1.571E+03  | 1.662E+03  | 2.024E+03  | 3.575E+03  | 2.961E+04  | *5.161E+13 | 3.672E+09  |
| Cm-244         | 2.138E+04    | 2.232E+04  | 2.433E+04  | 3.294E+04  | 7.864E+04  | 1.638E+06  | *8.088E+13 | 1.585E+09  |
| Co-58          | 7.374E+02    | 2.645E+04  | 3.402E+07  | *3.183E+16 | *3.183E+16 | *3.183E+16 | *3.183E+16 | *3.183E+16 |
| Co-60          | 8.614E+01    | 9.864E+01  | 1.294E+02  | 3.345E+02  | 5.084E+03  | 7.946E+07  | *1.132E+15 | *1.132E+15 |
| Cs-134         | 1.472E+02    | 2.069E+02  | 4.083E+02  | 4.416E+03  | 4.002E+06  | *1.295E+15 | *1.295E+15 | *1.295E+15 |
| Cs-137         | 3.491E+02    | 3.586E+02  | 3.785E+02  | 4.573E+02  | 7.906E+02  | 6.114E+03  | *8.704E+13 | *8.704E+13 |
| Eu-152         | 1.823E+02    | 1.928E+02  | 2.157E+02  | 3.193E+02  | 9.873E+02  | 5.839E+04  | *1.765E+14 | *1.765E+14 |
| Eu-154         | 1.713E+02    | 1.861E+02  | 2.195E+02  | 3.920E+02  | 2.069E+03  | 7.945E+05  | *2.639E+14 | *2.639E+14 |
| Eu-155         | 4.770E+03    | 5.500E+03  | 7.313E+03  | 1.983E+04  | 3.444E+05  | 8.143E+09  | *4.652E+14 | *4.652E+14 |
| Fe-55          | 6.028E+08    | 7.834E+08  | 1.323E+09  | 8.298E+09  | 1.587E+12  | *2.410E+15 | *2.410E+15 | *2.410E+15 |
| H-3            | 2.958E+07    | 3.165E+09  | 1.082E+14  | *9.597E+15 | *9.597E+15 | *9.597E+15 | *9.597E+15 | *9.597E+15 |
| Ni-59          | 1.027E+08    | 1.034E+08  | 1.048E+08  | 1.099E+08  | 1.269E+08  | 2.429E+08  | 1.997E+10  | *8.088E+10 |
| Ni-63          | 3.780E+07    | 3.829E+07  | 3.929E+07  | 4.302E+07  | 5.622E+07  | 1.662E+08  | *5.917E+13 | *5.917E+13 |
| Np-237         | 8.172E+02    | 8.448E+02  | 9.028E+02  | 1.060E+03  | 2.080E+03  | 2.489E+04  | *7.047E+08 | *7.047E+08 |
| Pu-238         | 1.334E+04    | 1.352E+04  | 1.388E+04  | 1.525E+04  | 2.010E+04  | 6.118E+04  | 2.393E+11  | 1.166E+10  |
| Pu-239         | 1.213E+04    | 1.220E+04  | 1.233E+04  | 1.282E+04  | 1.444E+04  | 2.537E+04  | *6.214E+10 | 4.010E+06  |
| Pu-240         | 1.215E+04    | 1.221E+04  | 1.235E+04  | 1.284E+04  | 1.449E+04  | 2.557E+04  | *2.278E+11 | 4.333E+06  |
| Pu-241         | 5.964E+05    | 5.508E+05  | 4.831E+05  | 3.639E+05  | 2.825E+05  | 3.658E+05  | 2.663E+12  | 8.249E+12  |
| Sb-125         | 5.305E+02    | 6.848E+02  | 1.143E+03  | 6.868E+03  | 1.162E+06  | 8.305E+13  | *1.033E+15 | *1.033E+15 |
| Sr-90          | 1.812E+04    | 1.866E+04  | 1.981E+04  | 2.443E+04  | 4.477E+04  | 4.251E+05  | 4.634E+10  | *1.365E+14 |
| Tc-99          | 2.574E+05    | 5.444E+05  | 2.812E+06  | 8.816E+08  | *1.697E+10 | *1.697E+10 | *1.697E+10 | *1.697E+10 |

\*At specific activity limit

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)  
 and Single Radionuclide Soil Guidelines G(i,t) in pCi/g  
 at tmin = time of minimum single radionuclide soil guideline  
 and at tmax = time of maximum total dose = 0.000E+00 years

| Nuclide<br>(i) | Initial<br>(pCi/g) | tmin<br>(years) | DSR(i,tmin) | G(i,tmin)<br>(pCi/g) | DSR(i,tmax) | G(i,tmax)<br>(pCi/g) |
|----------------|--------------------|-----------------|-------------|----------------------|-------------|----------------------|
| Am-241         | 1.000E+00          | 0.000E+00       | 3.627E-03   | 6.893E+03            | 3.627E-03   | 6.893E+03            |
| C-14           | 1.000E+00          | 0.000E+00       | 6.142E-07   | 4.070E+07            | 6.142E-07   | 4.070E+07            |
| Ce-144         | 1.000E+00          | 0.000E+00       | 4.556E-03   | 5.487E+03            | 4.556E-03   | 5.487E+03            |
| Cm-243         | 1.000E+00          | 0.000E+00       | 1.636E-02   | 1.528E+03            | 1.636E-02   | 1.528E+03            |
| Cm-244         | 1.000E+00          | 0.000E+00       | 1.169E-03   | 2.138E+04            | 1.169E-03   | 2.138E+04            |
| Co-58          | 1.000E+00          | 0.000E+00       | 3.390E-02   | 7.374E+02            | 3.390E-02   | 7.374E+02            |
| Co-60          | 1.000E+00          | 0.000E+00       | 2.902E-01   | 8.614E+01            | 2.902E-01   | 8.614E+01            |
| Cs-134         | 1.000E+00          | 0.000E+00       | 1.698E-01   | 1.472E+02            | 1.698E-01   | 1.472E+02            |
| Cs-137         | 1.000E+00          | 0.000E+00       | 7.161E-02   | 3.491E+02            | 7.161E-02   | 3.491E+02            |
| Eu-152         | 1.000E+00          | 0.000E+00       | 1.371E-01   | 1.823E+02            | 1.371E-01   | 1.823E+02            |
| Eu-154         | 1.000E+00          | 0.000E+00       | 1.460E-01   | 1.713E+02            | 1.460E-01   | 1.713E+02            |
| Eu-155         | 1.000E+00          | 0.000E+00       | 5.241E-03   | 4.770E+03            | 5.241E-03   | 4.770E+03            |
| Fe-55          | 1.000E+00          | 0.000E+00       | 4.148E-08   | 6.028E+08            | 4.148E-08   | 6.028E+08            |
| H-3            | 1.000E+00          | 0.000E+00       | 8.452E-07   | 2.958E+07            | 8.452E-07   | 2.958E+07            |
| Ni-59          | 1.000E+00          | 0.000E+00       | 2.433E-07   | 1.027E+08            | 2.433E-07   | 1.027E+08            |
| Ni-63          | 1.000E+00          | 0.000E+00       | 6.613E-07   | 3.780E+07            | 6.613E-07   | 3.780E+07            |
| Np-237         | 1.000E+00          | 0.000E+00       | 3.059E-02   | 8.172E+02            | 3.059E-02   | 8.172E+02            |
| Pu-238         | 1.000E+00          | 0.000E+00       | 1.874E-03   | 1.334E+04            | 1.874E-03   | 1.334E+04            |
| Pu-239         | 1.000E+00          | 0.000E+00       | 2.061E-03   | 1.213E+04            | 2.061E-03   | 1.213E+04            |
| Pu-240         | 1.000E+00          | 0.000E+00       | 2.058E-03   | 1.215E+04            | 2.058E-03   | 1.215E+04            |
| Pu-241         | 1.000E+00          | 39.31 ± 0.08    | 8.992E-05   | 2.780E+05            | 4.191E-05   | 5.964E+05            |
| Sb-125         | 1.000E+00          | 0.000E+00       | 4.713E-02   | 5.305E+02            | 4.713E-02   | 5.305E+02            |
| Sr-90          | 1.000E+00          | 0.000E+00       | 1.380E-03   | 1.812E+04            | 1.380E-03   | 1.812E+04            |
| Tc-99          | 1.000E+00          | 0.000E+00       | 9.713E-05   | 2.574E+05            | 9.713E-05   | 2.574E+05            |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

