

# CAP88-PC Version 4 Testing Report

## Revision 1

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# CAP88-PC Version 4



## Testing Report

### June 2013



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## 1 INTRODUCTION

This report includes the results of the testing, to date, of CAP88 Version 4 Release Candidate 3. It includes a description of the testing of the user interface; a description of the six test cases used to test the incorporation of age-specific dose factors; a description of the seventh test case verifying the calculation of air concentrations and working levels for radon-only cases; a description of the 31 issues identified and the corrective actions that resolved those issues; a brief biographical sketch describing the independence and qualifications of the independent tester; and the conclusions drawn from the testing.

## 2 USER INTERFACE TESTING

As part of the software testing, the user interface was extensively tested. The testing verified that the interface only accepted:

- Positive distances less than or equal to 80 kilometers (km) for receptor distances;
- Non-negative release rates;
- Annual precipitation amounts between 0.01 and 500 centimeters per year ( $\text{cm y}^{-1}$ );
- Annual ambient temperatures between -100 and 100 degrees Celsius ( $^{\circ}\text{C}$ );
- Lid heights between 25 and 10,000 meters(m);
- Non-negative source heights, and positive source diameters or areas;
- Non-negative heat release rates, exit velocities, and fixed plume rises; and
- Agricultural fractions that summed to unity.

All issues identified with the interface have been resolved and closed.

## 3 TEST CASES

Seven test cases have been developed to test the capabilities of CAP88 Version 4 Release Candidate 3. Six of these cases involve the calculation of dose and risk to an individual or population at the location identified by CAP88 Version 4 as that of the maximally exposed individual (MEI) or specified by the user. The testing objectives for these six cases include the following verifications:

- Dose factors agree with those calculated using the Dose Coefficient Data File Package from Oak Ridge National Laboratory, Version 2.2 (DCFPAK2.2) to 1% or less;
- Values of Chi-over-Q ( $\chi/Q$ ) agree within 1% with those calculated using CAP88, Version 3.1, including but not limited to the direction of the MEI (the calculated values for  $\chi/Q$  showed good agreement between Versions 3.1 and 4 in all directions);



- Air concentrations and deposition rates (where applicable) agree within 1% with those calculated using CAP88, Version 3.1; and
- Results for dose rates and risks agree within 5% with independent calculations; the 5% criteria is used here to allow for differences caused by different modeling methods.

The objective of Test Case 7 is to verify the CAP88 Version 4 calculations of the air concentrations and working levels for radon-only cases are consistent with Version 3.1.

Basic descriptions of the test cases are given below with the specifics found on the screen captures in the appendices of this report.

Independent calculations shown in the test case comparison tables are reported to the same number of significant figures as CAP88-PC outputs. The relative difference values in the table may show a non-zero value caused by the presence of digits in the calculated value beyond the printed rounded values.

### 3.1 Test Case 1

Test Case 1 involves the dose to an individual adult at a location determined by CAP88 to be that of the MEI. The source is a single stack emitting 0.1 curies per year ( $\text{Ci y}^{-1}$ ) of potassium-40 (K-40). The height and diameter of the stack are 10 m and 1 m, respectively. The plume type is buoyant with a heat release rate of 10 calories per second ( $\text{cal s}^{-1}$ ). Test Case 1 uses the urban agricultural fractions. Other inputs are found in Appendix A.

Table 1 shows a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK2.2 for Case 1. The observed relative difference in dose factors is not significant.



**Table 1: Comparison of Dose Conversion Factors for K-40**

| Dose Factors for K-40  | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 2.268E-04          | 2.268E-04 | 0.00%                  |
| 1-Year Old   | 1.550E-04          | 1.550E-04 | -0.02%                 |
| 5-Year Old   | 7.844E-05          | 7.844E-05 | 0.00%                  |
| 10-Year Old  | 4.699E-05          | 4.699E-05 | 0.00%                  |
| 15-Year Old  | 2.793E-05          | 2.794E-05 | -0.02%                 |
| Adult  | 2.279E-05          | 2.279E-05 | -0.01%                 |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type M)    |                    |           |                        |
| Infant   | 2.527E-04          | 2.527E-04 | 0.00%                  |
| 1-Year Old   | 2.126E-04          | 2.128E-04 | -0.07%                 |
| 5-Year Old   | 1.155E-04          | 1.154E-04 | 0.05%                  |
| 10-Year Old  | 7.703E-05          | 7.696E-05 | 0.09%                  |
| 15-Year Old  | 5.280E-05          | 5.291E-05 | -0.21%                 |
| Adult  | 4.851E-05          | 4.847E-05 | 0.08%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 9.250E+08          | 9.271E+08 | -0.23%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 2.377E+05          | 2.382E+05 | -0.21%                 |

For long-lived radionuclides, the air concentrations and deposition rates should be the same for Versions 3 and 4. A comparison was also made between the  $\chi/Q$ , air concentrations, and deposition rates between the output from Test Case 1 and results generated using Version 3.1 for the same inputs. For the  $\chi/Q$  values, all values agreed to the three significant figures reported. For air concentrations and deposition rates were in good agreement with the maximum differences of about 1.4% observed, and are consistent with rounding errors.

Table 2 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 1 for an adult receptor 100 m north of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. All differences between CAP88 and the independent calculations were insignificant and are consistent with rounding errors.



**Table 2: Dose Rate and Risk Comparison by Pathway for Test Case 1**

| Pathway        | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|----------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|                | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Ingestion      | 3.40E-01  | 3.41E-01                | -0.35%              | 1.08E-08   | 1.09E-08                | -0.53%              |
| Inhalation     | 2.44E-02  | 2.44E-02                | 0.03%               | 8.52E-09   | 8.51E-09                | 0.08%               |
| Air Immersion  | 8.84E-05  | 8.84E-05                | -0.03%              | 4.71E-11   | 4.71E-11                | -0.02%              |
| Ground Surface | 2.87E+00  | 2.87E+00                | 0.00%               | 1.20E-06   | 1.20E-06                | 0.01%               |
| Internal       | 3.64E-01  | 3.66E-01                | -0.44%              | 1.93E-08   | 1.94E-08                | -0.36%              |
| External       | 2.87E+00  | 2.87E+00                | -0.01%              | 1.20E-06   | 1.20E-06                | 0.01%               |
| Total          | 3.23E+00  | 3.24E+00                | -0.18%              | 1.22E-06   | 1.22E-06                | 0.06%               |

### 3.2 Test Case 2

Test Case 2 involves the dose to an individual 15-year old located at a location determined by CAP88 to be that of the MEI. The source includes two areas emitting a total of 2 Ci y<sup>-1</sup> of sodium-22 (Na-22) and 2,000 Ci y<sup>-1</sup> of sodium-24 (Na-24). The height of both sources is 0 m. The areas of the sources are 100 square meters (m<sup>2</sup>) and 150 m<sup>2</sup>, respectively. The plume type is “Momentum” with an exit velocity of 0.1 meters per second (m s<sup>-1</sup>) and 0.2 m s<sup>-1</sup> for Sources 1 and 2, respectively. Test Case 2 uses the rural agricultural fractions. Other inputs are found in Appendix B.

Tables 3 and 4 show a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK 2.2 for Test Case 2. The relative difference in dose factors is insignificant, demonstrating that the dose factors in CAP88 Version 4 show good agreement with DCFPAK2.2.



**Table 3: Comparison of Dose Conversion Factors for Na-22**

| Dose Factors for Na-22   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 7.585E-05          | 7.585E-05 | 0.00%                  |
| 1-Year Old   | 5.439E-05          | 5.439E-05 | 0.00%                  |
| 5-Year Old   | 3.127E-05          | 3.127E-05 | 0.02%                  |
| 10-Year Old  | 2.039E-05          | 2.039E-05 | 0.01%                  |
| 15-Year Old  | 1.387E-05          | 1.388E-05 | -0.04%                 |
| Adult  | 1.177E-05          | 1.177E-05 | 0.03%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulates (Size 1, Type F)   |                    |           |                        |
| Infant   | 3.559E-05          | 3.559E-05 | -0.01%                 |
| 1-Year Old   | 2.741E-05          | 2.742E-05 | -0.03%                 |
| 5-Year Old   | 1.263E-05          | 1.262E-05 | 0.10%                  |
| 10-Year Old  | 8.358E-06          | 8.362E-06 | -0.05%                 |
| 15-Year Old  | 4.592E-06          | 4.588E-06 | 0.09%                  |
| Adult  | 4.048E-06          | 4.070E-06 | -0.54%                 |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 1.188E+10          | 1.191E+10 | -0.25%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 2.388E+06          | 2.394E+06 | -0.24%                 |

**Table 4: Comparison of Dose Conversion Factors for Na-24**

| Dose Factors for Na-24   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 1.314E-05          | 1.314E-05 | 0.04%                  |
| 1-Year Old   | 8.510E-06          | 8.510E-06 | 0.00%                  |
| 5-Year Old   | 4.625E-06          | 4.625E-06 | 0.00%                  |
| 10-Year Old  | 2.901E-06          | 2.901E-06 | 0.01%                  |
| 15-Year Old  | 1.950E-06          | 1.950E-06 | 0.01%                  |
| Adult  | 1.606E-06          | 1.606E-06 | 0.01%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulates (Size 1, Type F)   |                    |           |                        |
| Infant   | 8.691E-06          | 8.695E-06 | -0.05%                 |
| 1-Year Old   | 6.915E-06          | 6.919E-06 | -0.06%                 |
| 5-Year Old   | 3.173E-06          | 3.171E-06 | 0.07%                  |
| 10-Year Old  | 1.993E-06          | 1.991E-06 | 0.12%                  |
| 15-Year Old  | 1.054E-06          | 1.055E-06 | -0.05%                 |
| Adult  | 8.728E-07          | 8.732E-07 | -0.05%                 |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 2.423E+10          | 2.429E+10 | -0.23%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 4.182E+06          | 4.192E+06 | -0.23%                 |

To test the calculation of decay of radionuclides while in flight, the ratio of air concentrations of Na-24 to Na-22 reported by CAP88 was compared to an independent calculation, based on the wind speed in the direction north of the source. Table 5 and Figure 1 show the results of this comparison. Agreement is very good with differences less than 1%.



**Table 5: Comparison of CAP88 Air Concentration Ratio of Na-24 to Na-22 to an Independent Calculation for Test Case 2**

| Distance (m) | Air Concentration Ratio of Na-22 to Na-24 |                         |                     |
|--------------|---|-------------------------|---------------------|
|              | CAP88                                     | Independent Calculation | Relative Difference |
| 200          | 9.96E+02                                  | 9.97E+02                | -0.12%              |
| 300          | 9.97E+02                                  | 9.96E+02                | 0.13%               |
| 400          | 9.97E+02                                  | 9.95E+02                | 0.17%               |
| 500          | 9.96E+02                                  | 9.94E+02                | 0.22%               |
| 700          | 9.88E+02                                  | 9.91E+02                | -0.31%              |
| 1,000        | 9.81E+02                                  | 9.87E+02                | -0.58%              |
| 1,500        | 9.81E+02                                  | 9.81E+02                | -0.01%              |
| 2,000        | 9.76E+02                                  | 9.75E+02                | 0.14%               |
| 3,000        | 9.61E+02                                  | 9.62E+02                | -0.10%              |
| 4,000        | 9.48E+02                                  | 9.50E+02                | -0.23%              |
| 5,000        | 9.37E+02                                  | 9.38E+02                | -0.09%              |
| 7,000        | 9.14E+02                                  | 9.14E+02                | -0.04%              |
| 10,000       | 8.80E+02                                  | 8.80E+02                | 0.03%               |
| 15,000       | 8.24E+02                                  | 8.25E+02                | -0.06%              |
| 20,000       | 7.73E+02                                  | 7.74E+02                | -0.06%              |
| 30,000       | 6.79E+02                                  | 6.80E+02                | -0.16%              |
| 40,000       | 5.97E+02                                  | 5.98E+02                | -0.20%              |
| 50,000       | 5.25E+02                                  | 5.26E+02                | -0.17%              |
| 80,000       | 3.57E+02                                  | 3.58E+02                | -0.33%              |

Table 6 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 2 for a 15-year-old receptor 200 m northwest of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. Table 7 shows a comparison by radionuclide of the effective dose equivalent rate and risk for Test Case 2. All differences between CAP88 and the independent calculations were less than 1% and are consistent with rounding errors.

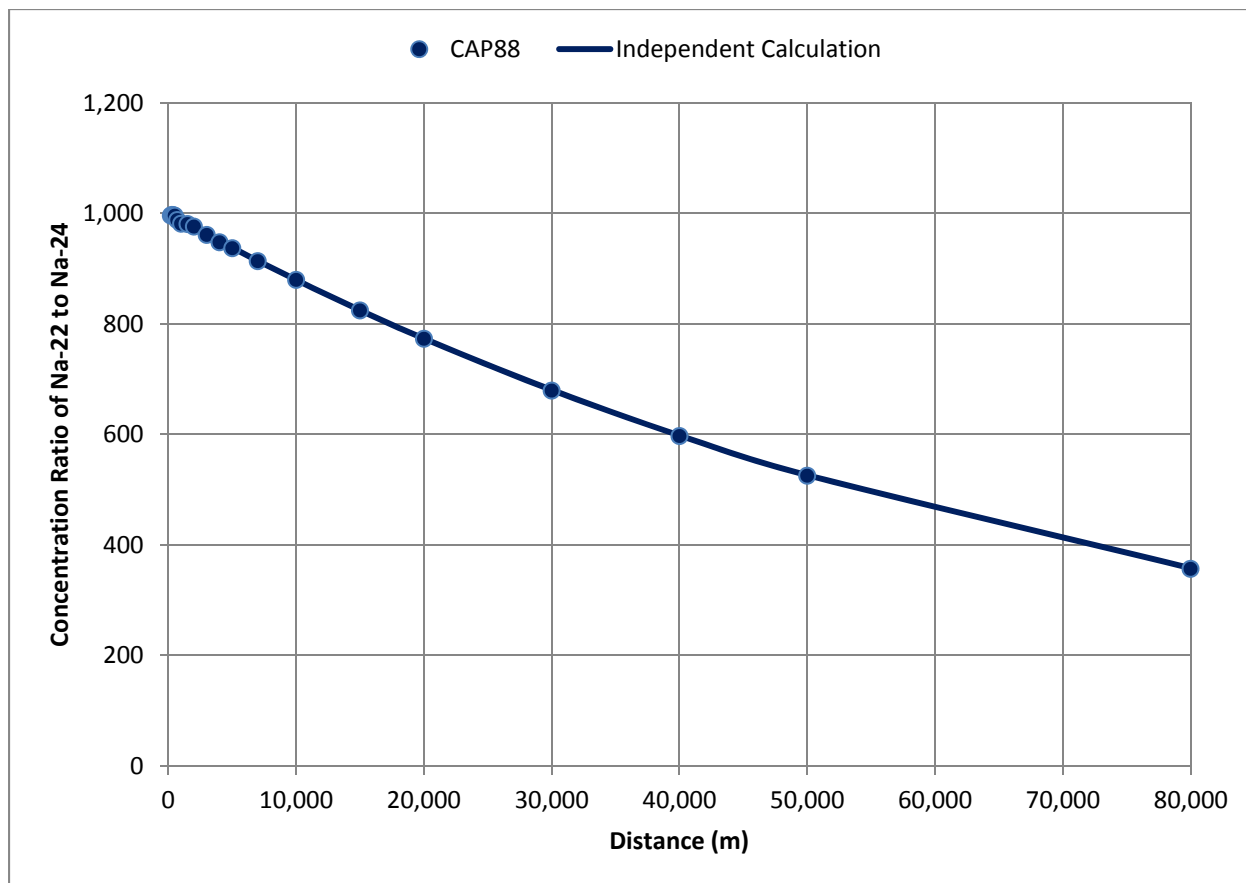


Figure 1: Air Concentration Ratio of Na-24 to Na-22 for Test Case 2

Table 6: Dose Rate and Risk Comparison by Pathway for Test Case 2

| Pathway        | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|----------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|                | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Ingestion      | 3.63E+00  | 3.63E+00                | 0.12%               | 2.66E-06   | 2.67E-06                | -0.26%              |
| Inhalation     | 3.43E+00  | 3.43E+00                | -0.05%              | 1.66E-07   | 1.66E-07                | -0.09%              |
| Air Immersion  | 1.41E+01  | 1.41E+01                | -0.06%              | 7.80E-06   | 7.80E-06                | -0.03%              |
| Ground Surface | 4.18E+01  | 4.18E+01                | 0.00%               | 2.28E-05   | 2.28E-05                | -0.13%              |
| Internal       | 7.07E+00  | 7.06E+00                | 0.18%               | 2.83E-06   | 2.83E-06                | -0.11%              |
| External       | 5.59E+01  | 5.59E+01                | -0.02%              | 3.06E-05   | 3.06E-05                | -0.11%              |
| Total          | 6.29E+01  | 6.30E+01                | -0.11%              | 3.34E-05   | 3.35E-05                | -0.20%              |



**Table 7: Dose Rate and Risk Comparison by Radionuclide for Test Case 2**

| Radionuclide | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|--------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|              | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Na-22        | 2.22E+01  | 2.21E+01                | 0.31%               | 1.18E-05   | 1.18E-05                | -0.28%              |
| Na-24        | 4.08E+01  | 4.08E+01                | -0.09%              | 2.16E-05   | 2.16E-05                | -0.15%              |
| Total        | 6.29E+01  | 6.30E+01                | -0.11%              | 3.34E-05   | 3.35E-05                | -0.20%              |

### 3.3 Test Case 3

Test Case 3 involves the dose to an individual 10-year old located at a location determined by CAP88 to be that of the MEI. The source includes three stack sources emitting a total of 0.8 Ci y<sup>-1</sup> of iron-60 (Fe-60). The heights of the sources are 10 m, 15 m, and 20 m, respectively. The diameters of the stacks are 2.0 m, 1.5 m, and 1.0 m, respectively. The plume type is fixed with plume rises of 0.0 m, 1.0 m, 2.0 m, 3.0 m, 4.0 m, 5.0 m, and 6.0 m for stability classes A, B, C, D, E, F, and G, respectively. Test Case 3 uses the regional agricultural fractions. Other inputs are found in Appendix C.

Tables 8, 9, and 10 show a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK2.2 for Test Case 3. The relative difference in dose factors is less than 0.25%, demonstrating that the dose factors in CAP88 Version 4 show good agreement with DCFPAK2.2 for Fe-60 and its decay products, Co-60m and Co-60.