## Individual Nuclide Dose Summed Over All Pathways

Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | DOSE(j,t), mrem/yr |           |           |           |           |           |           |           |
|----------------|---------------|-----------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00       | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Am-241         | Am-241        | 1.000E+00 | 3.627E-03          | 3.608E-03 | 3.571E-03 | 3.444E-03 | 3.093E-03 | 2.000E-03 | 0.000E+00 | 0.000E+00 |
| Am-241         | Pu-241        | 1.000E+00 | 2.861E-06          | 8.371E-06 | 1.848E-05 | 4.585E-05 | 8.075E-05 | 6.818E-05 | 0.000E+00 | 1.258E-19 |
| Am-241         | ΣDOSE(j)      |           | 3.630E-03          | 3.617E-03 | 3.590E-03 | 3.490E-03 | 3.174E-03 | 2.068E-03 | 0.000E+00 | 1.258E-19 |
| Np-237         | Am-241        | 1.000E+00 | 4.960E-09          | 1.465E-08 | 3.293E-08 | 8.743E-08 | 1.816E-07 | 1.754E-07 | 2.571E-10 | 8.298E-11 |
| Np-237         | Np-237        | 1.000E+00 | 3.059E-02          | 2.959E-02 | 2.769E-02 | 2.359E-02 | 1.202E-02 | 1.004E-03 | 0.000E+00 | 0.000E+00 |
| Np-237         | Pu-241        | 1.000E+00 | 2.621E-12          | 1.792E-11 | 8.946E-11 | 6.520E-10 | 3.196E-09 | 5.534E-09 | 9.389E-12 | 3.031E-12 |
| Np-237         | Pu-241        | 2.450E-05 | 1.196E-13          | 3.462E-13 | 7.432E-13 | 1.678E-12 | 2.175E-12 | 3.574E-13 | 9.470E-21 | 0.000E+00 |
| Np-237         | ΣDOSE(j)      |           | 3.059E-02          | 2.959E-02 | 2.769E-02 | 2.359E-02 | 1.202E-02 | 1.005E-03 | 2.665E-10 | 8.601E-11 |
| U-233          | Am-241        | 1.000E+00 | 1.581E-16          | 1.084E-15 | 5.543E-15 | 4.443E-14 | 2.761E-13 | 9.916E-13 | 1.149E-14 | 7.048E-17 |
| U-233          | Np-237        | 1.000E+00 | 1.455E-09          | 4.267E-09 | 9.555E-09 | 2.496E-08 | 4.945E-08 | 4.453E-08 | 3.738E-10 | 0.000E+00 |
| U-233          | Pu-241        | 1.000E+00 | 6.307E-20          | 9.188E-19 | 1.017E-17 | 2.266E-16 | 3.431E-15 | 2.450E-14 | 3.157E-16 | 2.531E-18 |
| U-233          | Pu-241        | 2.450E-05 | 3.828E-21          | 2.591E-20 | 1.286E-19 | 9.271E-19 | 4.321E-18 | 6.854E-18 | 5.796E-20 | 0.000E+00 |
| U-233          | ΣDOSE(j)      |           | 1.455E-09          | 4.267E-09 | 9.555E-09 | 2.496E-08 | 4.945E-08 | 4.453E-08 | 3.738E-10 | 7.301E-17 |
| Th-229         | Am-241        | 1.000E+00 | 2.637E-19          | 3.914E-18 | 4.463E-17 | 1.090E-15 | 2.106E-14 | 3.147E-13 | 7.827E-17 | 8.509E-17 |
| Th-229         | Np-237        | 1.000E+00 | 3.253E-12          | 2.249E-11 | 1.157E-10 | 9.401E-10 | 6.043E-09 | 2.526E-08 | 3.035E-12 | 3.346E-12 |
| Th-229         | Pu-241        | 1.000E+00 | 8.398E-23          | 2.558E-21 | 6.206E-20 | 4.234E-18 | 2.044E-16 | 6.536E-15 | 2.067E-18 | 2.279E-18 |
| Th-229         | Pu-241        | 2.450E-05 | 6.400E-24          | 9.407E-23 | 1.049E-21 | 2.369E-20 | 3.704E-19 | 3.057E-18 | 4.500E-22 | 4.730E-22 |
| Th-229         | ΣDOSE(j)      |           | 3.253E-12          | 2.249E-11 | 1.157E-10 | 9.401E-10 | 6.043E-09 | 2.526E-08 | 3.035E-12 | 3.346E-12 |
| C-14           | C-14          | 1.000E+00 | 6.142E-07          | 4.550E-16 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ce-144         | Ce-144        | 1.000E+00 | 4.556E-03          | 1.863E-03 | 3.115E-04 | 5.947E-07 | 1.006E-14 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Cm-243         | Cm-243        | 2.400E-03 | 3.927E-05          | 3.818E-05 | 3.610E-05 | 2.965E-05 | 1.678E-05 | 2.024E-06 | 0.000E+00 | 0.000E+00 |
| Cm-243         | Cm-243        | 9.976E-01 | 1.632E-02          | 1.587E-02 | 1.501E-02 | 1.232E-02 | 6.976E-03 | 8.411E-04 | 0.000E+00 | 0.000E+00 |
| Cm-243         | ΣDOSE(j)      |           | 1.636E-02          | 1.591E-02 | 1.504E-02 | 1.235E-02 | 6.992E-03 | 8.432E-04 | 0.000E+00 | 0.000E+00 |
| Am-243         | Cm-243        | 2.400E-03 | 2.964E-09          | 8.770E-09 | 1.985E-08 | 5.351E-08 | 1.153E-07 | 1.390E-07 | 0.000E+00 | 0.000E+00 |
| Pu-239         | Cm-243        | 2.400E-03 | 2.214E-15          | 1.532E-14 | 7.891E-14 | 6.435E-13 | 4.162E-12 | 1.677E-11 | 0.000E+00 | 1.530E-13 |
| Pu-239         | Cm-243        | 9.976E-01 | 2.934E-08          | 8.669E-08 | 1.955E-07 | 5.200E-07 | 1.076E-06 | 1.073E-06 | 0.000E+00 | 6.808E-09 |
| Pu-239         | Pu-239        | 1.000E+00 | 2.061E-03          | 2.050E-03 | 2.027E-03 | 1.950E-03 | 1.731E-03 | 9.854E-04 | 0.000E+00 | 6.234E-06 |
| Pu-239         | ΣDOSE(j)      |           | 2.061E-03          | 2.050E-03 | 2.028E-03 | 1.951E-03 | 1.732E-03 | 9.864E-04 | 0.000E+00 | 6.241E-06 |
| U-235          | Cm-243        | 2.400E-03 | 5.405E-24          | 8.039E-23 | 9.200E-22 | 2.276E-20 | 4.554E-19 | 7.535E-18 | 5.550E-24 | 4.849E-21 |
| U-235          | Cm-243        | 9.976E-01 | 9.558E-17          | 6.622E-16 | 3.419E-15 | 2.813E-14 | 1.868E-13 | 8.448E-13 | 5.424E-18 | 3.885E-17 |
| U-235          | Pu-239        | 1.000E+00 | 1.004E-11          | 3.001E-11 | 6.945E-11 | 2.021E-10 | 5.351E-10 | 1.127E-09 | 3.662E-14 | 3.383E-14 |
| U-235          | ΣDOSE(j)      |           | 1.004E-11          | 3.001E-11 | 6.945E-11 | 2.022E-10 | 5.353E-10 | 1.128E-09 | 3.662E-14 | 3.387E-14 |
| Pa-231         | Cm-243        | 2.400E-03 | 1.166E-29          | 3.935E-28 | 9.760E-27 | 7.138E-25 | 4.147E-23 | 2.204E-21 | 1.220E-23 | 5.081E-22 |
| Pa-231         | Cm-243        | 9.976E-01 | 2.822E-22          | 4.211E-21 | 4.821E-20 | 1.185E-18 | 2.321E-17 | 3.503E-16 | 5.942E-20 | 8.203E-19 |
| Pa-231         | Pu-239        | 1.000E+00 | 3.956E-17          | 2.767E-16 | 1.450E-15 | 1.252E-14 | 9.427E-14 | 6.015E-13 | 5.121E-16 | 7.038E-16 |
| Pa-231         | ΣDOSE(j)      |           | 3.956E-17          | 2.767E-16 | 1.450E-15 | 1.252E-14 | 9.430E-14 | 6.018E-13 | 5.122E-16 | 7.046E-16 |
| Ac-227         | Cm-243        | 2.400E-03 | 0.000E+00          | 2.934E-29 | 1.536E-27 | 3.197E-25 | 4.975E-23 | 6.877E-21 | 7.410E-24 | 3.088E-22 |
| Ac-227         | Cm-243        | 9.976E-01 | 1.259E-23          | 3.847E-22 | 9.400E-21 | 6.585E-19 | 3.413E-17 | 1.288E-15 | 7.732E-21 | 5.063E-19 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

## Individual Nuclide Dose Summed Over All Pathways

Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | DOSE(j,t), mrem/yr |           |           |           |           |           |           |           |
|----------------|---------------|-----------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00       | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Ac-227         | Pu-239        | 1.000E+00 | 2.197E-18          | 3.257E-17 | 3.708E-16 | 9.009E-15 | 1.719E-13 | 2.477E-12 | 6.350E-17 | 4.342E-16 |
| Ac-227         | ΣDOSE(j)      |           | 2.197E-18          | 3.257E-17 | 3.708E-16 | 9.010E-15 | 1.719E-13 | 2.478E-12 | 6.351E-17 | 4.347E-16 |
| Cm-244         | Cm-244        | 1.350E-06 | 1.579E-09          | 1.512E-09 | 1.386E-09 | 1.022E-09 | 4.247E-10 | 1.699E-11 | 0.000E+00 | 0.000E+00 |
| Cm-244         | Cm-244        | 4.950E-08 | 5.788E-11          | 5.543E-11 | 5.082E-11 | 3.748E-11 | 1.557E-11 | 6.230E-13 | 0.000E+00 | 0.000E+00 |
| Cm-244         | ΣDOSE(j)      |           | 1.636E-09          | 1.567E-09 | 1.437E-09 | 1.060E-09 | 4.403E-10 | 1.761E-11 | 0.000E+00 | 0.000E+00 |
| Pu-240         | Cm-244        | 4.950E-08 | 5.330E-15          | 1.565E-14 | 3.482E-14 | 8.849E-14 | 1.638E-13 | 1.324E-13 | 0.000E+00 | 7.807E-16 |
| Pu-240         | Pu-240        | 4.950E-08 | 1.019E-10          | 1.013E-10 | 1.002E-10 | 9.636E-11 | 8.541E-11 | 4.840E-11 | 0.000E+00 | 2.856E-13 |
| Pu-240         | ΣDOSE(j)      |           | 1.019E-10          | 1.014E-10 | 1.003E-10 | 9.645E-11 | 8.558E-11 | 4.853E-11 | 0.000E+00 | 2.864E-13 |
| Cm-244         | Cm-244        | 1.000E+00 | 1.169E-03          | 1.120E-03 | 1.027E-03 | 7.571E-04 | 3.146E-04 | 1.259E-05 | 0.000E+00 | 0.000E+00 |
| Pu-240         | Cm-244        | 1.000E+00 | 1.077E-07          | 3.161E-07 | 7.034E-07 | 1.788E-06 | 3.308E-06 | 2.675E-06 | 0.000E+00 | 1.577E-08 |
| U-236          | Cm-244        | 1.000E+00 | 3.055E-16          | 2.106E-15 | 1.075E-14 | 8.497E-14 | 5.083E-13 | 1.725E-12 | 6.413E-15 | 2.249E-16 |
| U-236          | Pu-240        | 1.000E+00 | 8.735E-12          | 2.608E-11 | 6.017E-11 | 1.733E-10 | 4.458E-10 | 8.266E-10 | 2.948E-12 | 8.096E-14 |
| U-236          | ΣDOSE(j)      |           | 8.736E-12          | 2.608E-11 | 6.018E-11 | 1.734E-10 | 4.464E-10 | 8.283E-10 | 2.955E-12 | 8.118E-14 |
| Th-232         | Cm-244        | 1.000E+00 | 4.863E-26          | 7.201E-25 | 8.163E-24 | 1.954E-22 | 3.576E-21 | 4.524E-20 | 8.721E-25 | 1.438E-24 |
| Th-232         | Pu-240        | 1.000E+00 | 1.849E-21          | 1.288E-20 | 6.733E-20 | 5.790E-19 | 4.324E-18 | 2.651E-17 | 4.505E-22 | 7.098E-22 |
| Th-232         | ΣDOSE(j)      |           | 1.849E-21          | 1.288E-20 | 6.734E-20 | 5.792E-19 | 4.328E-18 | 2.655E-17 | 4.513E-22 | 7.112E-22 |
| Ra-228         | Cm-244        | 1.000E+00 | 1.804E-26          | 5.425E-25 | 1.279E-23 | 7.911E-22 | 3.067E-20 | 6.699E-19 | 6.676E-24 | 1.086E-23 |
| Ra-228         | Pu-240        | 1.000E+00 | 8.527E-22          | 1.243E-20 | 1.361E-19 | 2.909E-18 | 4.224E-17 | 4.060E-16 | 3.452E-21 | 5.369E-21 |
| Ra-228         | ΣDOSE(j)      |           | 8.527E-22          | 1.243E-20 | 1.361E-19 | 2.910E-18 | 4.227E-17 | 4.067E-16 | 3.459E-21 | 5.379E-21 |
| Th-228         | Cm-244        | 1.000E+00 | 1.614E-27          | 9.422E-26 | 4.288E-24 | 5.767E-22 | 3.574E-20 | 9.502E-19 | 2.592E-25 | 4.212E-25 |
| Th-228         | Pu-240        | 1.000E+00 | 9.086E-23          | 2.591E-21 | 5.473E-20 | 2.428E-18 | 5.251E-17 | 5.835E-16 | 1.340E-22 | 2.083E-22 |
| Th-228         | ΣDOSE(j)      |           | 9.086E-23          | 2.592E-21 | 5.473E-20 | 2.428E-18 | 5.255E-17 | 5.845E-16 | 1.343E-22 | 2.088E-22 |
| Co-58          | Co-58         | 1.000E+00 | 3.390E-02          | 9.453E-04 | 7.349E-07 | 9.622E-18 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60          | Co-60         | 1.000E+00 | 2.902E-01          | 2.534E-01 | 1.932E-01 | 7.474E-02 | 4.917E-03 | 3.146E-07 | 0.000E+00 | 0.000E+00 |
| Cs-134         | Cs-134        | 1.000E+00 | 1.698E-01          | 1.208E-01 | 6.122E-02 | 5.662E-03 | 6.248E-06 | 2.449E-16 | 0.000E+00 | 0.000E+00 |
| Cs-137         | Cs-137        | 1.000E+00 | 7.161E-02          | 6.971E-02 | 6.606E-02 | 5.467E-02 | 3.162E-02 | 4.089E-03 | 0.000E+00 | 0.000E+00 |
| Eu-152         | Eu-152        | 7.208E-01 | 9.884E-02          | 9.346E-02 | 8.356E-02 | 5.643E-02 | 1.825E-02 | 3.086E-04 | 0.000E+00 | 0.000E+00 |
| Eu-152         | Eu-152        | 2.792E-01 | 3.828E-02          | 3.620E-02 | 3.237E-02 | 2.186E-02 | 7.070E-03 | 1.195E-04 | 0.000E+00 | 0.000E+00 |
| Eu-152         | ΣDOSE(j)      |           | 1.371E-01          | 1.297E-01 | 1.159E-01 | 7.829E-02 | 2.532E-02 | 4.282E-04 | 0.000E+00 | 0.000E+00 |
| Gd-152         | Eu-152        | 2.792E-01 | 9.883E-19          | 2.884E-18 | 6.334E-18 | 1.542E-17 | 2.592E-17 | 1.845E-17 | 0.000E+00 | 2.993E-21 |
| Eu-154         | Eu-154        | 1.000E+00 | 1.460E-01          | 1.344E-01 | 1.139E-01 | 6.378E-02 | 1.209E-02 | 3.147E-05 | 0.000E+00 | 0.000E+00 |
| Eu-155         | Eu-155        | 1.000E+00 | 5.241E-03          | 4.545E-03 | 3.418E-03 | 1.260E-03 | 7.259E-05 | 3.070E-09 | 0.000E+00 | 0.000E+00 |
| Fe-55          | Fe-55         | 1.000E+00 | 4.148E-08          | 3.191E-08 | 1.889E-08 | 3.013E-09 | 1.575E-11 | 1.406E-19 | 0.000E+00 | 0.000E+00 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