**Table 8: Comparison of Dose Conversion Factors for Fe-60**

| Dose Factors for Fe-60   | CAP88 Version 4 | DCFPAK2.2 | Relative Difference |
|--|-----------------|-----------|---------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                 |           |                     |
| Infant   | 2.864E-03       | 2.864E-03 | 0.01%               |
| 1-Year Old   | 1.010E-03       | 1.010E-03 | -0.01%              |
| 5-Year Old   | 1.010E-03       | 1.010E-03 | -0.01%              |
| 10-Year Old  | 9.139E-04       | 9.139E-04 | 0.00%               |
| 15-Year Old  | 8.695E-04       | 8.695E-04 | 0.00%               |
| Adult  | 4.144E-04       | 4.144E-04 | 0.00%               |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulates (Size 1, Type M)   |                 |           |                     |
| Infant   | 7.123E-04       | 7.104E-04 | 0.27%               |
| 1-Year Old   | 6.431E-04       | 6.438E-04 | -0.11%              |
| 5-Year Old   | 5.720E-04       | 5.698E-04 | 0.39%               |
| 10-Year Old  | 5.195E-04       | 5.180E-04 | 0.29%               |
| 15-Year Old  | 4.692E-04       | 4.699E-04 | -0.15%              |
| Adult  | 4.847E-04       | 4.847E-04 | 0.00%               |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 8.073E+05       | 8.092E-13 | -0.23%              |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 2.668E+01       | 2.674E-13 | -0.22%              |





**Table 9: Comparison of Dose Conversion Factors for Co-60m**

| Dose Factors for Co-60m  | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 8.029E-08          | 8.029E-08 | 0.00%                  |
| 1-Year Old   | 4.403E-08          | 4.403E-08 | 0.00%                  |
| 5-Year Old   | 2.124E-08          | 2.124E-08 | 0.01%                  |
| 10-Year Old  | 1.206E-08          | 1.206E-08 | -0.02%                 |
| 15-Year Old  | 8.214E-09          | 8.214E-09 | 0.00%                  |
| Adult  | 6.364E-09          | 6.364E-09 | 0.00%                  |
| Inhalation (mrem pCi <sup>-1</sup> )                                     |                    |           |                        |
| Infant   | 2.248E-08          | 2.250E-08 | -0.07%                 |
| 1-Year Old   | 1.447E-08          | 1.447E-08 | 0.02%                  |
| 5-Year Old   | 7.359E-09          | 7.363E-09 | -0.05%                 |
| 10-Year Old  | 5.054E-09          | 5.069E-09 | -0.30%                 |
| 15-Year Old  | 3.677E-09          | 3.678E-09 | -0.02%                 |
| Adult  | 3.204E-09          | 3.204E-09 | -0.01%                 |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 2.260E+07          | 2.265E-11 | -0.23%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 4.940E+03          | 4.951E-11 | -0.22%                 |

**Table 10: Comparison of Dose Conversion Factors for Co-60**

| Dose Factors for Co-60   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 2.005E-04          | 2.005E-04 | -0.02%                 |
| 1-Year Old   | 9.916E-05          | 9.916E-05 | 0.00%                  |
| 5-Year Old   | 6.253E-05          | 6.253E-05 | 0.00%                  |
| 10-Year Old  | 4.144E-05          | 4.144E-05 | 0.00%                  |
| 15-Year Old  | 2.938E-05          | 2.938E-05 | 0.01%                  |
| Adult  | 1.265E-05          | 1.265E-05 | -0.03%                 |
| Inhalation (mrem pCi <sup>-1</sup> )                                     |                    |           |                        |
| Infant   | 1.462E-04          | 1.462E-04 | 0.03%                  |
| 1-Year Old   | 1.245E-04          | 1.247E-04 | -0.15%                 |
| 5-Year Old   | 7.578E-05          | 7.585E-05 | -0.09%                 |
| 10-Year Old  | 5.276E-05          | 5.291E-05 | -0.28%                 |
| 15-Year Old  | 3.948E-05          | 3.959E-05 | -0.28%                 |
| Adult  | 3.465E-05          | 3.441E-05 | 0.70%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 1.386E+10          | 1.389E-08 | -0.25%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 2.680E+06          | 2.686E-08 | -0.21%                 |

Table 11 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 3 for a 10-year-old receptor 2,500 m west of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. Table 12 shows a comparison by radionuclide of the effective dose equivalent



rate and risk for Test Case 2. All differences between CAP88 and the independent calculations were less than 1.5%.

**Table 11: Dose Rate and Risk Comparison by Pathway for Test Case 3**

| Pathway        | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|----------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|                | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Ingestion      | 1.08E-02  | 1.10E-02                | -1.40%              | 4.51E-11   | 4.57E-11                | -1.26%              |
| Inhalation     | 1.19E-02  | 1.19E-02                | 0.35%               | 7.78E-10   | 7.78E-10                | 0.03%               |
| Air Immersion  | 1.01E-07  | 1.01E-07                | -0.15%              | 5.21E-14   | 5.22E-14                | -0.16%              |
| Ground Surface | 5.67E+00  | 5.68E+00                | -0.24%              | 3.13E-06   | 3.14E-06                | -0.27%              |
| Internal       | 2.27E-02  | 2.28E-02                | -0.49%              | 8.23E-10   | 8.23E-10                | -0.05%              |
| External       | 5.67E+00  | 5.68E+00                | -0.24%              | 3.13E-06   | 3.14E-06                | -0.27%              |
| Total          | 5.70E+00  | 5.71E+00                | -0.11%              | 3.13E-06   | 3.14E-06                | -0.29%              |

**Table 12: Dose Rate and Risk Comparison by Radionuclide for Test Case 3**

| Radionuclide | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|--------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|              | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Fe-60        | 2.27E-02  | 2.29E-02                | -0.78%              | 8.52E-10   | 8.52E-10                | -0.01%              |
| Co-60m       | 1.23E-02  | 1.24E-02                | -0.54%              | 6.46E-09   | 6.47E-09                | -0.22%              |
| Co-60        | 5.66E+00  | 5.67E+00                | -0.20%              | 3.13E-06   | 3.13E-06                | -0.06%              |
| Total        | 5.70E+00  | 5.71E+00                | -0.11%              | 3.13E-06   | 3.14E-06                | -0.29%              |

### 3.4 Test Case 4

Test Case 4 involves the dose to a population of 5-year-olds at a location specified by the user. The source includes four area sources emitting a total of 183,600 Ci y<sup>-1</sup> of sulphur-35 (S-35) in several different chemical forms. The heights of the sources are 5 m, 10 m, 8 m, and 2 m, respectively. The areas of the sources are 100 m<sup>2</sup>, 50 m<sup>2</sup>, 70 m<sup>2</sup>, and 120 m<sup>2</sup>, respectively. The plume type is "None". Test Case 4 uses the imported agricultural fractions. Other inputs are found in Appendix D.

Table 13 shows a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK2.2 for Test Case 4. The relative difference in dose factors is less than 0.25%, demonstrating that the dose factors in CAP88 Version 4 show good agreement with DCFPAK2.2.



**Table 13: Comparison of Dose Conversion Factors for S-35**

| Dose Factors for S-35  | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )  |                    |           |                        |
| Infant   | 4.699E-06          | 4.699E-06 | 0.00%                  |
| 1-Year Old   | 3.208E-06          | 3.208E-06 | 0.00%                  |
| 5-Year Old   | 1.643E-06          | 1.643E-06 | 0.01%                  |
| 10-Year Old  | 9.916E-07          | 9.916E-07 | 0.00%                  |
| 15-Year Old  | 6.031E-07          | 6.031E-07 | 0.00%                  |
| Adult  | 4.884E-07          | 4.884E-07 | 0.00%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type S)                |                    |           |                        |
| Infant   | 2.355E-05          | 2.357E-05 | -0.08%                 |
| 1-Year Old   | 1.898E-05          | 1.898E-05 | -0.01%                 |
| 5-Year Old   | 1.090E-05          | 1.092E-05 | -0.14%                 |
| 10-Year Old  | 8.062E-06          | 8.066E-06 | -0.05%                 |
| 15-Year Old  | 6.190E-06          | 6.179E-06 | 0.18%                  |
| Adult  | 5.280E-06          | 5.291E-06 | -0.21%                 |
| Inhalation (mrem pCi <sup>-1</sup> ) for Sulfur Dioxide (SO <sub>2</sub> )           |                    |           |                        |
| Infant   | 3.478E-06          | 3.478E-06 | 0.00%                  |
| 1-Year Old   | 2.448E-06          | 2.449E-06 | -0.06%                 |
| 5-Year Old   | 1.268E-06          | 1.269E-06 | -0.09%                 |
| 10-Year Old  | 7.763E-07          | 7.770E-07 | -0.09%                 |
| 15-Year Old  | 4.740E-07          | 4.736E-07 | 0.08%                  |
| Adult  | 4.026E-07          | 4.033E-07 | -0.17%                 |
| Inhalation (mrem pCi <sup>-1</sup> ) for Carbon Disulfide Dioxide (CS <sub>2</sub> ) |                    |           |                        |
| Infant   | 2.554E-05          | 2.553E-05 | 0.04%                  |
| 1-Year Old   | 1.769E-05          | 1.769E-05 | 0.02%                  |
| 5-Year Old   | 8.924E-06          | 8.917E-06 | 0.08%                  |
| 10-Year Old  | 5.339E-06          | 5.328E-06 | 0.21%                  |
| 15-Year Old  | 3.164E-06          | 3.164E-06 | 0.02%                  |
| Adult  | 2.593E-06          | 2.594E-06 | -0.03%                 |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )              | 3.577E+05          | 3.585E+05 | -0.21%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> )             | 1.549E+01          | 1.553E+01 | -0.25%                 |

Table 14 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 4 for a 5-year-old receptor 100 m north of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. All differences between CAP88 and the independent calculations were less than 1% and are consistent with rounding errors.



**Table 14: Dose Rate and Risk Comparison by Pathway for Test Case 4**

| Pathway        | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|----------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|                | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Ingestion      | 0.00E+00  | 0.00E+00                | 0.00%               | 0.00E+00   | 0.00E+00                | 0.00%               |
| Inhalation     | 7.31E+00  | 7.31E+00                | 0.00%               | 6.09E-07   | 6.07E-07                | 0.27%               |
| Air Immersion  | 1.56E-04  | 1.56E-04                | 0.26%               | 1.91E-11   | 1.91E-11                | 0.25%               |
| Ground Surface | 2.05E-03  | 2.06E-03                | -0.28%              | 8.62E-10   | 8.63E-10                | -0.09%              |
| Internal       | 7.31E+00  | 7.31E+00                | 0.00%               | 6.09E-07   | 6.07E-07                | 0.27%               |
| External       | 2.21E-03  | 2.21E-03                | -0.06%              | 8.81E-10   | 8.82E-10                | -0.10%              |
| Total          | 7.32E+00  | 7.31E+00                | 0.11%               | 6.09E-07   | 6.08E-07                | 0.13%               |

### 3.5 Test Case 5

Test Case 5 involves the dose to a population of 1-year olds, at a location determined by CAP88 to be that of the MEI. The source includes five stack sources emitting a total of 113 Ci y<sup>-1</sup>, 0.565 Ci y<sup>-1</sup>, and 11.3 Ci y<sup>-1</sup> of technetium-97 (Tc-97), technetium-98 (Tc-98), and technetium-99 (Tc-99), respectively. The heights of the sources are 10 m, 10 m, 12 m, 15 m, and 25 m, respectively. The diameters of the sources are 1.0 m<sup>2</sup>, 1.2 m<sup>2</sup>, 1.0 m<sup>2</sup>, 1.3 m<sup>2</sup>, and 0.8 m, respectively. The plume type is “Buoyant” with heat releases of 10 cal s<sup>-1</sup>, 20 cal s<sup>-1</sup>, 15 cal s<sup>-1</sup>, 25 cal s<sup>-1</sup>, and 5 cal s<sup>-1</sup>, respectively. The agricultural fractions were entered manually. For vegetables, the fractions were 0.3 home produced, 0.6 from the assessment area, and 0.1 imported. For milk, the fractions were 0.2 home produced, 0.7 from the assessment area, and 0.1 imported. For meat, the fractions were 0.1 home produced, 0.8 from the assessment area, and 0.1 imported. Other inputs are found in Appendix E.

Tables 15, 16, and 17 show a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK2.2 for Test Case 5. The relative difference in dose factors is less than 0.25%, demonstrating that the dose factors in CAP88 Version 4 show good agreement with DCFPAK2.2.



**Table 15: Comparison of Dose Conversion Factors for Tc-97**

| Dose Factors for Tc-97   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 3.678E-06          | 3.678E-06 | 0.01%                  |
| 1-Year Old   | 1.820E-06          | 1.820E-06 | -0.02%                 |
| 5-Year Old   | 8.991E-07          | 8.991E-07 | 0.00%                  |
| 10-Year Old  | 5.217E-07          | 5.217E-07 | 0.00%                  |
| 15-Year Old  | 3.278E-07          | 3.278E-07 | -0.01%                 |
| Adult  | 2.512E-07          | 2.512E-07 | -0.01%                 |
| Inhalation (mrem pCi <sup>-1</sup> )                                     |                    |           |                        |
| Infant   | 4.625E-06          | 4.625E-06 | 0.00%                  |
| 1-Year Old   | 3.922E-06          | 3.922E-06 | 0.00%                  |
| 5-Year Old   | 2.196E-06          | 2.198E-06 | -0.08%                 |
| 10-Year Old  | 1.415E-06          | 1.413E-06 | 0.11%                  |
| 15-Year Old  | 1.012E-06          | 1.010E-06 | 0.19%                  |
| Adult  | 8.147E-07          | 8.103E-07 | 0.54%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 2.575E+06          | 2.580E+06 | -0.21%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 5.312E+03          | 5.324E+03 | -0.23%                 |

**Table 16: Comparison of Dose Conversion Factors for Tc-98**

| Dose Factors for Tc-98   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 8.399E-05          | 8.399E-05 | 0.00%                  |
| 1-Year Old   | 4.329E-05          | 4.329E-05 | 0.00%                  |
| 5-Year Old   | 2.276E-05          | 2.276E-05 | 0.02%                  |
| 10-Year Old  | 1.391E-05          | 1.391E-05 | -0.01%                 |
| 15-Year Old  | 9.176E-06          | 9.176E-06 | 0.00%                  |
| Adult  | 7.289E-06          | 7.289E-06 | 0.00%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type M)    |                    |           |                        |
| Infant   | 1.196E-04          | 1.195E-04 | 0.08%                  |
| 1-Year Old   | 1.032E-04          | 1.032E-04 | -0.03%                 |
| 5-Year Old   | 6.098E-05          | 6.105E-05 | -0.11%                 |
| 10-Year Old  | 4.303E-05          | 4.292E-05 | 0.26%                  |
| 15-Year Old  | 3.222E-05          | 3.223E-05 | -0.02%                 |
| Adult  | 2.771E-05          | 2.757E-05 | 0.53%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 7.468E+09          | 7.485E+09 | -0.22%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 1.561E+06          | 1.565E+06 | -0.23%                 |



**Table 17: Comparison of Dose Conversion Factors for Tc-99**

| Dose Factors for Tc-99   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 3.811E-05          | 3.811E-05 | 0.00%                  |
| 1-Year Old   | 1.765E-05          | 1.765E-05 | 0.01%                  |
| 5-Year Old   | 8.510E-06          | 8.510E-06 | 0.00%                  |
| 10-Year Old  | 4.847E-06          | 4.847E-06 | 0.00%                  |
| 15-Year Old  | 3.049E-06          | 3.049E-06 | 0.01%                  |
| Adult  | 2.375E-06          | 2.375E-06 | -0.02%                 |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type M)    |                    |           |                        |
| Infant   | 5.461E-05          | 5.476E-05 | -0.27%                 |
| 1-Year Old   | 4.507E-05          | 4.514E-05 | -0.16%                 |
| 5-Year Old   | 2.555E-05          | 2.557E-05 | -0.07%                 |
| 10-Year Old  | 1.867E-05          | 1.865E-05 | 0.12%                  |
| 15-Year Old  | 1.410E-05          | 1.410E-05 | 0.02%                  |
| Adult  | 1.208E-05          | 1.210E-05 | -0.16%                 |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 3.355E+06          | 3.363E-12 | -0.23%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 7.631E+01          | 7.648E-13 | -0.22%                 |

Table 18 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 5 for a 1-year-old receptor 7,500 m west-northwest of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. Table 19 shows a comparison by radionuclide of the effective dose equivalent rate and risk for Test Case 5. All differences between CAP88 and the independent calculations were less than 1.5%.

**Table 18: Dose Rate and Risk Comparison by Pathway for Test Case 5**

| Pathway        | Effective Dose Equivalent for<br>Selected Individual (mrem y <sup>-1</sup> ) |                            |                        | Total Lifetime Fatal Cancer Risk<br>for Selected Individual |                            |                        |
|----------------|--|----------------------------|------------------------|---|----------------------------|------------------------|
|                | CAP88  | Independent<br>Calculation | Relative<br>Difference | CAP88   | Independent<br>Calculation | Relative<br>Difference |
| Ingestion      | 1.24E+00   | 1.24E+00                   | 0.06%                  | 1.57E-07  | 1.58E-07                   | -0.37%                 |
| Inhalation     | 1.92E-03   | 1.93E-03                   | -0.33%                 | 6.36E-11  | 6.38E-11                   | -0.36%                 |
| Air Immersion  | 4.78E-06   | 4.77E-06                   | 0.11%                  | 2.53E-12  | 2.53E-12                   | 0.00%                  |
| Ground Surface | 5.06E-01   | 5.07E-01                   | -0.15%                 | 2.28E-07  | 2.29E-07                   | -0.28%                 |
| Internal       | 1.24E+00   | 1.24E+00                   | -0.10%                 | 1.57E-07  | 1.58E-07                   | -0.41%                 |
| External       | 5.06E-01   | 5.07E-01                   | -0.15%                 | 2.28E-07  | 2.29E-07                   | -0.28%                 |
| Total          | 1.74E+00   | 1.75E+00                   | -0.46%                 | 3.86E-07  | 3.86E-07                   | -0.07%                 |

**Table 19: Dose Rate and Risk Comparison by Radionuclide for Test Case 5**

| Radionuclide | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|--------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|              | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Tc-97        | 7.98E-01  | 7.99E-01                | -0.16%              | 1.36E-07   | 1.36E-07                | 0.01%               |
| Tc-98        | 3.72E-01  | 3.72E-01                | -0.01%              | 1.76E-07   | 1.76E-07                | 0.17%               |
| Tc-99        | 5.75E-01  | 5.77E-01                | -0.29%              | 7.44E-08   | 7.46E-08                | -0.26%              |
| Total        | 1.74E+00  | 1.75E+00                | -0.46%              | 3.86E-07   | 3.86E-07                | -0.07%              |

### 3.6 Test Case 6

Test Case 6 consists of a source emitting iron-52 (Fe-52) and K-40. Iron-52, half-life of 8.275 hours, decays into manganese-52m (Mn-52m). Manganese-52m, half-life of 5.591 days, decays into radioactive Mn-52 (with a probability of 1.75%) and stable chromium-52 (with a probability of 98.25%). By modeling a constant wind speed of 1 m s<sup>-1</sup> in one direction, the ratios of Fe-52, Mn-52m, and Mn-52 to long-lived K-40 may be calculated and then compared to the ratios independently calculated.

Test Case 6 involves the dose to a population of infants, with the location of the MEI identified by CAP88. The source includes six area sources emitting a total of 6 Ci y<sup>-1</sup> of Fe-52 and 0.006 Ci y<sup>-1</sup> of K-40. The heights of the area sources are all 5 m. The areas of the sources are 1 m<sup>2</sup>, 2 m<sup>2</sup>, 3 m<sup>2</sup>, 4 m<sup>2</sup>, 5 m<sup>2</sup>, and 6 m<sup>2</sup>, respectively. The plume type is "Fixed" with fixed rises of 2.0 m, 2.0 m, 2.0 m, 1.5 m, 1.0 m, 1.0 m, and 0.5 m, respectively for Stability Classes A to G. The agricultural fractions are local. Other inputs are found in Appendix F.

Tables 20, 21, and 22 show a comparison of the dose factors reported by CAP88 Version 4 and DCFPAK2.2 for Test Case 6. The relative difference in dose factors is less than 0.26%, demonstrating that the dose factors in CAP88 Version 4 show good agreement with DCFPAK2.2.