## Individual Nuclide Dose Summed Over All Pathways

Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | DOSE(j,t), mrem/yr |           |           |           |           |           |           |           |
|----------------|---------------|-----------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00       | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| H-3            | H-3           | 1.000E+00 | 8.452E-07          | 7.899E-09 | 2.310E-13 | 3.036E-29 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ni-59          | Ni-59         | 1.000E+00 | 2.433E-07          | 2.417E-07 | 2.386E-07 | 2.275E-07 | 1.971E-07 | 1.029E-07 | 1.252E-09 | 0.000E+00 |
| Ni-63          | Ni-63         | 1.000E+00 | 6.613E-07          | 6.529E-07 | 6.364E-07 | 5.811E-07 | 4.447E-07 | 1.504E-07 | 0.000E+00 | 0.000E+00 |
| Pu-238         | Pu-238        | 1.840E-09 | 3.448E-12          | 3.403E-12 | 3.313E-12 | 3.016E-12 | 2.288E-12 | 7.517E-13 | 0.000E+00 | 3.941E-18 |
| Pu-238         | Pu-238        | 1.000E+00 | 1.874E-03          | 1.849E-03 | 1.801E-03 | 1.639E-03 | 1.244E-03 | 4.086E-04 | 0.000E+00 | 2.142E-09 |
| Pu-238         | ΣDOSE(j)      |           | 1.874E-03          | 1.849E-03 | 1.801E-03 | 1.639E-03 | 1.244E-03 | 4.086E-04 | 0.000E+00 | 2.142E-09 |
| U-234          | Pu-238        | 1.000E+00 | 8.880E-10          | 2.642E-09 | 6.049E-09 | 1.696E-08 | 4.032E-08 | 5.790E-08 | 1.045E-10 | 4.533E-14 |
| Th-230         | Pu-238        | 1.000E+00 | 6.551E-15          | 4.553E-14 | 2.369E-13 | 2.002E-12 | 1.423E-11 | 7.436E-11 | 2.209E-15 | 2.323E-13 |
| Ra-226         | Pu-238        | 1.000E+00 | 9.894E-17          | 1.476E-15 | 1.701E-14 | 4.313E-13 | 9.203E-12 | 1.806E-10 | 2.392E-17 | 3.221E-13 |
| Pb-210         | Pu-238        | 1.000E+00 | 2.771E-21          | 7.662E-20 | 1.765E-18 | 1.212E-16 | 6.596E-15 | 3.086E-13 | 3.558E-18 | 1.622E-13 |
| Po-210         | Pu-238        | 1.000E+00 | 8.532E-23          | 3.675E-21 | 1.240E-19 | 1.161E-17 | 7.046E-16 | 3.114E-14 | 6.266E-17 | 2.275E-12 |
| Pu-240         | Pu-240        | 1.000E+00 | 2.058E-03          | 2.047E-03 | 2.025E-03 | 1.947E-03 | 1.726E-03 | 9.778E-04 | 0.000E+00 | 5.770E-06 |
| Pu-241         | Pu-241        | 1.000E+00 | 3.871E-05          | 3.670E-05 | 3.297E-05 | 2.265E-05 | 7.681E-06 | 1.507E-07 | 0.000E+00 | 1.507E-28 |
| Pu-241         | Pu-241        | 2.450E-05 | 3.418E-07          | 3.246E-07 | 2.927E-07 | 2.037E-07 | 7.192E-08 | 1.685E-09 | 0.000E+00 | 0.000E+00 |
| Pu-241         | ΣDOSE(j)      |           | 3.905E-05          | 3.702E-05 | 3.326E-05 | 2.285E-05 | 7.753E-06 | 1.524E-07 | 0.000E+00 | 1.507E-28 |
| Sb-125         | Sb-125        | 7.720E-01 | 3.631E-02          | 2.810E-02 | 1.684E-02 | 2.802E-03 | 1.656E-05 | 2.313E-13 | 0.000E+00 | 0.000E+00 |
| Sb-125         | Sb-125        | 2.280E-01 | 1.072E-02          | 8.300E-03 | 4.973E-03 | 8.275E-04 | 4.892E-06 | 6.832E-14 | 0.000E+00 | 0.000E+00 |
| Sb-125         | ΣDOSE(j)      |           | 4.703E-02          | 3.640E-02 | 2.181E-02 | 3.630E-03 | 2.146E-05 | 2.996E-13 | 0.000E+00 | 0.000E+00 |
| Te-125m        | Sb-125        | 2.280E-01 | 9.744E-05          | 1.013E-04 | 6.135E-05 | 1.046E-05 | 6.674E-08 | 1.387E-15 | 0.000E+00 | 0.000E+00 |
| Sr-90          | Sr-90         | 1.000E+00 | 1.380E-03          | 1.340E-03 | 1.262E-03 | 1.023E-03 | 5.584E-04 | 5.880E-05 | 5.395E-10 | 0.000E+00 |
| Tc-99          | Tc-99         | 1.000E+00 | 9.713E-05          | 4.592E-05 | 8.890E-06 | 2.836E-08 | 2.075E-15 | 0.000E+00 | 0.000E+00 | 0.000E+00 |

THF(i) is the thread fraction of the parent nuclide.

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Individual Nuclide Soil Concentration  
Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | S(j,t), pCi/g |           |           |           |           |           |           |           |
|----------------|---------------|-----------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00  | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Am-241         | Am-241        | 1.000E+00 | 1.000E+00     | 9.982E-01 | 9.946E-01 | 9.819E-01 | 9.468E-01 | 8.335E-01 | 5.790E-01 | 1.618E-01 |
| Am-241         | Pu-241        | 1.000E+00 | 0.000E+00     | 1.564E-03 | 4.466E-03 | 1.259E-02 | 2.453E-02 | 2.841E-02 | 1.993E-02 | 5.568E-03 |
| Am-241         | ΣS(j):        |           | 1.000E+00     | 9.997E-01 | 9.990E-01 | 9.945E-01 | 9.714E-01 | 8.619E-01 | 5.989E-01 | 1.673E-01 |
| Np-237         | Am-241        | 1.000E+00 | 0.000E+00     | 3.189E-07 | 9.274E-07 | 2.779E-06 | 6.252E-06 | 9.148E-06 | 6.780E-06 | 1.895E-06 |
| Np-237         | Np-237        | 1.000E+00 | 1.000E+00     | 9.710E-01 | 9.154E-01 | 7.447E-01 | 4.130E-01 | 5.247E-02 | 1.445E-04 | 1.582E-13 |
| Np-237         | Pu-241        | 1.000E+00 | 0.000E+00     | 2.529E-10 | 2.159E-09 | 2.000E-08 | 1.098E-07 | 2.886E-07 | 2.332E-07 | 6.521E-08 |
| Np-237         | Pu-241        | 2.450E-05 | 0.000E+00     | 7.633E-12 | 2.118E-11 | 5.384E-11 | 7.500E-11 | 1.867E-11 | 6.030E-14 | 6.625E-23 |
| Np-237         | ΣS(j):        |           | 1.000E+00     | 9.710E-01 | 9.154E-01 | 7.447E-01 | 4.130E-01 | 5.248E-02 | 1.515E-04 | 1.960E-06 |
| U-233          | Am-241        | 1.000E+00 | 0.000E+00     | 7.007E-13 | 6.174E-12 | 6.376E-11 | 4.709E-10 | 2.930E-09 | 8.906E-09 | 1.303E-08 |
| U-233          | Np-237        | 1.000E+00 | 0.000E+00     | 4.307E-06 | 1.254E-05 | 3.770E-05 | 8.579E-05 | 1.320E-04 | 1.175E-04 | 6.348E-05 |
| U-233          | Pu-241        | 1.000E+00 | 0.000E+00     | 3.711E-16 | 9.626E-15 | 3.107E-13 | 5.784E-12 | 7.230E-11 | 2.790E-10 | 4.334E-10 |
| U-233          | Pu-241        | 2.450E-05 | 0.000E+00     | 1.690E-17 | 1.444E-16 | 1.341E-15 | 7.420E-15 | 2.032E-14 | 1.960E-14 | 1.060E-14 |
| U-233          | ΣS(j):        |           | 0.000E+00     | 4.307E-06 | 1.254E-05 | 3.770E-05 | 8.579E-05 | 1.320E-04 | 1.175E-04 | 6.349E-05 |
| Th-229         | Am-241        | 1.000E+00 | 0.000E+00     | 2.212E-17 | 5.876E-16 | 2.060E-14 | 4.787E-13 | 1.133E-11 | 1.270E-10 | 9.060E-10 |
| Th-229         | Np-237        | 1.000E+00 | 0.000E+00     | 2.044E-10 | 1.803E-09 | 1.870E-08 | 1.398E-07 | 9.142E-07 | 3.268E-06 | 8.587E-06 |
| Th-229         | Pu-241        | 1.000E+00 | 0.000E+00     | 8.795E-21 | 6.900E-19 | 7.630E-17 | 4.586E-15 | 2.347E-13 | 3.670E-12 | 2.923E-11 |
| Th-229         | Pu-241        | 2.450E-05 | 0.000E+00     | 5.356E-22 | 1.391E-20 | 4.503E-19 | 8.464E-18 | 1.104E-16 | 4.985E-16 | 1.390E-15 |
| Th-229         | ΣS(j):        |           | 0.000E+00     | 2.044E-10 | 1.803E-09 | 1.870E-08 | 1.398E-07 | 9.142E-07 | 3.268E-06 | 8.588E-06 |