**Table 20: Comparison of Dose Conversion Factors for Fe-52**

| Dose Factors for Fe-52   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 4.810E-05          | 4.810E-05 | 0.00%                  |
| 1-Year Old   | 3.382E-05          | 3.382E-05 | 0.01%                  |
| 5-Year Old   | 1.713E-05          | 1.713E-05 | -0.01%                 |
| 10-Year Old  | 1.036E-05          | 1.036E-05 | 0.00%                  |
| 15-Year Old  | 6.179E-06          | 6.179E-06 | 0.00%                  |
| Adult  | 5.106E-06          | 5.106E-06 | 0.00%                  |
| Inhalation (mrem pCi <sup>-1</sup> )                                     |                    |           |                        |
| Infant   | 2.156E-05          | 2.157E-05 | -0.05%                 |
| 1-Year Old   | 1.534E-05          | 1.536E-05 | -0.10%                 |
| 5-Year Old   | 6.364E-06          | 6.364E-06 | 0.00%                  |
| 10-Year Old  | 4.170E-06          | 4.181E-06 | -0.26%                 |
| 15-Year Old  | 2.179E-06          | 2.179E-06 | -0.01%                 |
| Adult  | 1.839E-06          | 1.839E-06 | 0.01%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 3.821E+09          | 3.830E+09 | -0.23%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 8.272E+05          | 8.290E+05 | -0.22%                 |

**Table 21: Comparison of Dose Conversion Factors for Mn-52m**

| Dose Factors for Mn-52m  | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 2.890E-06          | 2.890E-06 | 0.01%                  |
| 1-Year Old   | 1.635E-06          | 1.635E-06 | -0.02%                 |
| 5-Year Old   | 8.140E-07          | 8.140E-07 | 0.00%                  |
| 10-Year Old  | 4.773E-07          | 4.773E-07 | 0.00%                  |
| 15-Year Old  | 3.267E-07          | 3.267E-07 | 0.00%                  |
| Adult  | 2.572E-07          | 2.572E-07 | 0.02%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type M)    |                    |           |                        |
| Infant   | 1.035E-06          | 1.036E-06 | -0.10%                 |
| 1-Year Old   | 7.015E-07          | 7.030E-07 | -0.21%                 |
| 5-Year Old   | 2.866E-07          | 2.864E-07 | 0.08%                  |
| 10-Year Old  | 1.865E-07          | 1.865E-07 | 0.01%                  |
| 15-Year Old  | 1.007E-07          | 1.006E-07 | 0.06%                  |
| Adult  | 8.602E-08          | 8.584E-08 | 0.21%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 1.316E+10          | 1.319E+10 | -0.26%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 2.749E+06          | 2.756E+06 | -0.24%                 |





**Table 22: Comparison of Dose Conversion Factors for Mn-52**

| Dose Factors for Mn-52   | CAP88<br>Version 4 | DCFPK2.2  | Relative<br>Difference |
|--|--------------------|-----------|------------------------|
| Ingestion (mrem pCi <sup>-1</sup> )                                      |                    |           |                        |
| Infant   | 4.551E-05          | 4.551E-05 | 0.00%                  |
| 1-Year Old   | 3.278E-05          | 3.278E-05 | -0.01%                 |
| 5-Year Old   | 1.887E-05          | 1.887E-05 | 0.00%                  |
| 10-Year Old  | 1.265E-05          | 1.265E-05 | -0.03%                 |
| 15-Year Old  | 8.362E-06          | 8.362E-06 | 0.00%                  |
| Adult  | 6.697E-06          | 6.697E-06 | 0.00%                  |
| Inhalation (mrem pCi <sup>-1</sup> ) for Particulate (Size 1, Type M)    |                    |           |                        |
| Infant   | 3.099E-05          | 4.551E-05 | -0.05%                 |
| 1-Year Old   | 2.508E-05          | 3.278E-05 | -0.02%                 |
| 5-Year Old   | 1.249E-05          | 1.887E-05 | -0.13%                 |
| 10-Year Old  | 8.503E-06          | 1.265E-05 | -0.08%                 |
| 15-Year Old  | 5.228E-06          | 8.362E-06 | 0.21%                  |
| Adult  | 4.307E-06          | 6.697E-06 | 0.35%                  |
| Air Immersion (mrem cm <sup>3</sup> μCi <sup>-1</sup> y <sup>-1</sup> )  | 1.887E+10          | 1.892E+10 | -0.24%                 |
| Ground Surface (mrem cm <sup>2</sup> μCi <sup>-1</sup> y <sup>-1</sup> ) | 3.740E+06          | 3.748E+06 | -0.22%                 |

Table 23 shows the air concentrations of the four radionuclides north of the source location.

**Table 23: Air Concentrations in the North Direction as a Function of Distance for Test Case 6**

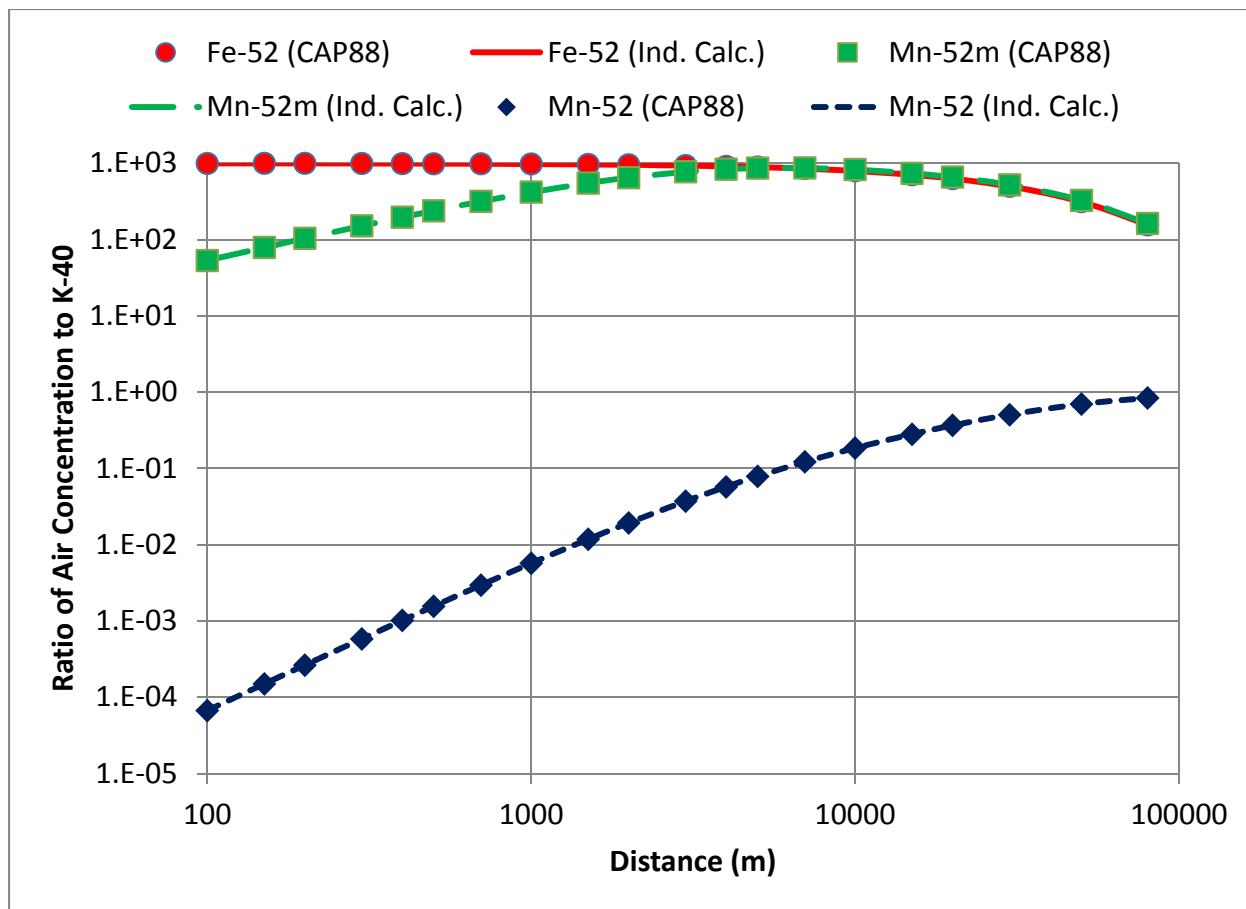
| Distance (m) | Air Concentrations (pCi m <sup>-3</sup> ) |          |          |          |
|--------------|---|----------|----------|----------|
|              | K-40                                      | Fe-52    | Mn-52    | Mn-52m   |
| 100          | 1.42E-02                                  | 1.41E+01 | 7.53E-01 | 9.55E-07 |
| 150          | 9.43E-03                                  | 9.39E+00 | 7.42E-01 | 1.42E-06 |
| 200          | 6.91E-03                                  | 6.88E+00 | 7.16E-01 | 1.83E-06 |
| 300          | 4.24E-03                                  | 4.21E+00 | 6.40E-01 | 2.48E-06 |
| 400          | 2.82E-03                                  | 2.79E+00 | 5.52E-01 | 2.88E-06 |
| 500          | 1.99E-03                                  | 1.96E+00 | 4.73E-01 | 3.11E-06 |
| 700          | 1.12E-03                                  | 1.10E+00 | 3.53E-01 | 3.31E-06 |
| 1,000        | 5.85E-04                                  | 5.72E-01 | 2.44E-01 | 3.35E-06 |
| 1,500        | 2.92E-04                                  | 2.82E-01 | 1.60E-01 | 3.45E-06 |
| 2,000        | 1.77E-04                                  | 1.69E-01 | 1.14E-01 | 3.42E-06 |
| 3,000        | 8.66E-05                                  | 8.08E-02 | 6.68E-02 | 3.23E-06 |
| 4,000        | 5.41E-05                                  | 4.93E-02 | 4.51E-02 | 3.11E-06 |
| 5,000        | 3.79E-05                                  | 3.38E-02 | 3.27E-02 | 2.99E-06 |
| 7,000        | 2.15E-05                                  | 1.83E-02 | 1.86E-02 | 2.63E-06 |
| 10,000       | 1.18E-05                                  | 9.36E-03 | 9.73E-03 | 2.19E-06 |
| 15,000       | 6.59E-06                                  | 4.65E-03 | 4.85E-03 | 1.85E-06 |
| 20,000       | 4.11E-06                                  | 2.58E-03 | 2.70E-03 | 1.51E-06 |
| 30,000       | 1.91E-06                                  | 9.49E-04 | 9.91E-04 | 9.67E-07 |
| 50,000       | 7.52E-07                                  | 2.35E-04 | 2.45E-04 | 5.25E-07 |
| 80,000       | 2.03E-07                                  | 3.16E-05 | 3.30E-05 | 1.71E-07 |



Table 24 and Figure 2 show the ratios of Fe-52, Mn-52m, and Mn-52 calculated using the CAP88 output, along with an independent calculation of the ratios based on the wind speed and distance downwind in the direction north of the sources.

**Table 24: Air Concentration Ratios for Test Case 6**

| Distance (m) | Fe-52:K-40 Ratio |                         | Mn-54m:K-40 Ratio |                         | Mn-54m:K-40 Ratio |                         |
|--------------|------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|
|              | CAP88            | Independent Calculation | CAP88             | Independent Calculation | CAP88             | Independent Calculation |
| 100          | 9.925E-01        | 9.977E-01               | 5.306E-02         | 5.322E-02               | 6.724E-08         | 6.745E-08               |
| 150          | 9.959E-01        | 9.965E-01               | 7.867E-02         | 7.871E-02               | 1.501E-07         | 1.503E-07               |
| 200          | 9.959E-01        | 9.954E-01               | 1.034E-01         | 1.035E-01               | 2.655E-07         | 2.648E-07               |
| 300          | 9.936E-01        | 9.930E-01               | 1.510E-01         | 1.509E-01               | 5.842E-07         | 5.847E-07               |
| 400          | 9.912E-01        | 9.907E-01               | 1.959E-01         | 1.957E-01               | 1.021E-06         | 1.020E-06               |
| 500          | 9.884E-01        | 9.884E-01               | 2.378E-01         | 2.380E-01               | 1.564E-06         | 1.565E-06               |
| 700          | 9.815E-01        | 9.838E-01               | 3.154E-01         | 3.156E-01               | 2.957E-06         | 2.959E-06               |
| 1,000        | 9.770E-01        | 9.770E-01               | 4.158E-01         | 4.163E-01               | 5.722E-06         | 5.725E-06               |
| 1,500        | 9.642E-01        | 9.657E-01               | 5.495E-01         | 5.492E-01               | 1.181E-05         | 1.182E-05               |
| 2,000        | 9.522E-01        | 9.545E-01               | 6.451E-01         | 6.475E-01               | 1.932E-05         | 1.935E-05               |
| 3,000        | 9.315E-01        | 9.326E-01               | 7.740E-01         | 7.719E-01               | 3.726E-05         | 3.730E-05               |
| 4,000        | 9.107E-01        | 9.111E-01               | 8.344E-01         | 8.347E-01               | 5.752E-05         | 5.750E-05               |
| 5,000        | 8.901E-01        | 8.902E-01               | 8.622E-01         | 8.621E-01               | 7.879E-05         | 7.876E-05               |
| 7,000        | 8.482E-01        | 8.497E-01               | 8.645E-01         | 8.648E-01               | 1.220E-04         | 1.220E-04               |
| 10,000       | 7.931E-01        | 7.924E-01               | 8.227E-01         | 8.232E-01               | 1.852E-04         | 1.851E-04               |
| 15,000       | 7.080E-01        | 7.054E-01               | 7.389E-01         | 7.364E-01               | 2.823E-04         | 2.813E-04               |
| 20,000       | 6.276E-01        | 6.279E-01               | 6.559E-01         | 6.558E-01               | 3.667E-04         | 3.663E-04               |
| 30,000       | 4.985E-01        | 4.976E-01               | 5.198E-01         | 5.196E-01               | 5.076E-04         | 5.069E-04               |
| 50,000       | 3.123E-01        | 3.124E-01               | 3.262E-01         | 3.263E-01               | 6.969E-04         | 6.980E-04               |
| 80,000       | 1.553E-01        | 1.555E-01               | 1.622E-01         | 1.624E-01               | 8.395E-04         | 8.414E-04               |



**Figure 2: Radionuclide Ratios for Test Case 6 as a Function of Distance Downwind**

Table 25 shows a comparison by pathway of the effective dose equivalent rate and risk for Test Case 6 for infant 1,500 m north of the source between CAP88 Version 4 and the dose equivalent and risk independently calculated from the reported air concentrations and deposition rates. Table 26 shows a comparison by radionuclide of the effective dose equivalent rate and risk for Test Case 6. All differences between CAP88 and the independent calculations were less than 1.5%.



**Table 25: Dose Rate and Risk Comparison by Pathway for Test Case 6**

| Pathway        | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|----------------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|                | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Ingestion      | 8.61E-02  | 8.68E-02                | -0.81%              | 6.04E-09   | 6.09E-09                | -0.83%              |
| Inhalation     | 8.64E-03  | 8.66E-03                | -0.22%              | 1.58E-10   | 1.58E-10                | -0.07%              |
| Air Immersion  | 3.19E-03  | 3.19E-03                | -0.01%              | 1.74E-09   | 1.73E-09                | 0.51%               |
| Ground Surface | 1.69E-02  | 1.68E-02                | 0.38%               | 7.68E-09   | 7.62E-09                | 0.79%               |
| Internal       | 9.47E-02  | 9.55E-02                | -0.80%              | 6.20E-09   | 6.25E-09                | -0.78%              |
| External       | 2.01E-02  | 2.00E-02                | 0.37%               | 9.42E-09   | 9.35E-09                | 0.74%               |
| Total          | 1.15E-01  | 1.15E-01                | -0.43%              | 1.56E-08   | 1.56E-08                | 0.00%               |

**Table 26: Dose Rate and Risk Comparison by Radionuclide for Test Case 6**

| Pathway | Effective Dose Equivalent for Selected Individual (mrem y <sup>-1</sup> ) |                         |                     | Total Lifetime Fatal Cancer Risk for Selected Individual |                         |                     |
|---------|---|-------------------------|---------------------|--|-------------------------|---------------------|
|         | CAP88   | Independent Calculation | Relative Difference | CAP88  | Independent Calculation | Relative Difference |
| Fe-52   | 1.06E-02  | 1.06E-02                | -0.24%              | 1.39E-09   | 1.39E-09                | -0.18%              |
| Mn-52m  | 6.37E-03  | 6.47E-03                | 1.62%               | 3.27E-09   | 3.33E-09                | 1.79%               |
| Mn-52   | 9.64E-05  | 9.98E-05                | 3.57%               | 5.30E-11   | 5.49E-11                | 3.68%               |
| K-40    | 9.84E-02  | 9.77E-02                | -0.71%              | 1.09E-08   | 1.08E-08                | -0.76%              |
| Total   | 1.15E-01  | 1.15E-01                | -0.43%              | 1.56E-08   | 1.56E-08                | 0.00%               |

### 3.7 Test Case 7

Test Case 7 involves the calculation of the air concentration and working level to an adult from a radon release. Inputs are included in Appendix G. Table 27 shows the comparison of the radon concentration, working level, and lifetime fatal cancer risk between Versions 4.0 and 3.1. No differences were observed.

**Table 27: Comparison between Version 4.0 and Version 3.1 for Test Case 7**

| Quantity                                   | Rn-222 Maximally Exposed Individual at 500 meters North |                   |                     |
|--|---|-------------------|---------------------|
|  | CAP88 Version 4.0                                       | CAP88 Version 3.1 | Relative Difference |
| Radon Concentration (pCi L <sup>-1</sup> ) | 1.60E+00  | 1.60E+00          | 0.00%               |
| Decay Product Concentration (WL)           | 4.62E-03  | 4.62E-03          | 0.00%               |
| Lifetime Fatal Cancer Risk                 | 6.07E-03  | 6.07E-03          | 0.00%               |



## 4 CORRECTIVE ACTIONS

The following is a description of the 31 issues identified, resolved, and closed during the testing phase.