| C-14           | C-14          | 1.000E+00 | 1.000E+00     | 2.467E-10 | 1.501E-29 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ce-144         | Ce-144        | 1.000E+00 | 1.000E+00     | 4.104E-01 | 6.913E-02 | 1.356E-04 | 2.492E-12 | 2.098E-39 | 0.000E+00 | 0.000E+00 |
| Cm-243         | Cm-243        | 2.400E-03 | 2.400E-03     | 2.342E-03 | 2.231E-03 | 1.882E-03 | 1.157E-03 | 2.105E-04 | 1.620E-06 | 6.479E-14 |
| Cm-243         | Cm-243        | 9.976E-01 | 9.976E-01     | 9.736E-01 | 9.274E-01 | 7.821E-01 | 4.807E-01 | 8.752E-02 | 6.735E-04 | 2.693E-11 |
| Cm-243         | ΣS(j):        |           | 1.000E+00     | 9.760E-01 | 9.296E-01 | 7.840E-01 | 4.819E-01 | 8.773E-02 | 6.751E-04 | 2.700E-11 |
| Am-243         | Cm-243        | 2.400E-03 | 0.000E+00     | 2.227E-07 | 6.520E-07 | 1.999E-06 | 4.786E-06 | 8.359E-06 | 8.883E-06 | 7.954E-06 |
| Pu-239         | Cm-243        | 2.400E-03 | 0.000E+00     | 3.220E-12 | 2.851E-11 | 2.993E-10 | 2.312E-09 | 1.637E-08 | 6.488E-08 | 2.040E-07 |
| Pu-239         | Cm-243        | 9.976E-01 | 0.000E+00     | 2.838E-05 | 8.309E-05 | 2.546E-04 | 6.085E-04 | 1.054E-03 | 1.088E-03 | 8.735E-04 |
| Pu-239         | Pu-239        | 1.000E+00 | 1.000E+00     | 9.997E-01 | 9.991E-01 | 9.969E-01 | 9.906E-01 | 9.690E-01 | 9.100E-01 | 7.302E-01 |
| Pu-239         | ΣS(j):        |           | 1.000E+00     | 9.997E-01 | 9.991E-01 | 9.971E-01 | 9.912E-01 | 9.701E-01 | 9.111E-01 | 7.311E-01 |
| U-235          | Cm-243        | 2.400E-03 | 0.000E+00     | 1.059E-21 | 2.823E-20 | 1.001E-18 | 2.395E-17 | 6.157E-16 | 8.006E-15 | 7.939E-14 |
| U-235          | Cm-243        | 9.976E-01 | 0.000E+00     | 1.403E-14 | 1.242E-13 | 1.302E-12 | 1.000E-11 | 6.942E-11 | 2.574E-10 | 6.376E-10 |
| U-235          | Pu-239        | 1.000E+00 | 0.000E+00     | 9.843E-10 | 2.949E-09 | 9.790E-09 | 2.902E-08 | 9.281E-08 | 2.475E-07 | 5.505E-07 |
| U-235          | ΣS(j):        |           | 0.000E+00     | 9.843E-10 | 2.949E-09 | 9.792E-09 | 2.903E-08 | 9.288E-08 | 2.477E-07 | 5.512E-07 |
| Pa-231         | Cm-243        | 2.400E-03 | 0.000E+00     | 5.608E-27 | 4.495E-25 | 5.351E-23 | 3.922E-21 | 3.551E-19 | 1.490E-17 | 5.011E-16 |
| Pa-231         | Cm-243        | 9.976E-01 | 0.000E+00     | 9.914E-20 | 2.642E-18 | 9.355E-17 | 2.233E-15 | 5.674E-14 | 7.115E-13 | 6.152E-12 |
| Pa-231         | Pu-239        | 1.000E+00 | 0.000E+00     | 1.041E-14 | 9.359E-14 | 1.035E-12 | 9.198E-12 | 9.772E-11 | 7.739E-10 | 5.522E-09 |
| Pa-231         | ΣS(j):        |           | 0.000E+00     | 1.041E-14 | 9.359E-14 | 1.035E-12 | 9.201E-12 | 9.777E-11 | 7.746E-10 | 5.528E-09 |
| Ac-227         | Cm-243        | 2.400E-03 | 0.000E+00     | 3.554E-29 | 8.471E-27 | 3.259E-24 | 6.579E-22 | 1.516E-19 | 1.082E-17 | 4.574E-16 |
| Ac-227         | Cm-243        | 9.976E-01 | 0.000E+00     | 7.850E-22 | 6.213E-20 | 7.078E-18 | 4.594E-16 | 2.856E-14 | 5.674E-13 | 5.813E-12 |



Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Individual Nuclide Soil Concentration  
Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | S(j,t), pCi/g |           |           |           |           |           |           |           |
|----------------|---------------|-----------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00  | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| Ac-227         | Pu-239        | 1.000E+00 | 0.000E+00     | 1.096E-16 | 2.910E-15 | 1.017E-13 | 2.349E-12 | 5.509E-11 | 6.337E-10 | 5.232E-09 |
| Ac-227         | ΣS(j):        |           | 0.000E+00     | 1.096E-16 | 2.910E-15 | 1.017E-13 | 2.349E-12 | 5.512E-11 | 6.343E-10 | 5.238E-09 |
| Cm-244         | Cm-244        | 1.350E-06 | 1.350E-06     | 1.299E-06 | 1.204E-06 | 9.206E-07 | 4.280E-07 | 2.934E-08 | 1.386E-11 | 3.175E-23 |
| Cm-244         | Cm-244        | 4.950E-08 | 4.950E-08     | 4.764E-08 | 4.413E-08 | 3.375E-08 | 1.569E-08 | 1.076E-09 | 5.082E-13 | 1.164E-24 |
| Cm-244         | ΣS(j):        |           | 1.399E-06     | 1.347E-06 | 1.248E-06 | 9.543E-07 | 4.437E-07 | 3.042E-08 | 1.437E-11 | 3.292E-23 |
| Pu-240         | Cm-244        | 4.950E-08 | 0.000E+00     | 5.148E-12 | 1.487E-11 | 4.352E-11 | 9.297E-11 | 1.302E-10 | 1.231E-10 | 9.362E-11 |
| Pu-240         | Pu-240        | 4.950E-08 | 4.950E-08     | 4.948E-08 | 4.944E-08 | 4.931E-08 | 4.892E-08 | 4.760E-08 | 4.401E-08 | 3.346E-08 |
| Pu-240         | ΣS(j):        |           | 4.950E-08     | 4.949E-08 | 4.946E-08 | 4.935E-08 | 4.901E-08 | 4.773E-08 | 4.414E-08 | 3.355E-08 |
| Cm-244         | Cm-244        | 1.000E+00 | 1.000E+00     | 9.624E-01 | 8.915E-01 | 6.819E-01 | 3.171E-01 | 2.173E-02 | 1.027E-05 | 2.352E-17 |
| Pu-240         | Cm-244        | 1.000E+00 | 0.000E+00     | 1.040E-04 | 3.003E-04 | 8.791E-04 | 1.878E-03 | 2.630E-03 | 2.488E-03 | 1.891E-03 |
| U-236          | Cm-244        | 1.000E+00 | 0.000E+00     | 1.549E-12 | 1.358E-11 | 1.381E-10 | 9.835E-10 | 5.795E-09 | 1.886E-08 | 4.347E-08 |
| U-236          | Pu-240        | 1.000E+00 | 0.000E+00     | 2.958E-08 | 8.864E-08 | 2.942E-07 | 8.714E-07 | 2.779E-06 | 7.351E-06 | 1.587E-05 |
| U-236          | ΣS(j):        |           | 0.000E+00     | 2.959E-08 | 8.865E-08 | 2.943E-07 | 8.724E-07 | 2.785E-06 | 7.369E-06 | 1.591E-05 |
| Th-232         | Cm-244        | 1.000E+00 | 0.000E+00     | 2.556E-23 | 6.766E-22 | 2.344E-20 | 5.298E-19 | 1.192E-17 | 1.361E-16 | 1.284E-15 |
| Th-232         | Pu-240        | 1.000E+00 | 0.000E+00     | 7.299E-19 | 6.564E-18 | 7.271E-17 | 6.488E-16 | 6.998E-15 | 5.789E-14 | 4.837E-13 |
| Th-232         | ΣS(j):        |           | 0.000E+00     | 7.299E-19 | 6.564E-18 | 7.273E-17 | 6.494E-16 | 7.010E-15 | 5.803E-14 | 4.850E-13 |
| Ra-228         | Cm-244        | 1.000E+00 | 0.000E+00     | 7.534E-25 | 5.731E-23 | 5.741E-21 | 2.767E-19 | 9.769E-18 | 1.282E-16 | 1.262E-15 |
| Ra-228         | Pu-240        | 1.000E+00 | 0.000E+00     | 2.847E-20 | 7.246E-19 | 2.217E-17 | 3.866E-16 | 5.935E-15 | 5.480E-14 | 4.758E-13 |
| Ra-228         | ΣS(j):        |           | 0.000E+00     | 2.847E-20 | 7.246E-19 | 2.218E-17 | 3.869E-16 | 5.945E-15 | 5.492E-14 | 4.771E-13 |
| Th-228         | Cm-244        | 1.000E+00 | 0.000E+00     | 5.172E-26 | 1.066E-23 | 2.618E-21 | 2.079E-19 | 9.091E-18 | 1.257E-16 | 1.257E-15 |
| Th-228         | Pu-240        | 1.000E+00 | 0.000E+00     | 2.416E-21 | 1.633E-19 | 1.162E-17 | 3.102E-16 | 5.597E-15 | 5.383E-14 | 4.737E-13 |
| Th-228         | ΣS(j):        |           | 0.000E+00     | 2.416E-21 | 1.633E-19 | 1.162E-17 | 3.104E-16 | 5.606E-15 | 5.395E-14 | 4.749E-13 |
| Co-58          | Co-58         | 1.000E+00 | 1.000E+00     | 2.799E-02 | 2.193E-05 | 2.951E-16 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Co-60          | Co-60         | 1.000E+00 | 1.000E+00     | 8.767E-01 | 6.739E-01 | 2.683E-01 | 1.932E-02 | 1.935E-06 | 7.241E-18 | 0.000E+00 |
| Cs-134         | Cs-134        | 1.000E+00 | 1.000E+00     | 7.145E-01 | 3.647E-01 | 3.466E-02 | 4.162E-05 | 2.499E-15 | 1.541E-44 | 0.000E+00 |
| Cs-137         | Cs-137        | 1.000E+00 | 1.000E+00     | 9.771E-01 | 9.328E-01 | 7.931E-01 | 4.988E-01 | 9.844E-02 | 9.540E-04 | 8.548E-11 |
| Eu-152         | Eu-152        | 7.208E-01 | 7.208E-01     | 6.843E-01 | 6.166E-01 | 4.284E-01 | 1.513E-01 | 3.962E-03 | 1.197E-07 | 1.814E-23 |
| Eu-152         | Eu-152        | 2.792E-01 | 2.792E-01     | 2.650E-01 | 2.388E-01 | 1.659E-01 | 5.861E-02 | 1.535E-03 | 4.636E-08 | 7.027E-24 |
| Eu-152         | ΣS(j):        |           | 1.000E+00     | 9.493E-01 | 8.555E-01 | 5.943E-01 | 2.099E-01 | 5.496E-03 | 1.661E-07 | 2.517E-23 |
| Gd-152         | Eu-152        | 2.792E-01 | 0.000E+00     | 1.746E-15 | 4.975E-15 | 1.395E-14 | 2.704E-14 | 3.334E-14 | 3.140E-14 | 2.496E-14 |
| Eu-154         | Eu-154        | 1.000E+00 | 1.000E+00     | 9.242E-01 | 7.895E-01 | 4.547E-01 | 9.403E-02 | 3.781E-04 | 5.404E-11 | 5.967E-35 |
| Eu-155         | Eu-155        | 1.000E+00 | 1.000E+00     | 8.695E-01 | 6.575E-01 | 2.471E-01 | 1.509E-02 | 8.496E-07 | 6.133E-19 | 0.000E+00 |
| Fe-55          | Fe-55         | 1.000E+00 | 1.000E+00     | 7.733E-01 | 4.625E-01 | 7.651E-02 | 4.480E-04 | 6.878E-12 | 3.253E-34 | 0.000E+00 |

Summary : RESRAD Default Parameters

File : C:\USERS\DNF\DOCUMENTS\FT CALHOUN\RESRAD INPUT FILES\BFM DRILLING SPOILS DSR\FCS DRILLING SPOILS DSR.RAD

Individual Nuclide Soil Concentration  
Parent Nuclide and Branch Fraction Indicated

| Nuclide<br>(j) | Parent<br>(i) | THF(i)    | S(j,t), pCi/g |           |           |           |           |           |           |           |
|----------------|---------------|-----------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                |               |           | t= 0.000E+00  | 1.000E+00 | 3.000E+00 | 1.000E+01 | 3.000E+01 | 1.000E+02 | 3.000E+02 | 1.000E+03 |
| H-3            | H-3           | 1.000E+00 | 1.000E+00     | 5.435E-03 | 1.605E-07 | 2.249E-23 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Ni-59          | Ni-59         | 1.000E+00 | 1.000E+00     | 9.985E-01 | 9.954E-01 | 9.848E-01 | 9.552E-01 | 8.582E-01 | 6.322E-01 | 2.168E-01 |
| Ni-63          | Ni-63         | 1.000E+00 | 1.000E+00     | 9.923E-01 | 9.771E-01 | 9.256E-01 | 7.930E-01 | 4.615E-01 | 9.832E-02 | 4.386E-04 |
| Pu-238         | Pu-238        | 1.840E-09 | 1.840E-09     | 1.825E-09 | 1.795E-09 | 1.695E-09 | 1.439E-09 | 8.116E-10 | 1.579E-10 | 5.127E-13 |
| Pu-238         | Pu-238        | 1.000E+00 | 1.000E+00     | 9.918E-01 | 9.757E-01 | 9.214E-01 | 7.823E-01 | 4.411E-01 | 8.580E-02 | 2.786E-04 |
| Pu-238         | ΣS(j):        |           | 1.000E+00     | 9.918E-01 | 9.757E-01 | 9.214E-01 | 7.823E-01 | 4.411E-01 | 8.580E-02 | 2.786E-04 |
| U-234          | Pu-238        | 1.000E+00 | 0.000E+00     | 2.822E-06 | 8.390E-06 | 2.710E-05 | 7.439E-05 | 1.842E-04 | 2.648E-04 | 1.612E-04 |
| Th-230         | Pu-238        | 1.000E+00 | 0.000E+00     | 1.272E-11 | 1.138E-10 | 1.238E-09 | 1.050E-08 | 9.579E-08 | 5.295E-07 | 1.875E-06 |
| Ra-226         | Pu-238        | 1.000E+00 | 0.000E+00     | 1.838E-15 | 4.938E-14 | 1.798E-12 | 4.623E-11 | 1.454E-09 | 2.583E-08 | 3.213E-07 |
| Pb-210         | Pu-238        | 1.000E+00 | 0.000E+00     | 1.420E-17 | 1.132E-15 | 1.321E-13 | 9.160E-12 | 6.975E-10 | 2.001E-08 | 3.035E-07 |
| Po-210         | Pu-238        | 1.000E+00 | 0.000E+00     | 3.951E-18 | 6.245E-16 | 1.078E-13 | 8.555E-12 | 6.844E-10 | 1.990E-08 | 3.030E-07 |
| Pu-240         | Pu-240        | 1.000E+00 | 1.000E+00     | 9.996E-01 | 9.988E-01 | 9.961E-01 | 9.883E-01 | 9.616E-01 | 8.891E-01 | 6.759E-01 |
| Pu-241         | Pu-241        | 1.000E+00 | 1.000E+00     | 9.527E-01 | 8.648E-01 | 6.162E-01 | 2.339E-01 | 7.890E-03 | 4.913E-07 | 9.356E-22 |
| Pu-241         | Pu-241        | 2.450E-05 | 2.450E-05     | 2.334E-05 | 2.119E-05 | 1.510E-05 | 5.732E-06 | 1.933E-07 | 1.204E-11 | 2.292E-26 |
| Pu-241         | ΣS(j):        |           | 1.000E+00     | 9.527E-01 | 8.648E-01 | 6.162E-01 | 2.340E-01 | 7.891E-03 | 4.913E-07 | 9.356E-22 |
| Sb-125         | Sb-125        | 7.720E-01 | 7.720E-01     | 5.998E-01 | 3.621E-01 | 6.189E-02 | 3.978E-04 | 8.470E-12 | 1.019E-33 | 0.000E+00 |
| Sb-125         | Sb-125        | 2.280E-01 | 2.280E-01     | 1.771E-01 | 1.069E-01 | 1.828E-02 | 1.175E-04 | 2.501E-12 | 3.011E-34 | 0.000E+00 |
| Sb-125         | ΣS(j):        |           | 1.000E+00     | 7.770E-01 | 4.690E-01 | 8.017E-02 | 5.153E-04 | 1.097E-11 | 1.321E-33 | 0.000E+00 |
| Te-125m        | Sb-125        | 2.280E-01 | 0.000E+00     | 1.846E-01 | 1.133E-01 | 1.937E-02 | 1.245E-04 | 2.650E-12 | 3.190E-34 | 0.000E+00 |
| Sr-90          | Sr-90         | 1.000E+00 | 1.000E+00     | 9.749E-01 | 9.266E-01 | 7.755E-01 | 4.664E-01 | 7.869E-02 | 4.873E-04 | 9.108E-12 |
| Tc-99          | Tc-99         | 1.000E+00 | 1.000E+00     | 4.422E-01 | 8.648E-02 | 2.861E-04 | 2.341E-11 | 3.668E-36 | 0.000E+00 | 0.000E+00 |

THF(i) is the thread fraction of the parent nuclide.

RESICALC.EXE execution time = 12.56 seconds