|                      |  |
|----------------------|--|
| Issue Number         | 1  |
| Title                | Edits to setup instructions  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (3) Low  |
| Description          | <p>Consider making the following changes to the "Beta Tester Setup Instructions":</p> <ol style="list-style-type: none"><li>1.Add a step between Steps 1 and 2 to extract the files from the compressed zip file</li><li>2.Change Step 2 to instruct the user to "Run setup.exe as Administrator"</li><li>3.Change Step 6 to instruct the user to "run the migration tool by clicking 'Run'"</li></ol>   |
| Category             | Installation Failure   |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel3/16/20124:36:09 PM<br/>Reviewed revised installation instructions for Beta 1-2 (unchanged for Beta 1-3 and 1-4) during installation of Beta 1-4. All recommended edits have been incorporated.</p> <p>Raymond P. Wood 2/15/20122:44:21 PM<br/>Sorry - forgot to check resolved in the status box! Now Dave can review the updated instructions and close it if OK</p> <p>Raymond P. Wood 2/15/20122:37:38 PM<br/>The requested changes were made to the CAP88PCv4_BetaReadme.docx file. The new instructions were put into version 2.0 of the CAP88PCv4Beta_setup1-2.zip archive. No changes to code</p> |
| Date Entered         | 02/13/12   |
| Beta Revision Number | Beta 1.2   |
| Location Observed    | Other  |



|                      |  |
|----------------------|--|
| Issue Number         | 2  |
| Title                | Differences in Chi/Q Between Versions 3 and 4  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (1) High   |
| Description          | Significant differences in chi/Q values (10% and higher) between Version 3 and 4 were observed for Stability Classes E and F, but not for Stability Classes A, B, C, and D. (See attached Excel Workbook). Differences occurred over a range of downwind distances and wind speeds, but were greatest at shorter distances and lower wind speeds.  |
| Category             | Incorrect Value  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 3/12/20121:22:14 PM<br/>Differences in chi/Q values between Versions 3 and 4 Beta 1-3 were observed for Stability Classes E and F to be less than 1%, (see attached workbook), and are not considered significant. Small differences are possibly due to rounding errors and/or a correction in the treatment of plume reflection between Versions 3 and 4.</p> <p>Doug L. Williams3/3/20123:03:28 PM<br/>You were correct oh king of chi. We were using centigrade for the temperature value in v4 while v3 used temperature in kelvin. The values match much more closely, and we will deploy a new version shortly.</p> |
| Date Entered         | 02/29/12   |
| Beta Revision Number | Beta 1-2   |
| Location Observed    | Output Report  |



|                      |  |
|----------------------|--|
| Issue Number         | 3  |
| Title                | Incorrect Units for Inhalation Rate on General Report Output   |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (2) Normal   |
| Description          | The units for the inhalation rate on the General Report output are given as cubic centimeters per hour (see attached), while the numerical value appears to be that of the inhalation rate in units of cubic meters per year. The calculation of the inhalation dose appears to be correct if the units are assumed to be cubic meters per year.         |
| Category             | Report Format  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 3/9/2012 2:44:00 PM<br/>General reports included in the outputs of Beta Version 1-3 include the correct units of "Cubic meters/yr" for the human inhalation rate.</p> <p>Doug L. Williams 3/3/2012 3:09:54 PM<br/>We switched the units in report to match the units in the EPA spreadsheet. Will be viewable in the next release.</p> |
| Date Entered         | 03/02/12   |
| Beta Revision Number | Beta 1-2   |
| Location Observed    | Output Report  |



|                      |   |
|----------------------|---|
| Issue Number         | 4   |
| Title                | Discrepancy in Units for Radioactive Decay Constant on General Report Output  |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (2) Normal  |
| Description          | <p>The attached General Report lists the radioactive decay constant for K-40 as 1.76e-17 d-1 (inverse days). Independent calculation of the radioactive decay constant for K-40 indicates it is 1.76e-17 s-1 (inverse seconds). It is not entirely clear if this is a report formatting issue or an incorrect value. (I suspect it is the former)</p> <p>The same table also includes what appear to be incorrect references to the footnote. Footnote 1 at the bottom of the table would seem to correspond to Footnote 2 in the table. Footnote 2 at the bottom of the table would seem to correspond to Footnote 3 in the table. There doesn't appear to be a footnote at the bottom of the table corresponding to the first footnote in the table</p> |
| Category             | Report Format   |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 3/12/2012 1:15:57 PM<br/>Reviewed output report for K-40 generated by Beta Version 1-3. The decay constant for K-40 is now correctly given as 1.52e-12 inverse days (d-1). Footnotes have also been corrected.</p> <p>Doug L. Williams 3/3/2012 3:26:01 PM<br/>In v4 we are taking in half life in inverse seconds; corrected report to multiply printed value by 86400. Also removed the 1 reference by radioactive decay constant and changed the references from 2, 3 to 1, 2. Release coming out shortly.</p>   |
| Date Entered         | 03/02/12  |
| Beta Revision Number | Beta 1-2  |
| Location Observed    | Other   |





|                     |  |
|---------------------|--|
| Issue Number        | 5  |
| Title               | Differences in Dose Rates Between Versions 3 and 4   |
| Tester              | David Stuenkel   |
| Issue Status        | Closed   |
| Priority            | (1) High   |
| Description         | <p>Summary of Testing Results</p> <p>The inhalation dose rates in Version 4 are within 1% of the Version 3 dose rates (corrected for differences in dose factors and usage rates).</p> <p>The air immersion dose rates in Version 4 are within 1% of the Version 3 dose rates (corrected for differences in dose factors).</p> <p>The ground surface dose rates in Version 4 are about 5.4% lower than those provided by Version 3 (corrected for differences in dose factors).</p> <p>The ingestion dose rates in Version 4 differ significantly from those in Version 3, with the following observations:</p> <ul style="list-style-type: none"><li>•The relative difference between Version 3 and 4 for milk and meat are the same (within rounding errors) for each radionuclide.</li><li>•The intakes for milk, meat, and vegetables (calculated by dividing the dose rate by the dose factor) are the same for different isotopes of the same element, although the numbers differ between Versions 3 and 4.</li></ul> |
| Category            | Incorrect Value  |
| Related Issues      | None   |
| Comments/Resolution | <p>David Stuenkel 5/28/2012 2:34:55 PM</p> <p>Differences in ingestion and ground surface dose rates between Version 4 and both Versions 2.1 and 3 are expected due to changes in the model used to calculate the concentration of radionuclides in food and on the ground. As such, significant discrepancies in the ingestion and ground surface dose rates are to be expected.</p> <p>Doug L. Williams 3/13/2012 8:21:23 PM</p> <p>It turns out that the difference is because of a change in the model. This will need to be written up formally: in v3.0 we were using the already decayed and depleted values for the deposition at each sector. In version 4, we are using the decayed and the</p>  |



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|                      | actual flight time removal amount. This leads to a much higher dose rate for sectors close to the sources. It is probably distance dependent. It would be better to compare this test case in version 2. We did make one change to a number which does make a change, and had a big effect. |
| Date Entered         | 03/08/12  |
| Beta Revision Number | Beta 1-3  |
| Location Observed    | Output Report   |



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| Issue Number         | 6   |
| Title                | First Reports Generated Date and Time Stamped Jan 1, 1900 12:00 am  |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (2) Normal  |
| Description          | The first set of reports generated for a dataset are date and time stamped Jan 1, 1900 12:00 am   |
| Category             | Report Format   |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 3/16/20125:07:59 PM<br/>Reviewed initial reports generated by Beta 1-4. Date and time stamps reflect date and time report(s) were last generated, not January 1, 1900 12:00 am. (See attached)</p> <p>Doug L. Williams3/10/201211:42:40 AM<br/>This error resulted from a change in the dataset format. We now have Fortran filling in the DATE and TIME of the run to be printed; the last save date for the dataset is still being included and used. Fix coming in next release.</p> |
| Date Entered         | 03/08/12  |
| Beta Revision Number | Beta 1-3  |
| Location Observed    | User Interface  |



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| Issue Number         | 7  |
| Title                | Error Message Attempting to Generate Reports After Printing Reports  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (3) Low  |
| Description          | <p>After printing reports to Nitro PDF, attempts to regenerate reports were unsuccessful and resulted in the following error message:</p> <p>Errors occurred generating the reports. If needed, copy/paste the below information into an email or file, and send to CAP88 support.</p> <p>Fortran Path: C:\Users\dstuenkel\Documents\CAP88\Fortran\ Getting dataset, copying wnd/pop files, writing out the dataset. Deleting fortran Output folder files. Shell process started. Deleting previous reports. The process cannot access the file 'C:\Users\dstuenkel\Documents\CAP88\Datasets\F-18-New.SUM' because it is being used by another process.</p>  |
| Category             | Incorrect Value  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 4/18/20123:47:16 PM<br/>Error messages were not observed while regenerating reports using Beta Version 1-6.</p> <p>Raymond P. Wood 4/5/20121:34:40 PM<br/>Charles identified the problem and fixed it in the user interface code as of release 4.0.0.456 and added another fix in 4.0.0.461. The second fix corrected a similar, related problem with opening the wind and pop file editor. These should be corrected in Beta package 1-5.</p> <p>Doug L. Williams 3/10/201211:07:07 AM<br/>In looking at this issue and doing research it seems as if Nitro is locking a file, and there isn't much our program can do about it. Can you please try printing to a regular printer to see if the file stays locked? Or a different internal printer?</p> |
| Date Entered         | 03/08/12   |
| Beta Revision Number | Beta 1-3   |
| Location Observed    | User Interface   |



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| Issue Number         | 8   |
| Title                | Negative Wet Deposition Rates at Low Rainfall Amounts and Large Distances   |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (2) Normal  |
| Description          | Small but negative wet deposition rates were observed at low rainfall amounts (0.01 cm/y) and large distances (5-80 km) for K-40 and F-18.  |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 4/18/20123:44:40 PM<br/>Wet deposition rates for very low rainfall rates in Beta Version 1-6 are now reported as either a positive value or zero. Note that the values for the wet deposition values are not calculated separately, but calculated from the difference between the total deposition rate and the dry deposition rate. The reported values for the wet deposition rate are not used in later calculations. Instead calculations use the total deposition rate.</p> <p>Doug L. Williams3/10/201212:23:27 PM<br/>Good catch -- we put in a guard in the Fortran to prevent this sort of rounding error. Issue to be fixed in the next release.</p> |
| Date Entered         | 03/08/12  |
| Beta Revision Number | Beta 1-3  |
| Location Observed    | Other   |



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| Issue Number         | 9  |
| Title                | Emission Years Limited to 2012   |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (3) Low  |
| Description          | It might be worth including additional years after 2012 in the "Emission Year" drop-down menu to allow users in the future to select their current year. I'd recommend adding years up to, and including, 2025.  |
| Category             | Report Format  |
| Related Issues       | None   |
| Comments/Resolution  | David Stuenkel 3/16/20125:15:02 PM<br>User interface for Beta 1-4 allows emission years between 1949 and 2017. (Note that emission year can also be left blank if desired.)<br><br>Doug L. Williams3/10/201210:52:36 AM<br>Changed the vb logic to do current year + 5. New version will have change |
| Date Entered         | 03/08/12   |
| Beta Revision Number | Beta 1-3   |
| Location Observed    | User Interface   |



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| Issue Number         | 10   |
| Title                | Zero Values for Scavenging Coefficients and Dry Deposition Velocities for Radionuclides with No Internal Dose Factors  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (1) High   |
| Description          | <p>In version 4, Beta 1-3, for radionuclides with no internal dose factors, such as Bi-211 (see attachments), the chemical form is blank, the type is blank, and the size is zero. Additionally, the scavenging coefficient and dry deposition velocities are both zero.</p> <p>In Version 3, for radionuclides with no internal dose factors, such as Bi-211 (see attachments), the chemical form is unspecified, the type is "M", and the size is "1". Additionally, the scavenging coefficient and dry deposition velocities are both non-zero.</p> <p>It would seem logical that, for example, Bi-211 should have all the chemical forms of other bismuth isotopes, such as Bi-210, and that for purposes of calculating external dose rates, isotopes of the same chemical form should have the same scavenging coefficients and dry deposition velocities.</p> |
| Category             | Incorrect Value  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 3/12/2012 12:26:43 PM</p> <p>Issue 10 is the same issue as Issue 11. Issue 10 did not include attachments due to an error in the filename of the attachment. Issue 10 was closed to avoid duplication of effort and confusion. The issue will be traced as Issue 11.</p>   |
| Date Entered         | 03/12/12   |
| Beta Revision Number | Beta 1-3   |
| Location Observed    | Output Report  |



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| Issue Number         | 11   |
| Title                | Zero Values for Scavenging Coefficients and Dry Deposition Velocities for Radionuclides with No Internal Dose Factors  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (1) High   |
| Description          | <p>In version 4, Beta 1-3, for radionuclides with no internal dose factors, such as Bi-211 (see attachments), the chemical form is blank, the type is blank, and the size is zero. Additionally, the scavenging coefficient and dry deposition velocities are both zero.</p> <p>In Version 3, for radionuclides with no internal dose factors, such as Bi-211 (see attachments), the chemical form is unspecified, the type is "M", and the size is "1". Additionally, the scavenging coefficient and dry deposition velocities are both non-zero.</p> <p>It would seem logical that, for example, Bi-211 should have all the chemical forms of other bismuth isotopes, such as Bi-210, and that for purposes of calculating external dose rates, isotopes of the same chemical form should have the same scavenging coefficients and dry deposition velocities.</p> |
| Category             | Report Format  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 3/16/20125:12:08 PM<br/>Reviewed "General Report" output for Bi-211 using Beta 1-4. Nonzero values are provided for the scavenging coefficient and deposition velocity (See attached).</p> <p>Raymond P. Wood3/15/201212:46:00 AM<br/>Programmed new algorithm in the User Interface to generate non-zero deposition velocity and scavenging coefficients if the chemical form was 'B' and other isotopes of that element had chemical forms that were not 'V' or 'G'. Also modified the Default module in the FORTRAN to test for special case elements that should always be gases (noble gases, O, N, Cl, F) at room temperature. This should prevent spurious Default warning messages. New update is in Beta 1-4.</p>   |
| Date Entered         | 03/12/12   |
| Beta Revision Number | Beta 1-3   |
| Location Observed    | Output Report  |





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| Issue Number         | 12  |
| Title                | Abrupt Change in Chi/Q at Large Distances for Stability Classes A, B, and C   |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (1) High  |
| Description          | For Stability Classes A, B, and C, significant differences in chi/Q between Versions 3 and 4 were observed at large downwind distances. There is an abrupt step-like increase in chi/Q (see attached Excel workbook). Issue was observed for all plume types (buoyant, momentum, fixed, none).  |
| Category             | Incorrect Value   |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 5/7/201210:40:52 PM<br/>Verified that there were no significant differences in chi/Q between Version 2.1, 3.0, and 4.0 Beta 1-8, and that chi/Q followed a smooth curve for both long (K-40) and shorter (F-18) lived radionuclides.</p> <p>Doug L. Williams4/27/201210:13:44 PM<br/>We had noticed in version 4 that the reflection term had been commented out. We put it back in. Apparently it was commented out because the reflection term is too big and causes the discontinuity. We commented it back out, and the next version should show a nice smooth line (numbers seemed to match v3).</p> |
| Date Entered         | 04/27/12  |
| Beta Revision Number | Beta 1-6  |
| Location Observed    | Output Report   |



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| Issue Number         | 13  |
| Title                | Incorrect Heat Release Rate Reported on Synopsis Report   |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (2) Normal  |
| Description          | <p>The Synopsis Report shows the incorrect value for the heat release. It appears that Synopsis Report is reporting the stack diameter instead. (See attached)</p> <p>Additionally, when the plume type is changed, the regenerated Synopsis Report does not reflect the changes made to the plume type for the source(s). For example, if the plume type is changed from buoyant to fixed, the report only shows the plume rise in (cal/s) for the number of stacks, not the 7 stability classes</p> |
| Category             | Incorrect Value   |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 5/28/20122:41:28 PM<br/>Beta Version 1-11 prints the correct headers and labels for "Buoyant", "Momentum", "Fixed", and "None".</p> <p>Doug L. Williams5/17/20127:12:29 PM<br/>Changed the none release to print none under the Pasquill categories. Let me know if this isn't correct. Fix will be in Beta 1-10.</p> <p>Doug L. Williams4/27/20129:49:17 PM<br/>Please try beta 1-7. We were printing the wrong variable for a buoyant plume</p>                                   |
| Date Entered         | 04/27/12  |
| Beta Revision Number | Beta 1-6  |
| Location Observed    | Output Report   |



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| Issue Number         | 14  |
| Title                | Downwind Midpoint Distances Greater than 80 km (or Zero) Allowed  |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (3) Low   |
| Description          | <p>CAP88 allows the input of downwind distances greater than 80 km (the limit of the model). Distances greater than 80 km but less than or equal to 200 km can be used to generate reports. Distances greater than 200 km result in the following error:</p> <p>Errors occurred generating the reports. If needed, copy/paste the below information into an email or file, and send to CAP88 support.<br/>Fortran Path: C:\Users\dstuenkel\Documents\CAP88\Fortran\<br/>Getting dataset, copying wnd/pop files, writing out the dataset.<br/>Deleting fortran Output folder files.<br/>Shell process started.<br/>Reading fortranlog.txt<br/>1</p> <p>CAP88 does not enforce a limit of 80,000 meters, and provides no warning to the user for distances greater than 80 km. CAP88 also allows a value of zero, which results in the same error message as above.</p> |
| Category             | Code Crash  |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 5/7/2012 10:34:02 PM<br/>Verified that Beta Version 1-8 does allow the user to enter distances greater than 80,000 meters (80 km).</p> <p>Doug L. Williams 5/1/2012 8:04:09 PM<br/>Put in checks of distances and population to make sure not greater than 80000 meters. See Beta1-8.</p>   |
| Date Entered         | 04/27/12  |
| Beta Revision Number | Beta 1-6  |
| Location Observed    | User Interface  |



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| Issue Number         | 15   |
| Title                | Negative Release Rates Allowed for Multiple Sources  |
| Tester               | David Stuenkel   |
| Issue Status         | Closed   |
| Priority             | (3) Low  |
| Description          | <p>For multiple sources (i.e. stacks), CAP88 allows the user to enter negative values for some of the release rates (provided that at least one release rate for each radionuclide is positive). The total release rate can be positive or negative or zero.</p> <p>This can result in non-positive values for <math>\chi/Q</math>. Concentrations, deposition rates, and doses are still apparently positive (even for values of zero for <math>\chi/Q</math>).</p> |
| Category             | Incorrect Value  |
| Related Issues       | None   |
| Comments/Resolution  | <p>David Stuenkel 5/7/2012 10:32:19 PM<br/>Verified that Beta Version 1-8 does not allow the user to enter negative release rates.</p> <p>Doug L. Williams 5/1/2012 8:19:32 PM<br/>Added a check that all release rates are positive. See Beta 1-8</p>   |
| Date Entered         | 04/27/12   |
| Beta Revision Number | Beta 1-6   |
| Location Observed    | User Interface   |



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| Issue Number         | 16  |
| Title                | Blanks in Dataset Name  |
| Tester               | David Stuenkel  |
| Issue Status         | Closed  |
| Priority             | (3) Low   |
| Description          | When a blank is included in the filename of a dataset (i.e. "K-F Test.dat"), CAP88 saves the file under that name, but generates the reports with filenames that do not include the blank (i.e. K-FTest.CHI), as evidenced by looking in Datasets folder. However, CAP88 does not display the reports in the user interface (Reports Tab).  |
| Category             | Report Format   |
| Related Issues       | None  |
| Comments/Resolution  | <p>David Stuenkel 5/28/2011 22:46:41 PM<br/>Beta Version 1-11 saves all report with filenames that do not include spaces. When opening a dataset with a space in the filename, CAP88 ignores the space and loads previously generated reports.</p> <p>Doug L. Williams 5/17/2012 7:54:51 PM<br/>The fortran removes spaces, so the VB does when copying the fortran report files as well. Test solution in Beta 1-10.</p> |
| Date Entered         | 05/14/12  |
| Beta Revision Number | Beta 1-9  |
| Location Observed    | User Interface  |



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| Issue Number         | 17   |
| Title                | Unexpected object error when opening dataset   |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Resolved   |
| Priority             | (2) Normal   |
| Description          | Opened test.dat and ran it successfully, then reopened it, edited it, resaved it as a new file, and ran the new file successfully. Upon attempting to then re-open the original test.dat, the program produced and 'unexpected object' error. If CAP88 V4 was closed and reopened the original test.dat would then run.  |
| Category             | UI Action  |
| Related Issues       |  |
| Comments/Resolution  | <p>Doug L. Williams 10/22/2012 9:53:24 PM<br/>There was existing code to check for the dataset already being open, however; the wrong condition was being checked. I updated, and things seem to be working.</p> <p>Raymond P. Wood 10/16/2012 3:46:03 PM<br/>TEA test reproduced this error when an open request was performed on an already open dataset. A fix to this error will be incorporated into Beta 1-15.</p> |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | User Interface   |



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| Issue Number         | 18  |
| Title                | Version 4 will not install to selected user locations   |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (2) Normal  |
| Description          | CAP88 V4 not installing to user selected locations. Also, the default data sets installed to a location that would not allow the code to run (it couldn't find them). The EPA user had to manually move files using the tools-options function (these are the code's data files not the case input file datasets)   |
| Category             | File System Problem   |
| Related Issues       |   |
| Comments/Resolution  | <p>Doug L. Williams 10/22/2012 9:52:29 PM<br/>I have moved the controls around to make more intuitive, and separated how the system works. Please test heavily, as I am unable to fully validate -- including a fresh installation.</p> <p>Raymond P. Wood 10/16/2012 3:50:49 PM<br/>TEA testing reproduced the issue. A fix is being investigated; this may require significant modification to the installer file management.</p> |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |



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| Issue Number         | 19  |
| Title                | Hg release rate not editable  |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (2) Normal  |
| Description          | In one EPA test case the Hg release rate could not be edited  |
| Category             | UI Action   |
| Related Issues       |   |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 3:54:15 PM<br><br>This issue has been addressed. The fix will be in Beta package 1-15 or later |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |





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| Issue Number         | 20  |
| Title                | No printing of Age Group  |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (1) High  |
| Description          | The code is not printing the age group selected for the dose and risk factor sets used in the case.   |
| Category             | Report Format   |
| Related Issues       |   |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 3:57:15 PM<br><br>The age group value is now being printed in multiple reports. This fix is incorporated into Beta package 1-15 and later. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | Output Report   |



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| Issue Number         | 21  |
| Title                | No printing to network printers   |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Not reproducible  |
| Priority             | (2) Normal  |
| Description          | The program is not able to print to EPA network printers from the report screen in the user interface.  |
| Category             | UI Action   |
| Related Issues       |   |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:01:04 PM<br><br>TEA tests could not reproduce this error - printing to TEA network printers was successful. This will be held open pending more information on EPA network topology and security restrictions. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |



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| Issue Number         | 22  |
| Title                | Release rate value was changed by program during save process   |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (2) Normal  |
| Description          | In one case, the code changed the release rates as part of the save process.  |
| Category             | UI Action   |
| Related Issues       |   |
| Comments/Resolution  | <p>Doug L. Williams 10/25/2012 1:15:47 AM<br/>Added help text in two spots mentioning the need to click away from a changed value in order to persist the change.</p> <p>Raymond P. Wood 10/16/2012 4:05:33 PM<br/>TEA testing reproduced this action. When editing a field the user must click away from the field to complete the update action. Any incomplete actions will not be saved, and the field value will revert to the earlier value during the save process. TEA will update the user instructions to note this behavior.</p> |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |



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| Issue Number         | 23   |
| Title                | Minimum allowed release rate value is inconsistent   |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Resolved   |
| Priority             | (2) Normal   |
| Description          | The code's documentation for what constitutes the minimum release rate allowed in CAP88 V4 is inconsistent.  |
| Category             | Incorrect Value  |
| Related Issues       |  |
| Comments/Resolution  | Doug L. Williams 10/25/2012 1:24:41 AM<br>Updated the introduction, and added a line in another help file indicating the need for a value at least 1.0e-25 ci/yr<br><br>Raymond P. Wood 10/16/2012 4:08:47 PM<br>TEA identified the proper value to be 1.0E-26 Ci/yr. The documentation will be updated to reflect this value. |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | User Interface   |



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| Issue Number         | 24  |
| Title                | Uninstall in XP SP3 with Admin Rights failed  |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Not reproducible  |
| Priority             | (2) Normal  |
| Description          | When using XP SP3 with administrator rights, the add/remove programs uninstall had no effect at all.  |
| Category             | Uninstall failure   |
| Related Issues       |   |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:14:02 PM<br><br>TEA ran install/uninstall on an XP SP3 machine and could not reproduce this issue. We will leave it open in the event more information becomes available or the error recurs in later beta versions. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |



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| Issue Number         | 25   |
| Title                | No info that user files not removed by uninstall   |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Active   |
| Priority             | (3) Low  |
| Description          | The uninstall process needs a note stating that the user files will not be removed and will need to be removed manually.   |
| Category             | File System Problem  |
| Related Issues       |  |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:17:39 PM<br><br>The fact that user data such as reports and datasets are not deleted during uninstall is by design. TEA will add instructions into the user manual making this information available. |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | User Interface   |



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| Issue Number         | 26   |
| Title                | No information regarding creating new population and wind files  |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Active   |
| Priority             | (3) Low  |
| Description          | The users would like some instructions on how to 'install' a new pop or wind file. This may include instructions such as to create it using the described format in an ASCII editor, and then place the new file in the appropriate directory. |
| Category             | File System Problem  |
| Related Issues       |  |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:20:56 PM<br><br>TEA will investigate this method and include instructions in future documentation.  |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | POP/Wind Editors   |



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| Issue Number         | 27  |
| Title                | Errors are not clear to user  |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (2) Normal  |
| Description          | The messages being delivered to the user when errors are generated is not clear. The location of error logs and other information is not clear.   |
| Category             | UI Action   |
| Related Issues       |   |
| Comments/Resolution  | Doug L. Williams 10/25/2012 1:31:05 AM<br>This text was already present in the help documentation. I added an additional link to it from the first page.<br><br>Raymond P. Wood 10/16/2012 4:23:45 PM<br>TEA will document where errors are being logged and where to send error reports. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |





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| Issue Number         | 28   |
| Title                | V3- V4 dataset conversion utility not working  |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Resolved   |
| Priority             | (2) Normal   |
| Description          | Conversion not working – see attached files. During conversion the error generated is “conversion from nfortra to type decimal is not valid”   |
| Category             | Code Crash   |
| Related Issues       |  |
| Comments/Resolution  | <p>Raymond P. Wood 11/25/2012 7:34:18 PM</p> <p>The ‘testdata.pop’ file was crashing migration because of a data field error that was creating a ‘not a decimal value’ error. Fixed it.</p> <p>Raymond P. Wood 10/16/2012 4:26:22 PM</p> <p>TEA will request the files upon which the conversion utility failed. The files that were sent by EPA were datasets that had successfully completed conversion.</p> |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | File Conversion Utility  |



|                      |  |
|----------------------|--|
| Issue Number         | 29   |
| Title                | dataset selection menu not closing after selection   |
| Tester Organization  | EPA  |
| Tester               | Neal Nelson  |
| Issue Status         | Resolved   |
| Priority             | (2) Normal   |
| Description          | Getting an intermittent error where, after selecting a dataset using the console, the dataset selection console window is not closing.   |
| Category             | UI Action  |
| Related Issues       |  |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:30:06 PM<br><br>TEA will further investigate this problem, but as of now this is apparently a Windows MDI menu issue. As a workaround, hitting the ESCAPE key will close the menus without disturbing the current screen. |
| Date Entered         | 10/16/2012   |
| Beta Revision Number | 1-11   |
| Location Observed    | File Conversion Utility  |



|                      |   |
|----------------------|---|
| Issue Number         | 30  |
| Title                | Program lock-up when opening a non-existent file  |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Not reproducible  |
| Priority             | (2) Normal  |
| Description          | The program is locking up when attempting to open a file from the C:\CAP88 folder if that file does not exist. Should it recognize that the file does not exist and say file not found?                                       |
| Category             | Code Hang   |
| Related Issues       |   |
| Comments/Resolution  | Raymond P. Wood 10/16/2012 4:33:49 PM<br><br>TEA could not reproduce this issue. When attempting to open a non-existent file we receive a 'file not found' dialog box. We will hold this issue open pending more information. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | User Interface  |



|                      |   |
|----------------------|---|
| Issue Number         | 31  |
| Title                | Migration only works on latest V3 files   |
| Tester Organization  | EPA   |
| Tester               | Neal Nelson   |
| Issue Status         | Resolved  |
| Priority             | (2) Normal  |
| Description          | Migration utility needs to state that the input V3 files must be from the latest version of the CAP88 V3 code currently on the EPA web site (date 12/9/2007?).  |
| Category             | Code Crash  |
| Related Issues       |   |
| Comments/Resolution  | Doug L. Williams 10/22/2012 9:58:09 PM<br>I added text to the migration form and the help text to specifically mention the version supported in migration.<br><br>Raymond P. Wood 10/16/2012 4:35:35 PM<br>TEA will attempt to add text stating the need for migration input files to be from the latest version 3 release. |
| Date Entered         | 10/16/2012  |
| Beta Revision Number | 1-11  |
| Location Observed    | File Conversion Utility   |



## 5 QUALIFICATIONS OF TESTER

Dr. David Stuenkel was the primary tester for the testing of CAP88 Version 4 Beta 1. He is an employee of Trinity Engineering Associates, Inc., and has been a CAP88-PC user of Versions 2 and 3. Dr. Stuenkel was not involved in development of CAP88-PC Version 4 (or earlier) versions of the code except for previous activities testing versions 2.1 and 3.

Dr. Stuenkel has a BS in Nuclear Engineering from the University of Illinois, and a MS and PhD from the University of Michigan. He is a Certified Health Physicist (CHP), receiving his initial certification in 2007 and his recertification in 2011. An employee of Trinity Engineering Associates since 1999, he has supported a number of clients, including U.S. Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), the U.S. Department of Energy (DOE), and the Federal Emergency Management Agency (FEMA). Since 2003, he has supported FEMA in the evaluation of Radiological Emergency Preparedness (REP), including the evaluation of dose assessment and field team activities. In 2005, he supported the development of dose and risk projections for NRC in support of the development of an Environmental Impact Statement (EIS) for the American Centrifuge Plant. Dr. Stuenkel has completed FEMA's week long Radiological Accident Assessment Concepts (RAAC) course and has used a number of dose assessment codes for various projects, including CAP88, RASCAL, HotSpot, RadTran, and MCNP.

## 6 CONCLUSIONS

At this time that appears to be that CAP88, Version 4 Release Candidate 3 is

- Properly generating the age-dependent dose factors;
- Generating age dependent risk factors in accordance with the data provided by Oak Ridge, however the risk factor data does not yet include age-dependency for all pathways;
- Properly generating the age-dependent ingestion rate;
- Generating air concentrations and ground deposition rates that match previous versions of CAP88-PC, where applicable;
- Properly performing decay chain calculations;
- Generating ground surface concentrations that match independent calculations but are not in full agreement with the concentrations calculated by previous versions of CAP88-PC (reason being the differences in methodology);
- Properly generating case dataset files;
- Properly performing file read/write operations;
- Properly printing results;



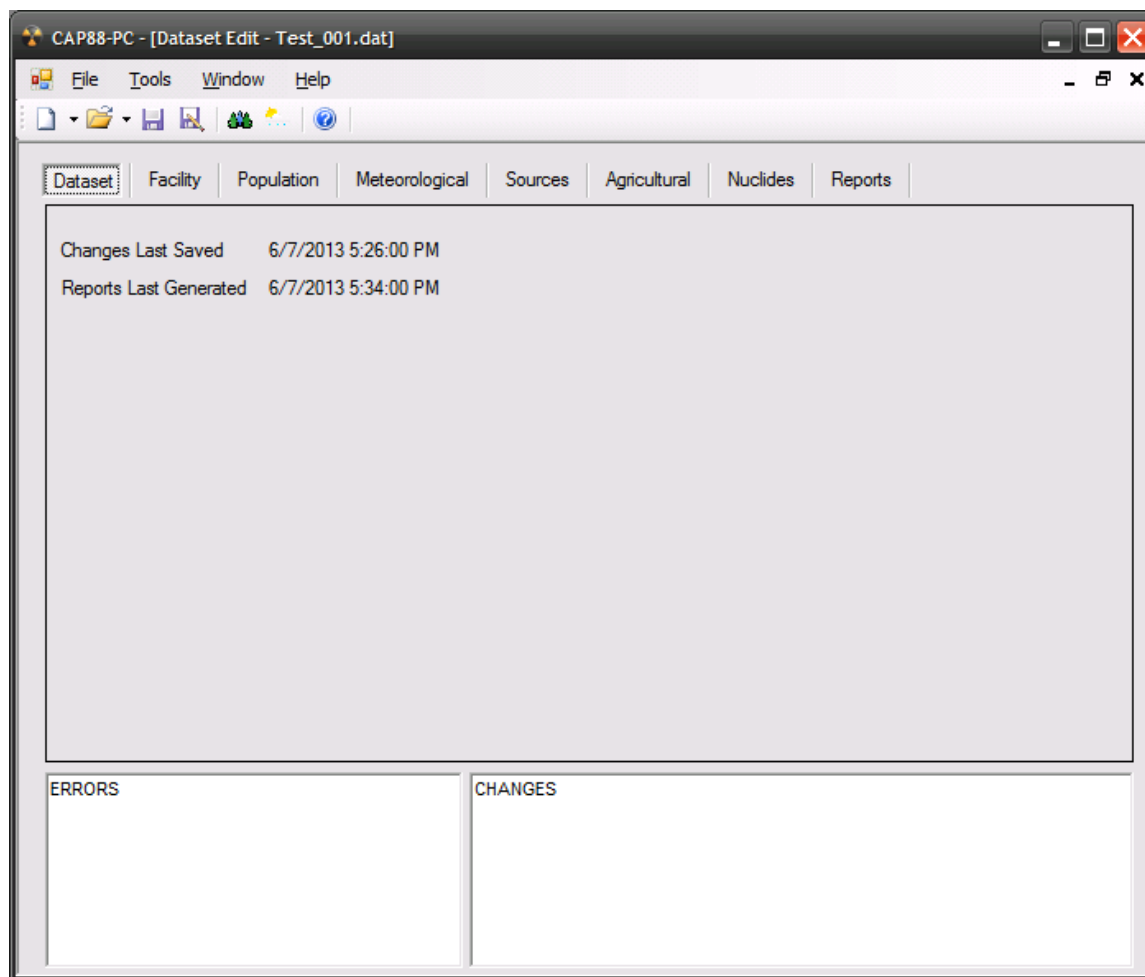
- Installing and executing under Windows XP with Service Pack 3, Windows Vista, and Windows 7 operating systems (both 32 and 64 bit); and
- Generating dose and results that agree with independent calculations based on the CAP88 outputs for air concentrations and ground deposition rates.



## ***Appendix A: Test Case 1 Inputs and Reports***

### **A.1 Inputs**

#### ***A.1.1 Dataset***





### A.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

|          |   |  |      |
|----------|---|--|------|
| Name     | Springfield Nuclear Power Plant             | Emission Year                                  | 1992 |
| Address  | 100 Industrial Way                          | Source Category                                |      |
|          |   |  |      |
| City     | Springfield                                 |  |      |
| Zip      | 62701                                       | (Note: State is found on the Agricultural tab) |      |
| Comments | Intended for Software Testing Purposes Only |  |      |
|          | Version 4.0, Release Candidate 3            |  |      |

|        |         |
|--------|---------|
| ERRORS | CHANGES |
|        |         |





### A.1.3 Population

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Individual Population Age: Adult Build up time: 100 years

☒ Create dose and risk summaries  
☒ Create dose and risk factors  
☒ Create concentration table  
☒ Create Chi/Q table

Midpoints: 20

|       |          |          |          |          |          |
|-------|----------|----------|----------|----------|----------|
| 1 - 5 | 100.00   | 150.00   | 200.00   | 300.00   | 400.00   |
| 6-10  | 500.00   | 700.00   | 1000.00  | 1500.00  | 2000.00  |
| 11-15 | 3000.00  | 4000.00  | 5000.00  | 7000.00  | 10000.00 |
| 16-20 | 15000.00 | 20000.00 | 30000.00 | 50000.00 | 80000.00 |

Maximum Exposed Individual

Direction: auto Midpoint index: 0 ☒ Auto-determine

ERRORS

CHANGES



### A.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.

File SPRG1990 Springfield

|                            |         |                |
|----------------------------|---------|----------------|
| Annual Precipitation       | 10.00   | cm/year        |
| Annual Ambient Temperature | 10.00   | Celsius        |
| Lid Height                 | 1000.00 | meters         |
| Absolute Humidity          | 8.00    | grams/cu meter |

ERRORS

CHANGES



### A.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility Population Meteorological **Sources** Agricultural Nuclides Reports

Source Type Stack

Sources 1

|             | 1     |
|-------------|-------|
| Height(m)   | 10.00 |
| Diameter(m) | 1.00  |

Plume Type Buoyant

Enter the heat release rate for each source

|         | 1     |
|---------|-------|
| cal/sec | 10.00 |

ERRORS

CHANGES



### A.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source

|                               | Vegetable                         | Milk                             | Meat                              |
|-------------------------------|-----------------------------------|----------------------------------|-----------------------------------|
| Fraction home produced        | <input type="text" value="0.08"/> | <input type="text" value="0.0"/> | <input type="text" value="0.01"/> |
| Fraction from assessment area | <input type="text" value="0.92"/> | <input type="text" value="1.0"/> | <input type="text" value="0.99"/> |
| Fraction imported             | <input type="text" value="0.0"/>  | <input type="text" value="0.0"/> | <input type="text" value="0.0"/>  |

Agriculture State

Beef cattle density  #/ha2

Milk cattle density  #/ha2

Land fraction cultivated for vegetables

ERRORS

CHANGES



### A.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_001.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length max ☐ Radon Only Ac-223 Add

Released Nuclide Count 1 Total Nuclide Count 1 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form   | Type | Size  | RR1       |
|-----|---------|-------------|------|-------|-----------|
| 0   | K-40    | Particulate | M    | 1.... | 1.000e-01 |

ERRORS

CHANGES



## A.2 Reports

### A.2.1 Synopsis Report

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: IL                      Zip: 62701

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: Adult

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Effective Dose Equivalent  
(mrem/year)

---

3.23E+00

---

At This Location:      100 Meters North

Dataset Name: Test\_001.  
Dataset Date: Jun 7, 2013 05:26 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind



Fri Jun 07 17:30:55 2013

SYNOPSIS  
Page 1

#### MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 100 Meters North  
Lifetime Fatal Cancer Risk: 1.22E-06

#### ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

| Organ    | Dose<br>Equivalent<br>(mrem/y) |
|----------|--------------------------------|
| Adrenal  | 2.05E+00                       |
| UB_Wall  | 2.35E+00                       |
| Bone_Sur | 3.01E+00                       |
| Brain    | 2.16E+00                       |
| Breasts  | 2.31E+00                       |
| St_Wall  | 2.22E+00                       |
| SI_Wall  | 2.20E+00                       |
| ULI_Wall | 2.45E+00                       |
| LLI_Wall | 3.02E+00                       |
| Kidneys  | 2.22E+00                       |
| Liver    | 2.21E+00                       |
| Muscle   | 2.41E+00                       |
| Ovaries  | 2.09E+00                       |
| Pancreas | 2.10E+00                       |
| R_Marrow | 2.33E+00                       |
| Skin     | 8.79E+01                       |
| Spleen   | 2.19E+00                       |
| Testes   | 2.41E+00                       |
| Thymus   | 2.16E+00                       |
| Thyroid  | 2.20E+00                       |
| GB_Wall  | 2.10E+00                       |
| Ht_Wall  | 2.17E+00                       |
| Uterus   | 2.15E+00                       |
| ET_Reg   | 2.10E+00                       |
| Lung_66  | 2.45E+00                       |
| Effectiv | 3.23E+00                       |

#### RADIONUCLIDE EMISSIONS DURING THE YEAR 1992

| Nuclide | Type | Size  | Source     | TOTAL   |
|---------|------|-------|------------|---------|
|         |      |       | #1<br>Ci/y | Ci/y    |
| K-40    | M    | 1.000 | 1.0E-01    | 1.0E-01 |

#### SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 10.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m



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SYNOPSIS  
Page 2

#### SOURCE INFORMATION

Source Number: 1

Stack Height (m): 10.00  
Diameter (m): 1.00

Plume Rise  
Buoyant (cal/s): 10.00  
(Heat Release Rate)

#### AGRICULTURAL DATA

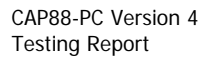
|                                | Vegetable | Milk  | Meat  |
|--------------------------------|-----------|-------|-------|
| Fraction Home Produced:        | 0.080     | 0.000 | 0.010 |
| Fraction From Assessment Area: | 0.920     | 1.000 | 0.990 |
| Fraction Imported:             | 0.000     | 0.000 | 0.000 |

Food Arrays were not generated for this run.  
Default Values used.

#### DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

|       |       |       |       |       |       |      |
|-------|-------|-------|-------|-------|-------|------|
| 100   | 150   | 200   | 300   | 400   | 500   | 700  |
| 1000  | 1500  | 2000  | 3000  | 4000  | 5000  | 7000 |
| 10000 | 15000 | 20000 | 30000 | 50000 | 80000 |      |





Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: IL                               Zip: 62701
```

```
Source Category:
Source Type:    Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_001.
Dataset Date:  Jun 7, 2013 05:26 PM
Wind File:     C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| K-40    | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| K-40    | 1.52E-12                 | 5.48E-05 | 0.00E+00 | 7.00E-03             | 2.00E-02 |

FOOTNOTES:

- (1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)
- (2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)



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Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

---

| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| K-40    | 3.00E+00                       | 3.00E-01   | 1.00E+00           | 1.00E+00  |

---

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)

---



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GENERAL  
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---

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

HUMAN INHALATION RATE  
Cubic meters/yr 5.26E+03

SOIL PARAMETERS  
Effective surface density (kg/sq m, dry weight)  
(Assumes 15 cm plow layer) 2.15E+02

BUILDUP TIMES  
For activity in soil (years) 1.00E+02  
For radionuclides deposited on ground/water (days) 3.65E+04

DELAY TIMES  
Ingestion of pasture grass by animals (hr) 0.00E+00  
Ingestion of stored feed by animals (hr) 2.16E+03  
Ingestion of leafy vegetables by man (hr) 3.36E+02  
Ingestion of produce by man (hr) 3.36E+02  
Transport time from animal feed-milk-man (day) 2.00E+00  
Time from slaughter to consumption (day) 2.00E+01

WEATHERING  
Removal rate constant for physical loss (per hr) 2.90E-03

CROP EXPOSURE DURATION  
Pasture grass (hr) 7.20E+02  
Crops/leafy vegetables (hr) 1.44E+03

AGRICULTURAL PRODUCTIVITY  
Grass-cow-milk-man pathway (kg/sq m) 2.80E-01  
Produce/leafy veg for human consumption (kg/sq m) 7.16E-01

FALLOUT INTERCEPTION FRACTIONS  
Vegetables 2.00E-01  
Pasture 5.70E-01

GRAZING PARAMETERS  
Fraction of year animals graze on pasture 4.00E-01  
Fraction of daily feed that is pasture grass  
when animal grazes on pasture 4.30E-01

---



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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 8.00E-02

Meat 1.00E-02

Milk 0.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside  
area listed below are actual fixed values.)

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 7.62E+01

Milk ingestion (L/y) 5.30E+01

Meat ingestion (kg/y) 8.40E+01

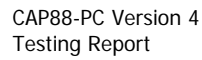
Leafy vegetable ingestion (kg/y) 7.79E+00

SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

---



Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: IL                               Zip: 62701
```

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_001.
Dataset Date:  Jun 7, 2013 05:26 PM
Wind File:     C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |





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WEATHER  
Page 2

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

---

| Pasquill Stability Class |   |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|---|
| Dir                      | A | B | C | D | E | F | G |

---

|       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| N     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

---

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 10.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *A.2.4 Dose and Risk Equivalent Summaries*

### D O S E   A N D   R I S K   E Q U I V A L E N T   S U M M A R I E S

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: IL                      Zip: 62701

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: Adult

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_001.  
Dataset Date: Jun 7, 2013 05:26 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.wnd



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SUMMARY  
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem/y) |
|----------|------------------------------------|
| Adrenal  | 2.05E+00                           |
| UB_Wall  | 2.35E+00                           |
| Bone_Sur | 3.01E+00                           |
| Brain    | 2.16E+00                           |
| Breasts  | 2.31E+00                           |
| St_Wall  | 2.22E+00                           |
| SI_Wall  | 2.20E+00                           |
| ULI_Wall | 2.45E+00                           |
| LLI_Wall | 3.02E+00                           |
| Kidneys  | 2.22E+00                           |
| Liver    | 2.21E+00                           |
| Muscle   | 2.41E+00                           |
| Ovaries  | 2.09E+00                           |
| Pancreas | 2.10E+00                           |
| R_Marrow | 2.33E+00                           |
| Skin     | 8.79E+01                           |
| Spleen   | 2.19E+00                           |
| Testes   | 2.41E+00                           |
| Thymus   | 2.16E+00                           |
| Thyroid  | 2.20E+00                           |
| GB_Wall  | 2.10E+00                           |
| Ht_Wall  | 2.17E+00                           |
| Uterus   | 2.15E+00                           |
| ET_Reg   | 2.10E+00                           |
| Lung_66  | 2.45E+00                           |
| Effectiv | 3.23E+00                           |

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem/y) |
|----------------|------------------------------------|
| INGESTION      | 3.40E-01                           |
| INHALATION     | 2.44E-02                           |
| AIR IMMERSION  | 8.84E-05                           |
| GROUND SURFACE | 2.87E+00                           |
| INTERNAL       | 3.64E-01                           |
| EXTERNAL       | 2.87E+00                           |
| TOTAL          | 3.23E+00                           |



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SUMMARY  
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclide | Selected<br>Individual<br>(mrem/y) |
|---------|------------------------------------|
| K-40    | 3.23E+00                           |
| TOTAL   | 3.23E+00                           |



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SUMMARY  
Page 3

CANCER RISK SUMMARY

| Cancer | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|--------|--|
|        |  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|----------------|--|
| INGESTION      | 1.08E-08   |
| INHALATION     | 8.52E-09   |
| AIR IMMERSION  | 4.71E-11   |
| GROUND SURFACE | 1.20E-06   |
| INTERNAL       | 1.93E-08   |
| EXTERNAL       | 1.20E-06   |
| TOTAL          | 1.22E-06   |



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SUMMARY  
Page 4

NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|---------|--|
| K-40    | 1.22E-06   |
| TOTAL   | 1.22E-06   |



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SUMMARY  
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 100          | 150     | 200     | 300     | 400     | 500     | 700     |
| N         | 3.2E+00      | 2.6E+00 | 2.1E+00 | 1.5E+00 | 1.2E+00 | 9.9E-01 | 7.3E-01 |
| NNW       | 2.7E+00      | 2.1E+00 | 1.7E+00 | 1.2E+00 | 9.7E-01 | 8.2E-01 | 6.2E-01 |
| NW        | 2.3E+00      | 1.8E+00 | 1.4E+00 | 1.0E+00 | 8.4E-01 | 7.1E-01 | 5.5E-01 |
| WNW       | 2.0E+00      | 1.6E+00 | 1.3E+00 | 9.2E-01 | 7.5E-01 | 6.4E-01 | 5.1E-01 |
| W         | 1.8E+00      | 1.4E+00 | 1.1E+00 | 8.3E-01 | 6.8E-01 | 5.9E-01 | 4.7E-01 |
| WSW       | 1.6E+00      | 1.3E+00 | 1.0E+00 | 7.6E-01 | 6.3E-01 | 5.5E-01 | 4.5E-01 |
| SW        | 1.5E+00      | 1.2E+00 | 9.5E-01 | 7.1E-01 | 5.9E-01 | 5.2E-01 | 4.3E-01 |
| SSW       | 1.4E+00      | 1.1E+00 | 8.8E-01 | 6.7E-01 | 5.6E-01 | 4.9E-01 | 4.1E-01 |
| S         | 1.3E+00      | 1.0E+00 | 8.3E-01 | 6.3E-01 | 5.3E-01 | 4.7E-01 | 4.0E-01 |
| SSE       | 1.2E+00      | 9.5E-01 | 7.8E-01 | 6.0E-01 | 5.1E-01 | 4.5E-01 | 3.9E-01 |
| SSE       | 1.1E+00      | 9.0E-01 | 7.5E-01 | 5.8E-01 | 4.9E-01 | 4.4E-01 | 3.8E-01 |
| ESE       | 1.1E+00      | 8.6E-01 | 7.1E-01 | 5.5E-01 | 4.8E-01 | 4.3E-01 | 3.7E-01 |
| E         | 1.0E+00      | 8.2E-01 | 6.9E-01 | 5.4E-01 | 4.6E-01 | 4.2E-01 | 3.6E-01 |
| ENE       | 9.9E-01      | 7.9E-01 | 6.6E-01 | 5.2E-01 | 4.5E-01 | 4.1E-01 | 3.6E-01 |
| NE        | 9.5E-01      | 7.6E-01 | 6.4E-01 | 5.0E-01 | 4.4E-01 | 4.0E-01 | 3.5E-01 |
| NNE       | 9.1E-01      | 7.3E-01 | 6.2E-01 | 4.9E-01 | 4.3E-01 | 3.9E-01 | 3.4E-01 |

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 1000         | 1500    | 2000    | 3000    | 4000    | 5000    | 7000    |
| N         | 5.4E-01      | 4.1E-01 | 3.5E-01 | 3.1E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 |
| NNW       | 4.7E-01      | 3.7E-01 | 3.3E-01 | 3.0E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 |
| NW        | 4.3E-01      | 3.5E-01 | 3.2E-01 | 2.9E-01 | 2.8E-01 | 2.8E-01 | 2.7E-01 |
| WNW       | 4.0E-01      | 3.4E-01 | 3.1E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 |
| W         | 3.8E-01      | 3.3E-01 | 3.0E-01 | 2.8E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 |
| WSW       | 3.7E-01      | 3.2E-01 | 3.0E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 |
| SW        | 3.6E-01      | 3.1E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 |
| SSW       | 3.5E-01      | 3.1E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 |
| S         | 3.4E-01      | 3.0E-01 | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 |
| SSE       | 3.3E-01      | 3.0E-01 | 2.9E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 |
| SSE       | 3.3E-01      | 3.0E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |
| ESE       | 3.2E-01      | 3.0E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |
| E         | 3.2E-01      | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |
| ENE       | 3.2E-01      | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |
| NE        | 3.1E-01      | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |
| NNE       | 3.1E-01      | 2.9E-01 | 2.8E-01 | 2.7E-01 | 2.7E-01 | 2.7E-01 | 2.6E-01 |



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SUMMARY  
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|
|           | 10000        | 15000   | 20000   | 30000   | 50000   | 80000   |
| N         | 2.7E-01      | 2.7E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| NNW       | 2.7E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| NW        | 2.7E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| WNW       | 2.7E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| W         | 2.7E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| WSW       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| SW        | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| SSW       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| S         | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| SSE       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| SSE       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| ESE       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| E         | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| ENE       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| NE        | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |
| NNE       | 2.6E-01      | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 | 2.6E-01 |





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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 100          | 150     | 200     | 300     | 400     | 500     | 700     |
| N         | 1.2E-06      | 9.6E-07 | 7.6E-07 | 5.2E-07 | 3.9E-07 | 3.0E-07 | 2.0E-07 |
| NNW       | 9.9E-07      | 7.6E-07 | 6.0E-07 | 4.0E-07 | 3.0E-07 | 2.3E-07 | 1.5E-07 |
| NW        | 8.3E-07      | 6.3E-07 | 4.9E-07 | 3.3E-07 | 2.4E-07 | 1.9E-07 | 1.3E-07 |
| WNW       | 7.2E-07      | 5.4E-07 | 4.2E-07 | 2.8E-07 | 2.1E-07 | 1.6E-07 | 1.1E-07 |
| W         | 6.3E-07      | 4.7E-07 | 3.6E-07 | 2.4E-07 | 1.8E-07 | 1.4E-07 | 9.4E-08 |
| WSW       | 5.6E-07      | 4.2E-07 | 3.2E-07 | 2.1E-07 | 1.6E-07 | 1.2E-07 | 8.4E-08 |
| SW        | 5.1E-07      | 3.8E-07 | 2.9E-07 | 1.9E-07 | 1.4E-07 | 1.1E-07 | 7.5E-08 |
| SSW       | 4.6E-07      | 3.4E-07 | 2.6E-07 | 1.7E-07 | 1.3E-07 | 1.0E-07 | 6.9E-08 |
| S         | 4.3E-07      | 3.1E-07 | 2.4E-07 | 1.6E-07 | 1.2E-07 | 9.4E-08 | 6.3E-08 |
| SSE       | 3.9E-07      | 2.9E-07 | 2.2E-07 | 1.5E-07 | 1.1E-07 | 8.7E-08 | 5.9E-08 |
| SSE       | 3.7E-07      | 2.7E-07 | 2.1E-07 | 1.4E-07 | 1.0E-07 | 8.1E-08 | 5.5E-08 |
| ESE       | 3.4E-07      | 2.5E-07 | 1.9E-07 | 1.3E-07 | 9.6E-08 | 7.6E-08 | 5.2E-08 |
| E         | 3.2E-07      | 2.4E-07 | 1.8E-07 | 1.2E-07 | 9.0E-08 | 7.2E-08 | 4.9E-08 |
| ENE       | 3.0E-07      | 2.2E-07 | 1.7E-07 | 1.1E-07 | 8.5E-08 | 6.8E-08 | 4.7E-08 |
| NE        | 2.9E-07      | 2.1E-07 | 1.6E-07 | 1.1E-07 | 8.1E-08 | 6.4E-08 | 4.4E-08 |
| NNE       | 2.7E-07      | 2.0E-07 | 1.5E-07 | 1.0E-07 | 7.7E-08 | 6.1E-08 | 4.2E-08 |

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 1000         | 1500    | 2000    | 3000    | 4000    | 5000    | 7000    |
| N         | 1.2E-07      | 6.9E-08 | 4.6E-08 | 2.8E-08 | 2.1E-08 | 1.7E-08 | 1.4E-08 |
| NNW       | 9.4E-08      | 5.4E-08 | 3.7E-08 | 2.3E-08 | 1.8E-08 | 1.5E-08 | 1.3E-08 |
| NW        | 7.8E-08      | 4.6E-08 | 3.2E-08 | 2.1E-08 | 1.6E-08 | 1.4E-08 | 1.2E-08 |
| WNW       | 6.7E-08      | 4.0E-08 | 2.8E-08 | 1.9E-08 | 1.5E-08 | 1.3E-08 | 1.1E-08 |
| W         | 5.9E-08      | 3.5E-08 | 2.6E-08 | 1.7E-08 | 1.4E-08 | 1.3E-08 | 1.1E-08 |
| WSW       | 5.2E-08      | 3.2E-08 | 2.3E-08 | 1.6E-08 | 1.4E-08 | 1.2E-08 | 1.1E-08 |
| SW        | 4.8E-08      | 3.0E-08 | 2.2E-08 | 1.5E-08 | 1.3E-08 | 1.2E-08 | 1.0E-08 |
| SSW       | 4.4E-08      | 2.7E-08 | 2.1E-08 | 1.5E-08 | 1.3E-08 | 1.1E-08 | 1.0E-08 |
| S         | 4.1E-08      | 2.6E-08 | 1.9E-08 | 1.4E-08 | 1.2E-08 | 1.1E-08 | 1.0E-08 |
| SSE       | 3.8E-08      | 2.4E-08 | 1.9E-08 | 1.4E-08 | 1.2E-08 | 1.1E-08 | 9.9E-09 |
| SSE       | 3.6E-08      | 2.3E-08 | 1.8E-08 | 1.3E-08 | 1.2E-08 | 1.1E-08 | 9.8E-09 |
| ESE       | 3.4E-08      | 2.2E-08 | 1.7E-08 | 1.3E-08 | 1.1E-08 | 1.1E-08 | 9.7E-09 |
| E         | 3.2E-08      | 2.1E-08 | 1.7E-08 | 1.3E-08 | 1.1E-08 | 1.0E-08 | 9.6E-09 |
| ENE       | 3.1E-08      | 2.0E-08 | 1.6E-08 | 1.2E-08 | 1.1E-08 | 1.0E-08 | 9.5E-09 |
| NE        | 2.9E-08      | 2.0E-08 | 1.6E-08 | 1.2E-08 | 1.1E-08 | 1.0E-08 | 9.5E-09 |
| NNE       | 2.8E-08      | 1.9E-08 | 1.5E-08 | 1.2E-08 | 1.1E-08 | 1.0E-08 | 9.4E-09 |



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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 10000   | 15000   | 20000   | 30000   | 50000   | 80000   |
| N            | 1.1E-08 | 1.0E-08 | 9.5E-09 | 8.9E-09 | 8.6E-09 | 8.4E-09 |
| NNW          | 1.1E-08 | 9.8E-09 | 9.3E-09 | 8.9E-09 | 8.6E-09 | 8.4E-09 |
| NW           | 1.0E-08 | 9.6E-09 | 9.2E-09 | 8.8E-09 | 8.6E-09 | 8.4E-09 |
| WNW          | 1.0E-08 | 9.4E-09 | 9.1E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 |
| W            | 9.9E-09 | 9.3E-09 | 9.0E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 |
| WSW          | 9.7E-09 | 9.2E-09 | 8.9E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 |
| SW           | 9.6E-09 | 9.1E-09 | 8.8E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 |
| SSW          | 9.5E-09 | 9.0E-09 | 8.8E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 |
| S            | 9.4E-09 | 9.0E-09 | 8.8E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 |
| SSE          | 9.3E-09 | 8.9E-09 | 8.7E-09 | 8.6E-09 | 8.4E-09 | 8.4E-09 |
| SSE          | 9.2E-09 | 8.9E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |
| ESE          | 9.2E-09 | 8.8E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |
| E            | 9.1E-09 | 8.8E-09 | 8.7E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |
| ENE          | 9.1E-09 | 8.8E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |
| NE           | 9.0E-09 | 8.7E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |
| NNE          | 9.0E-09 | 8.7E-09 | 8.6E-09 | 8.5E-09 | 8.4E-09 | 8.4E-09 |



## *A.2.5 Dose and Risk Conversion Factors*

### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: IL                      Zip: 62701

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: Adult

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_001.  
Dataset Date: Jun 7, 2013 05:26 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.wnd



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FACTOR  
Page 1

#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie/year intake rate, where the average lifetime is 70.7565 years.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units   |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries                |
| Inhalation | lifetime risk/100,000 picoCuries                |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie-years  |
| Surface    | lifetime risk-square cm/100,000 picoCurie-years |



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FACTOR  
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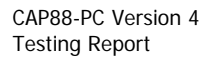
\*\*\*\*\*  
\* NUCLIDE K-40 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Adult

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.865E-05 | 6.405E-06  | 7.747E+08        | 1.468E+05         |
| UB_Wall  | 2.320E-05 | 6.767E-06  | 7.875E+08        | 1.654E+05         |
| Bone_Sur | 1.850E-05 | 5.790E-06  | 1.305E+09        | 2.260E+05         |
| Brain    | 1.798E-05 | 5.321E-06  | 9.926E+08        | 1.561E+05         |
| Breasts  | 1.787E-05 | 6.312E-06  | 1.032E+09        | 1.689E+05         |
| St_Wall  | 2.068E-05 | 6.345E-06  | 8.341E+08        | 1.584E+05         |
| SI_Wall  | 1.887E-05 | 5.591E-06  | 7.712E+08        | 1.584E+05         |
| ULI_Wall | 3.589E-05 | 1.053E-05  | 7.899E+08        | 1.584E+05         |
| LLI_Wall | 6.956E-05 | 2.011E-05  | 7.806E+08        | 1.631E+05         |
| Kidneys  | 1.850E-05 | 5.753E-06  | 8.365E+08        | 1.608E+05         |
| Liver    | 1.850E-05 | 6.253E-06  | 8.458E+08        | 1.596E+05         |
| Muscle   | 1.828E-05 | 5.746E-06  | 9.005E+08        | 1.771E+05         |
| Ovaries  | 1.891E-05 | 5.554E-06  | 7.934E+08        | 1.491E+05         |
| Pancreas | 1.872E-05 | 6.157E-06  | 7.631E+08        | 1.503E+05         |
| R_Marrow | 1.835E-05 | 5.876E-06  | 9.169E+08        | 1.701E+05         |
| Skin     | 1.776E-05 | 5.406E-06  | 4.881E+09        | 7.258E+06         |
| Spleen   | 1.850E-05 | 6.124E-06  | 8.470E+08        | 1.584E+05         |
| Testes   | 1.828E-05 | 5.317E-06  | 9.122E+08        | 1.771E+05         |
| Thymus   | 1.839E-05 | 6.619E-06  | 8.854E+08        | 1.561E+05         |
| Thyroid  | 1.835E-05 | 5.783E-06  | 9.413E+08        | 1.596E+05         |
| GB_Wall  | 1.865E-05 | 5.783E-06  | 7.875E+08        | 1.503E+05         |
| Ht_Wall  | 1.857E-05 | 7.211E-06  | 8.306E+08        | 1.561E+05         |
| Uterus   | 1.883E-05 | 5.517E-06  | 7.561E+08        | 1.549E+05         |
| ET_Reg   | 1.835E-05 | 2.071E-05  | 7.631E+08        | 1.503E+05         |
| Lung_66  | 1.824E-05 | 3.514E-04  | 9.238E+08        | 1.654E+05         |
| Effectiv | 2.279E-05 | 4.851E-05  | 9.250E+08        | 2.377E+05         |

RISK CONVERSION FACTORS FOR: Adult

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 9.176E-10 | 5.454E-09  | 9.204E-01        | 1.654E-04         |
| Stomach  | 1.288E-08 | 9.376E-09  | 3.367E+00        | 6.396E-04         |
| Colon    | 2.009E-08 | 3.258E-08  | 8.108E+00        | 1.654E-03         |
| Liver    | 1.369E-09 | 7.052E-09  | 1.281E+00        | 2.423E-04         |
| LUNG     | 8.769E-09 | 1.548E-06  | 9.029E+00        | 1.619E-03         |
| Bone     | 8.399E-11 | 3.933E-10  | 1.235E-01        | 2.144E-05         |
| Skin     | 7.178E-11 | 2.812E-10  | 4.870E-01        | 7.246E-04         |
| Breast   | 3.574E-09 | 1.030E-08  | 4.986E+00        | 8.167E-04         |
| Ovary    | 1.240E-09 | 5.395E-09  | 1.129E+00        | 2.120E-04         |
| Bladder  | 2.349E-09 | 1.266E-08  | 1.899E+00        | 3.996E-04         |
| Kidneys  | 4.736E-10 | 2.216E-09  | 4.357E-01        | 8.365E-05         |
| Thyroid  | 3.067E-10 | 6.849E-10  | 2.994E-01        | 5.079E-05         |
| Leukemia | 4.810E-09 | 2.530E-08  | 5.149E+00        | 9.553E-04         |
| Residual | 1.550E-08 | 3.306E-08  | 1.212E+01        | 2.353E-03         |
| Total    | 7.252E-08 | 1.693E-06  | 4.928E+01        | 9.937E-03         |



Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: IL Zip: 62701
```

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_001.
Dataset Date:  Jun 7, 2013 05:26 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 100                  | K-40    | 9.56E-02                | 1.72E-08                           | 4.97E-10                           | 1.77E-08                              |
| N              | 150                  | K-40    | 7.55E-02                | 1.36E-08                           | 3.31E-10                           | 1.39E-08                              |
| N              | 200                  | K-40    | 6.00E-02                | 1.08E-08                           | 2.48E-10                           | 1.10E-08                              |
| N              | 300                  | K-40    | 4.05E-02                | 7.30E-09                           | 1.64E-10                           | 7.46E-09                              |
| N              | 400                  | K-40    | 3.01E-02                | 5.42E-09                           | 1.23E-10                           | 5.54E-09                              |
| N              | 500                  | K-40    | 2.35E-02                | 4.23E-09                           | 9.77E-11                           | 4.32E-09                              |
| N              | 700                  | K-40    | 1.53E-02                | 2.75E-09                           | 6.92E-11                           | 2.81E-09                              |
| N              | 1000                 | K-40    | 8.90E-03                | 1.60E-09                           | 4.79E-11                           | 1.65E-09                              |
| N              | 1500                 | K-40    | 4.72E-03                | 8.50E-10                           | 3.14E-11                           | 8.82E-10                              |
| N              | 2000                 | K-40    | 2.95E-03                | 5.31E-10                           | 2.33E-11                           | 5.55E-10                              |
| N              | 3000                 | K-40    | 1.50E-03                | 2.70E-10                           | 1.52E-11                           | 2.85E-10                              |
| N              | 4000                 | K-40    | 9.53E-04                | 1.72E-10                           | 1.12E-11                           | 1.83E-10                              |
| N              | 5000                 | K-40    | 6.78E-04                | 1.22E-10                           | 8.85E-12                           | 1.31E-10                              |
| N              | 7000                 | K-40    | 3.95E-04                | 7.12E-11                           | 6.14E-12                           | 7.73E-11                              |
| N              | 10000                | K-40    | 2.24E-04                | 4.04E-11                           | 4.15E-12                           | 4.45E-11                              |
| N              | 15000                | K-40    | 1.31E-04                | 2.36E-11                           | 2.68E-12                           | 2.63E-11                              |
| N              | 20000                | K-40    | 8.56E-05                | 1.54E-11                           | 1.93E-12                           | 1.73E-11                              |
| N              | 30000                | K-40    | 4.36E-05                | 7.85E-12                           | 1.18E-12                           | 9.03E-12                              |
| N              | 50000                | K-40    | 2.06E-05                | 3.70E-12                           | 6.47E-13                           | 4.35E-12                              |
| N              | 80000                | K-40    | 7.24E-06                | 1.30E-12                           | 3.35E-13                           | 1.64E-12                              |
| NNW            | 100                  | K-40    | 7.78E-02                | 1.40E-08                           | 3.73E-10                           | 1.44E-08                              |
| NNW            | 150                  | K-40    | 5.99E-02                | 1.08E-08                           | 2.48E-10                           | 1.10E-08                              |
| NNW            | 200                  | K-40    | 4.68E-02                | 8.43E-09                           | 1.86E-10                           | 8.62E-09                              |
| NNW            | 300                  | K-40    | 3.12E-02                | 5.62E-09                           | 1.24E-10                           | 5.74E-09                              |
| NNW            | 400                  | K-40    | 2.30E-02                | 4.15E-09                           | 9.23E-11                           | 4.24E-09                              |
| NNW            | 500                  | K-40    | 1.79E-02                | 3.23E-09                           | 7.36E-11                           | 3.30E-09                              |
| NNW            | 700                  | K-40    | 1.16E-02                | 2.09E-09                           | 5.22E-11                           | 2.14E-09                              |
| NNW            | 1000                 | K-40    | 6.78E-03                | 1.22E-09                           | 3.63E-11                           | 1.26E-09                              |
| NNW            | 1500                 | K-40    | 3.62E-03                | 6.51E-10                           | 2.39E-11                           | 6.75E-10                              |
| NNW            | 2000                 | K-40    | 2.27E-03                | 4.08E-10                           | 1.77E-11                           | 4.26E-10                              |
| NNW            | 3000                 | K-40    | 1.16E-03                | 2.09E-10                           | 1.17E-11                           | 2.20E-10                              |
| NNW            | 4000                 | K-40    | 7.45E-04                | 1.34E-10                           | 8.62E-12                           | 1.43E-10                              |
| NNW            | 5000                 | K-40    | 5.34E-04                | 9.60E-11                           | 6.83E-12                           | 1.03E-10                              |
| NNW            | 7000                 | K-40    | 3.16E-04                | 5.69E-11                           | 4.77E-12                           | 6.16E-11                              |
| NNW            | 10000                | K-40    | 1.82E-04                | 3.28E-11                           | 3.25E-12                           | 3.61E-11                              |
| NNW            | 15000                | K-40    | 1.08E-04                | 1.94E-11                           | 2.11E-12                           | 2.16E-11                              |
| NNW            | 20000                | K-40    | 7.21E-05                | 1.30E-11                           | 1.54E-12                           | 1.45E-11                              |
| NNW            | 30000                | K-40    | 3.84E-05                | 6.92E-12                           | 9.59E-13                           | 7.88E-12                              |
| NNW            | 50000                | K-40    | 1.89E-05                | 3.39E-12                           | 5.34E-13                           | 3.93E-12                              |
| NNW            | 80000                | K-40    | 7.23E-06                | 1.30E-12                           | 2.85E-13                           | 1.59E-12                              |
| NW             | 100                  | K-40    | 6.54E-02                | 1.18E-08                           | 2.98E-10                           | 1.21E-08                              |
| NW             | 150                  | K-40    | 4.95E-02                | 8.91E-09                           | 1.99E-10                           | 9.11E-09                              |
| NW             | 200                  | K-40    | 3.84E-02                | 6.91E-09                           | 1.49E-10                           | 7.06E-09                              |
| NW             | 300                  | K-40    | 2.54E-02                | 4.57E-09                           | 9.89E-11                           | 4.66E-09                              |
| NW             | 400                  | K-40    | 1.87E-02                | 3.36E-09                           | 7.40E-11                           | 3.44E-09                              |
| NW             | 500                  | K-40    | 1.45E-02                | 2.61E-09                           | 5.90E-11                           | 2.67E-09                              |
| NW             | 700                  | K-40    | 9.38E-03                | 1.69E-09                           | 4.19E-11                           | 1.73E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 1000                 | K-40    | 5.48E-03                | 9.86E-10                           | 2.92E-11                           | 1.02E-09                              |
| NW             | 1500                 | K-40    | 2.93E-03                | 5.27E-10                           | 1.93E-11                           | 5.46E-10                              |
| NW             | 2000                 | K-40    | 1.84E-03                | 3.32E-10                           | 1.43E-11                           | 3.46E-10                              |
| NW             | 3000                 | K-40    | 9.46E-04                | 1.70E-10                           | 9.45E-12                           | 1.80E-10                              |
| NW             | 4000                 | K-40    | 6.12E-04                | 1.10E-10                           | 7.00E-12                           | 1.17E-10                              |
| NW             | 5000                 | K-40    | 4.39E-04                | 7.91E-11                           | 5.56E-12                           | 8.46E-11                              |
| NW             | 7000                 | K-40    | 2.63E-04                | 4.73E-11                           | 3.90E-12                           | 5.12E-11                              |
| NW             | 10000                | K-40    | 1.53E-04                | 2.76E-11                           | 2.67E-12                           | 3.02E-11                              |
| NW             | 15000                | K-40    | 9.16E-05                | 1.65E-11                           | 1.74E-12                           | 1.82E-11                              |
| NW             | 20000                | K-40    | 6.18E-05                | 1.11E-11                           | 1.28E-12                           | 1.24E-11                              |
| NW             | 30000                | K-40    | 3.40E-05                | 6.12E-12                           | 8.04E-13                           | 6.92E-12                              |
| NW             | 50000                | K-40    | 1.71E-05                | 3.08E-12                           | 4.54E-13                           | 3.53E-12                              |
| NW             | 80000                | K-40    | 6.99E-06                | 1.26E-12                           | 2.47E-13                           | 1.51E-12                              |
| WNW            | 100                  | K-40    | 5.63E-02                | 1.01E-08                           | 2.49E-10                           | 1.04E-08                              |
| WNW            | 150                  | K-40    | 4.22E-02                | 7.60E-09                           | 1.66E-10                           | 7.76E-09                              |
| WNW            | 200                  | K-40    | 3.25E-02                | 5.85E-09                           | 1.24E-10                           | 5.98E-09                              |
| WNW            | 300                  | K-40    | 2.14E-02                | 3.85E-09                           | 8.25E-11                           | 3.93E-09                              |
| WNW            | 400                  | K-40    | 1.57E-02                | 2.83E-09                           | 6.18E-11                           | 2.89E-09                              |
| WNW            | 500                  | K-40    | 1.22E-02                | 2.19E-09                           | 4.93E-11                           | 2.24E-09                              |
| WNW            | 700                  | K-40    | 7.88E-03                | 1.42E-09                           | 3.51E-11                           | 1.45E-09                              |
| WNW            | 1000                 | K-40    | 4.60E-03                | 8.28E-10                           | 2.44E-11                           | 8.52E-10                              |
| WNW            | 1500                 | K-40    | 2.46E-03                | 4.43E-10                           | 1.61E-11                           | 4.59E-10                              |
| WNW            | 2000                 | K-40    | 1.55E-03                | 2.79E-10                           | 1.20E-11                           | 2.91E-10                              |
| WNW            | 3000                 | K-40    | 7.99E-04                | 1.44E-10                           | 7.95E-12                           | 1.52E-10                              |
| WNW            | 4000                 | K-40    | 5.19E-04                | 9.33E-11                           | 5.90E-12                           | 9.92E-11                              |
| WNW            | 5000                 | K-40    | 3.73E-04                | 6.72E-11                           | 4.69E-12                           | 7.19E-11                              |
| WNW            | 7000                 | K-40    | 2.25E-04                | 4.04E-11                           | 3.30E-12                           | 4.37E-11                              |
| WNW            | 10000                | K-40    | 1.32E-04                | 2.38E-11                           | 2.26E-12                           | 2.60E-11                              |
| WNW            | 15000                | K-40    | 7.94E-05                | 1.43E-11                           | 1.49E-12                           | 1.58E-11                              |
| WNW            | 20000                | K-40    | 5.41E-05                | 9.73E-12                           | 1.09E-12                           | 1.08E-11                              |
| WNW            | 30000                | K-40    | 3.03E-05                | 5.46E-12                           | 6.93E-13                           | 6.15E-12                              |
| WNW            | 50000                | K-40    | 1.55E-05                | 2.79E-12                           | 3.95E-13                           | 3.19E-12                              |
| WNW            | 80000                | K-40    | 6.66E-06                | 1.20E-12                           | 2.19E-13                           | 1.42E-12                              |
| W              | 100                  | K-40    | 4.95E-02                | 8.91E-09                           | 2.13E-10                           | 9.12E-09                              |
| W              | 150                  | K-40    | 3.68E-02                | 6.62E-09                           | 1.42E-10                           | 6.76E-09                              |
| W              | 200                  | K-40    | 2.82E-02                | 5.08E-09                           | 1.06E-10                           | 5.18E-09                              |
| W              | 300                  | K-40    | 1.85E-02                | 3.33E-09                           | 7.08E-11                           | 3.40E-09                              |
| W              | 400                  | K-40    | 1.36E-02                | 2.44E-09                           | 5.30E-11                           | 2.50E-09                              |
| W              | 500                  | K-40    | 1.05E-02                | 1.89E-09                           | 4.23E-11                           | 1.93E-09                              |
| W              | 700                  | K-40    | 6.79E-03                | 1.22E-09                           | 3.01E-11                           | 1.25E-09                              |
| W              | 1000                 | K-40    | 3.96E-03                | 7.13E-10                           | 2.10E-11                           | 7.34E-10                              |
| W              | 1500                 | K-40    | 2.12E-03                | 3.82E-10                           | 1.39E-11                           | 3.96E-10                              |
| W              | 2000                 | K-40    | 1.34E-03                | 2.41E-10                           | 1.04E-11                           | 2.52E-10                              |
| W              | 3000                 | K-40    | 6.91E-04                | 1.24E-10                           | 6.85E-12                           | 1.31E-10                              |
| W              | 4000                 | K-40    | 4.50E-04                | 8.10E-11                           | 5.09E-12                           | 8.61E-11                              |
| W              | 5000                 | K-40    | 3.25E-04                | 5.84E-11                           | 4.05E-12                           | 6.25E-11                              |
| W              | 7000                 | K-40    | 1.96E-04                | 3.53E-11                           | 2.86E-12                           | 3.82E-11                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 10000                | K-40    | 1.16E-04                | 2.09E-11                           | 1.97E-12                           | 2.28E-11                              |
| W              | 15000                | K-40    | 7.00E-05                | 1.26E-11                           | 1.29E-12                           | 1.39E-11                              |
| W              | 20000                | K-40    | 4.80E-05                | 8.63E-12                           | 9.52E-13                           | 9.59E-12                              |
| W              | 30000                | K-40    | 2.73E-05                | 4.92E-12                           | 6.09E-13                           | 5.53E-12                              |
| W              | 50000                | K-40    | 1.41E-05                | 2.55E-12                           | 3.49E-13                           | 2.90E-12                              |
| W              | 80000                | K-40    | 6.31E-06                | 1.14E-12                           | 1.96E-13                           | 1.33E-12                              |
| WSW            | 100                  | K-40    | 4.41E-02                | 7.94E-09                           | 1.87E-10                           | 8.12E-09                              |
| WSW            | 150                  | K-40    | 3.26E-02                | 5.86E-09                           | 1.24E-10                           | 5.99E-09                              |
| WSW            | 200                  | K-40    | 2.49E-02                | 4.48E-09                           | 9.31E-11                           | 4.58E-09                              |
| WSW            | 300                  | K-40    | 1.63E-02                | 2.93E-09                           | 6.20E-11                           | 2.99E-09                              |
| WSW            | 400                  | K-40    | 1.19E-02                | 2.15E-09                           | 4.64E-11                           | 2.20E-09                              |
| WSW            | 500                  | K-40    | 9.24E-03                | 1.66E-09                           | 3.71E-11                           | 1.70E-09                              |
| WSW            | 700                  | K-40    | 5.96E-03                | 1.07E-09                           | 2.64E-11                           | 1.10E-09                              |
| WSW            | 1000                 | K-40    | 3.48E-03                | 6.26E-10                           | 1.84E-11                           | 6.45E-10                              |
| WSW            | 1500                 | K-40    | 1.87E-03                | 3.36E-10                           | 1.22E-11                           | 3.48E-10                              |
| WSW            | 2000                 | K-40    | 1.18E-03                | 2.12E-10                           | 9.10E-12                           | 2.21E-10                              |
| WSW            | 3000                 | K-40    | 6.09E-04                | 1.10E-10                           | 6.02E-12                           | 1.16E-10                              |
| WSW            | 4000                 | K-40    | 3.97E-04                | 7.15E-11                           | 4.48E-12                           | 7.60E-11                              |
| WSW            | 5000                 | K-40    | 2.87E-04                | 5.17E-11                           | 3.57E-12                           | 5.52E-11                              |
| WSW            | 7000                 | K-40    | 1.74E-04                | 3.13E-11                           | 2.52E-12                           | 3.38E-11                              |
| WSW            | 10000                | K-40    | 1.03E-04                | 1.86E-11                           | 1.74E-12                           | 2.03E-11                              |
| WSW            | 15000                | K-40    | 6.25E-05                | 1.13E-11                           | 1.14E-12                           | 1.24E-11                              |
| WSW            | 20000                | K-40    | 4.31E-05                | 7.75E-12                           | 8.45E-13                           | 8.60E-12                              |
| WSW            | 30000                | K-40    | 2.48E-05                | 4.47E-12                           | 5.42E-13                           | 5.01E-12                              |
| WSW            | 50000                | K-40    | 1.30E-05                | 2.33E-12                           | 3.13E-13                           | 2.65E-12                              |
| WSW            | 80000                | K-40    | 5.96E-06                | 1.07E-12                           | 1.77E-13                           | 1.25E-12                              |
| SW             | 100                  | K-40    | 3.98E-02                | 7.16E-09                           | 1.66E-10                           | 7.32E-09                              |
| SW             | 150                  | K-40    | 2.92E-02                | 5.26E-09                           | 1.11E-10                           | 5.37E-09                              |
| SW             | 200                  | K-40    | 2.23E-02                | 4.01E-09                           | 8.28E-11                           | 4.10E-09                              |
| SW             | 300                  | K-40    | 1.46E-02                | 2.62E-09                           | 5.51E-11                           | 2.67E-09                              |
| SW             | 400                  | K-40    | 1.07E-02                | 1.92E-09                           | 4.13E-11                           | 1.96E-09                              |
| SW             | 500                  | K-40    | 8.25E-03                | 1.49E-09                           | 3.30E-11                           | 1.52E-09                              |
| SW             | 700                  | K-40    | 5.32E-03                | 9.58E-10                           | 2.35E-11                           | 9.81E-10                              |
| SW             | 1000                 | K-40    | 3.10E-03                | 5.59E-10                           | 1.64E-11                           | 5.75E-10                              |
| SW             | 1500                 | K-40    | 1.67E-03                | 3.00E-10                           | 1.09E-11                           | 3.11E-10                              |
| SW             | 2000                 | K-40    | 1.05E-03                | 1.90E-10                           | 8.11E-12                           | 1.98E-10                              |
| SW             | 3000                 | K-40    | 5.45E-04                | 9.80E-11                           | 5.37E-12                           | 1.03E-10                              |
| SW             | 4000                 | K-40    | 3.56E-04                | 6.41E-11                           | 4.00E-12                           | 6.81E-11                              |
| SW             | 5000                 | K-40    | 2.57E-04                | 4.63E-11                           | 3.19E-12                           | 4.95E-11                              |
| SW             | 7000                 | K-40    | 1.56E-04                | 2.82E-11                           | 2.25E-12                           | 3.04E-11                              |
| SW             | 10000                | K-40    | 9.31E-05                | 1.68E-11                           | 1.56E-12                           | 1.83E-11                              |
| SW             | 15000                | K-40    | 5.65E-05                | 1.02E-11                           | 1.03E-12                           | 1.12E-11                              |
| SW             | 20000                | K-40    | 3.91E-05                | 7.03E-12                           | 7.59E-13                           | 7.79E-12                              |
| SW             | 30000                | K-40    | 2.27E-05                | 4.09E-12                           | 4.89E-13                           | 4.58E-12                              |
| SW             | 50000                | K-40    | 1.20E-05                | 2.15E-12                           | 2.83E-13                           | 2.44E-12                              |
| SW             | 80000                | K-40    | 5.64E-06                | 1.01E-12                           | 1.62E-13                           | 1.18E-12                              |
| SSW            | 100                  | K-40    | 3.62E-02                | 6.52E-09                           | 1.49E-10                           | 6.67E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 150                  | K-40    | 2.65E-02                | 4.77E-09                           | 9.95E-11                           | 4.87E-09                              |
| SSW            | 200                  | K-40    | 2.02E-02                | 3.64E-09                           | 7.46E-11                           | 3.71E-09                              |
| SSW            | 300                  | K-40    | 1.32E-02                | 2.37E-09                           | 4.96E-11                           | 2.42E-09                              |
| SSW            | 400                  | K-40    | 9.63E-03                | 1.73E-09                           | 3.72E-11                           | 1.77E-09                              |
| SSW            | 500                  | K-40    | 7.45E-03                | 1.34E-09                           | 2.97E-11                           | 1.37E-09                              |
| SSW            | 700                  | K-40    | 4.80E-03                | 8.64E-10                           | 2.12E-11                           | 8.85E-10                              |
| SSW            | 1000                 | K-40    | 2.80E-03                | 5.04E-10                           | 1.48E-11                           | 5.19E-10                              |
| SSW            | 1500                 | K-40    | 1.50E-03                | 2.71E-10                           | 9.79E-12                           | 2.80E-10                              |
| SSW            | 2000                 | K-40    | 9.51E-04                | 1.71E-10                           | 7.32E-12                           | 1.79E-10                              |
| SSW            | 3000                 | K-40    | 4.92E-04                | 8.86E-11                           | 4.85E-12                           | 9.35E-11                              |
| SSW            | 4000                 | K-40    | 3.22E-04                | 5.80E-11                           | 3.61E-12                           | 6.16E-11                              |
| SSW            | 5000                 | K-40    | 2.33E-04                | 4.20E-11                           | 2.88E-12                           | 4.49E-11                              |
| SSW            | 7000                 | K-40    | 1.42E-04                | 2.56E-11                           | 2.04E-12                           | 2.76E-11                              |
| SSW            | 10000                | K-40    | 8.47E-05                | 1.53E-11                           | 1.41E-12                           | 1.67E-11                              |
| SSW            | 15000                | K-40    | 5.16E-05                | 9.28E-12                           | 9.31E-13                           | 1.02E-11                              |
| SSW            | 20000                | K-40    | 3.57E-05                | 6.43E-12                           | 6.89E-13                           | 7.12E-12                              |
| SSW            | 30000                | K-40    | 2.09E-05                | 3.77E-12                           | 4.46E-13                           | 4.22E-12                              |
| SSW            | 50000                | K-40    | 1.11E-05                | 2.00E-12                           | 2.59E-13                           | 2.26E-12                              |
| SSW            | 80000                | K-40    | 5.33E-06                | 9.59E-13                           | 1.49E-13                           | 1.11E-12                              |
| S              | 100                  | K-40    | 3.32E-02                | 5.98E-09                           | 1.36E-10                           | 6.12E-09                              |
| S              | 150                  | K-40    | 2.43E-02                | 4.38E-09                           | 9.05E-11                           | 4.47E-09                              |
| S              | 200                  | K-40    | 1.84E-02                | 3.32E-09                           | 6.78E-11                           | 3.39E-09                              |
| S              | 300                  | K-40    | 1.20E-02                | 2.16E-09                           | 4.51E-11                           | 2.21E-09                              |
| S              | 400                  | K-40    | 8.79E-03                | 1.58E-09                           | 3.38E-11                           | 1.62E-09                              |
| S              | 500                  | K-40    | 6.79E-03                | 1.22E-09                           | 2.70E-11                           | 1.25E-09                              |
| S              | 700                  | K-40    | 4.38E-03                | 7.88E-10                           | 1.92E-11                           | 8.07E-10                              |
| S              | 1000                 | K-40    | 2.55E-03                | 4.59E-10                           | 1.34E-11                           | 4.73E-10                              |
| S              | 1500                 | K-40    | 1.37E-03                | 2.47E-10                           | 8.91E-12                           | 2.56E-10                              |
| S              | 2000                 | K-40    | 8.67E-04                | 1.56E-10                           | 6.66E-12                           | 1.63E-10                              |
| S              | 3000                 | K-40    | 4.49E-04                | 8.09E-11                           | 4.42E-12                           | 8.53E-11                              |
| S              | 4000                 | K-40    | 2.94E-04                | 5.30E-11                           | 3.30E-12                           | 5.63E-11                              |
| S              | 5000                 | K-40    | 2.13E-04                | 3.84E-11                           | 2.63E-12                           | 4.10E-11                              |
| S              | 7000                 | K-40    | 1.30E-04                | 2.34E-11                           | 1.86E-12                           | 2.53E-11                              |
| S              | 10000                | K-40    | 7.77E-05                | 1.40E-11                           | 1.29E-12                           | 1.53E-11                              |
| S              | 15000                | K-40    | 4.74E-05                | 8.53E-12                           | 8.51E-13                           | 9.38E-12                              |
| S              | 20000                | K-40    | 3.29E-05                | 5.93E-12                           | 6.31E-13                           | 6.56E-12                              |
| S              | 30000                | K-40    | 1.94E-05                | 3.49E-12                           | 4.09E-13                           | 3.90E-12                              |
| S              | 50000                | K-40    | 1.03E-05                | 1.86E-12                           | 2.38E-13                           | 2.10E-12                              |
| S              | 80000                | K-40    | 5.05E-06                | 9.09E-13                           | 1.38E-13                           | 1.05E-12                              |
| SSE            | 100                  | K-40    | 3.07E-02                | 5.53E-09                           | 1.24E-10                           | 5.65E-09                              |
| SSE            | 150                  | K-40    | 2.24E-02                | 4.04E-09                           | 8.29E-11                           | 4.12E-09                              |
| SSE            | 200                  | K-40    | 1.70E-02                | 3.06E-09                           | 6.22E-11                           | 3.12E-09                              |
| SSE            | 300                  | K-40    | 1.10E-02                | 1.99E-09                           | 4.14E-11                           | 2.03E-09                              |
| SSE            | 400                  | K-40    | 8.08E-03                | 1.45E-09                           | 3.10E-11                           | 1.48E-09                              |
| SSE            | 500                  | K-40    | 6.24E-03                | 1.12E-09                           | 2.48E-11                           | 1.15E-09                              |
| SSE            | 700                  | K-40    | 4.02E-03                | 7.23E-10                           | 1.77E-11                           | 7.41E-10                              |
| SSE            | 1000                 | K-40    | 2.34E-03                | 4.22E-10                           | 1.23E-11                           | 4.34E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSE            | 1500                 | K-40    | 1.26E-03                | 2.27E-10                           | 8.18E-12                           | 2.35E-10                              |
| SSE            | 2000                 | K-40    | 7.97E-04                | 1.43E-10                           | 6.12E-12                           | 1.50E-10                              |
| SSE            | 3000                 | K-40    | 4.13E-04                | 7.44E-11                           | 4.06E-12                           | 7.84E-11                              |
| SSE            | 4000                 | K-40    | 2.71E-04                | 4.88E-11                           | 3.03E-12                           | 5.18E-11                              |
| SSE            | 5000                 | K-40    | 1.96E-04                | 3.53E-11                           | 2.41E-12                           | 3.77E-11                              |
| SSE            | 7000                 | K-40    | 1.20E-04                | 2.16E-11                           | 1.71E-12                           | 2.33E-11                              |
| SSE            | 10000                | K-40    | 7.18E-05                | 1.29E-11                           | 1.19E-12                           | 1.41E-11                              |
| SSE            | 15000                | K-40    | 4.39E-05                | 7.89E-12                           | 7.84E-13                           | 8.68E-12                              |
| SSE            | 20000                | K-40    | 3.05E-05                | 5.49E-12                           | 5.82E-13                           | 6.08E-12                              |
| SSE            | 30000                | K-40    | 1.81E-05                | 3.26E-12                           | 3.78E-13                           | 3.63E-12                              |
| SSE            | 50000                | K-40    | 9.67E-06                | 1.74E-12                           | 2.21E-13                           | 1.96E-12                              |
| SSE            | 80000                | K-40    | 4.79E-06                | 8.62E-13                           | 1.29E-13                           | 9.91E-13                              |
| SE             | 100                  | K-40    | 2.85E-02                | 5.14E-09                           | 1.15E-10                           | 5.25E-09                              |
| SE             | 150                  | K-40    | 2.08E-02                | 3.75E-09                           | 7.66E-11                           | 3.83E-09                              |
| SE             | 200                  | K-40    | 1.57E-02                | 2.83E-09                           | 5.74E-11                           | 2.89E-09                              |
| SE             | 300                  | K-40    | 1.02E-02                | 1.84E-09                           | 3.82E-11                           | 1.88E-09                              |
| SE             | 400                  | K-40    | 7.48E-03                | 1.35E-09                           | 2.86E-11                           | 1.37E-09                              |
| SE             | 500                  | K-40    | 5.78E-03                | 1.04E-09                           | 2.29E-11                           | 1.06E-09                              |
| SE             | 700                  | K-40    | 3.72E-03                | 6.69E-10                           | 1.63E-11                           | 6.85E-10                              |
| SE             | 1000                 | K-40    | 2.17E-03                | 3.90E-10                           | 1.14E-11                           | 4.01E-10                              |
| SE             | 1500                 | K-40    | 1.16E-03                | 2.10E-10                           | 7.56E-12                           | 2.17E-10                              |
| SE             | 2000                 | K-40    | 7.37E-04                | 1.33E-10                           | 5.65E-12                           | 1.38E-10                              |
| SE             | 3000                 | K-40    | 3.82E-04                | 6.88E-11                           | 3.75E-12                           | 7.26E-11                              |
| SE             | 4000                 | K-40    | 2.51E-04                | 4.52E-11                           | 2.80E-12                           | 4.80E-11                              |
| SE             | 5000                 | K-40    | 1.82E-04                | 3.27E-11                           | 2.23E-12                           | 3.50E-11                              |
| SE             | 7000                 | K-40    | 1.11E-04                | 2.00E-11                           | 1.58E-12                           | 2.16E-11                              |
| SE             | 10000                | K-40    | 6.67E-05                | 1.20E-11                           | 1.10E-12                           | 1.31E-11                              |
| SE             | 15000                | K-40    | 4.08E-05                | 7.34E-12                           | 7.27E-13                           | 8.07E-12                              |
| SE             | 20000                | K-40    | 2.84E-05                | 5.12E-12                           | 5.40E-13                           | 5.66E-12                              |
| SE             | 30000                | K-40    | 1.69E-05                | 3.05E-12                           | 3.51E-13                           | 3.40E-12                              |
| SE             | 50000                | K-40    | 9.08E-06                | 1.63E-12                           | 2.06E-13                           | 1.84E-12                              |
| SE             | 80000                | K-40    | 4.56E-06                | 8.20E-13                           | 1.20E-13                           | 9.40E-13                              |
| ESE            | 100                  | K-40    | 2.67E-02                | 4.80E-09                           | 1.07E-10                           | 4.90E-09                              |
| ESE            | 150                  | K-40    | 1.95E-02                | 3.50E-09                           | 7.11E-11                           | 3.57E-09                              |
| ESE            | 200                  | K-40    | 1.47E-02                | 2.64E-09                           | 5.33E-11                           | 2.70E-09                              |
| ESE            | 300                  | K-40    | 9.51E-03                | 1.71E-09                           | 3.55E-11                           | 1.75E-09                              |
| ESE            | 400                  | K-40    | 6.96E-03                | 1.25E-09                           | 2.66E-11                           | 1.28E-09                              |
| ESE            | 500                  | K-40    | 5.37E-03                | 9.67E-10                           | 2.12E-11                           | 9.88E-10                              |
| ESE            | 700                  | K-40    | 3.46E-03                | 6.22E-10                           | 1.51E-11                           | 6.37E-10                              |
| ESE            | 1000                 | K-40    | 2.01E-03                | 3.63E-10                           | 1.06E-11                           | 3.73E-10                              |
| ESE            | 1500                 | K-40    | 1.08E-03                | 1.95E-10                           | 7.03E-12                           | 2.02E-10                              |
| ESE            | 2000                 | K-40    | 6.86E-04                | 1.23E-10                           | 5.26E-12                           | 1.29E-10                              |
| ESE            | 3000                 | K-40    | 3.56E-04                | 6.41E-11                           | 3.49E-12                           | 6.75E-11                              |
| ESE            | 4000                 | K-40    | 2.34E-04                | 4.21E-11                           | 2.61E-12                           | 4.47E-11                              |
| ESE            | 5000                 | K-40    | 1.69E-04                | 3.05E-11                           | 2.08E-12                           | 3.26E-11                              |
| ESE            | 7000                 | K-40    | 1.04E-04                | 1.87E-11                           | 1.47E-12                           | 2.02E-11                              |
| ESE            | 10000                | K-40    | 6.23E-05                | 1.12E-11                           | 1.02E-12                           | 1.22E-11                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 15000                | K-40    | 3.81E-05                | 6.86E-12                           | 6.78E-13                           | 7.54E-12                              |
| ESE            | 20000                | K-40    | 2.66E-05                | 4.79E-12                           | 5.03E-13                           | 5.30E-12                              |
| ESE            | 30000                | K-40    | 1.59E-05                | 2.86E-12                           | 3.28E-13                           | 3.19E-12                              |
| ESE            | 50000                | K-40    | 8.56E-06                | 1.54E-12                           | 1.92E-13                           | 1.73E-12                              |
| ESE            | 80000                | K-40    | 4.34E-06                | 7.81E-13                           | 1.13E-13                           | 8.94E-13                              |
| E              | 100                  | K-40    | 2.50E-02                | 4.50E-09                           | 9.96E-11                           | 4.60E-09                              |
| E              | 150                  | K-40    | 1.82E-02                | 3.28E-09                           | 6.64E-11                           | 3.35E-09                              |
| E              | 200                  | K-40    | 1.38E-02                | 2.48E-09                           | 4.97E-11                           | 2.53E-09                              |
| E              | 300                  | K-40    | 8.90E-03                | 1.60E-09                           | 3.31E-11                           | 1.63E-09                              |
| E              | 400                  | K-40    | 6.51E-03                | 1.17E-09                           | 2.48E-11                           | 1.20E-09                              |
| E              | 500                  | K-40    | 5.02E-03                | 9.04E-10                           | 1.98E-11                           | 9.24E-10                              |
| E              | 700                  | K-40    | 3.23E-03                | 5.82E-10                           | 1.41E-11                           | 5.96E-10                              |
| E              | 1000                 | K-40    | 1.88E-03                | 3.39E-10                           | 9.88E-12                           | 3.49E-10                              |
| E              | 1500                 | K-40    | 1.01E-03                | 1.82E-10                           | 6.57E-12                           | 1.89E-10                              |
| E              | 2000                 | K-40    | 6.41E-04                | 1.15E-10                           | 4.91E-12                           | 1.20E-10                              |
| E              | 3000                 | K-40    | 3.33E-04                | 5.99E-11                           | 3.26E-12                           | 6.32E-11                              |
| E              | 4000                 | K-40    | 2.19E-04                | 3.94E-11                           | 2.44E-12                           | 4.18E-11                              |
| E              | 5000                 | K-40    | 1.59E-04                | 2.86E-11                           | 1.94E-12                           | 3.05E-11                              |
| E              | 7000                 | K-40    | 9.73E-05                | 1.75E-11                           | 1.38E-12                           | 1.89E-11                              |
| E              | 10000                | K-40    | 5.85E-05                | 1.05E-11                           | 9.58E-13                           | 1.15E-11                              |
| E              | 15000                | K-40    | 3.58E-05                | 6.44E-12                           | 6.35E-13                           | 7.08E-12                              |
| E              | 20000                | K-40    | 2.50E-05                | 4.50E-12                           | 4.72E-13                           | 4.98E-12                              |
| E              | 30000                | K-40    | 1.50E-05                | 2.70E-12                           | 3.08E-13                           | 3.01E-12                              |
| E              | 50000                | K-40    | 8.09E-06                | 1.46E-12                           | 1.81E-13                           | 1.64E-12                              |
| E              | 80000                | K-40    | 4.14E-06                | 7.45E-13                           | 1.07E-13                           | 8.52E-13                              |
| ENE            | 100                  | K-40    | 2.35E-02                | 4.24E-09                           | 9.34E-11                           | 4.33E-09                              |
| ENE            | 150                  | K-40    | 1.72E-02                | 3.09E-09                           | 6.22E-11                           | 3.15E-09                              |
| ENE            | 200                  | K-40    | 1.30E-02                | 2.33E-09                           | 4.66E-11                           | 2.38E-09                              |
| ENE            | 300                  | K-40    | 8.36E-03                | 1.50E-09                           | 3.11E-11                           | 1.54E-09                              |
| ENE            | 400                  | K-40    | 6.11E-03                | 1.10E-09                           | 2.33E-11                           | 1.12E-09                              |
| ENE            | 500                  | K-40    | 4.72E-03                | 8.49E-10                           | 1.86E-11                           | 8.68E-10                              |
| ENE            | 700                  | K-40    | 3.03E-03                | 5.46E-10                           | 1.33E-11                           | 5.59E-10                              |
| ENE            | 1000                 | K-40    | 1.77E-03                | 3.18E-10                           | 9.27E-12                           | 3.27E-10                              |
| ENE            | 1500                 | K-40    | 9.50E-04                | 1.71E-10                           | 6.16E-12                           | 1.77E-10                              |
| ENE            | 2000                 | K-40    | 6.02E-04                | 1.08E-10                           | 4.61E-12                           | 1.13E-10                              |
| ENE            | 3000                 | K-40    | 3.13E-04                | 5.63E-11                           | 3.06E-12                           | 5.93E-11                              |
| ENE            | 4000                 | K-40    | 2.06E-04                | 3.70E-11                           | 2.29E-12                           | 3.93E-11                              |
| ENE            | 5000                 | K-40    | 1.49E-04                | 2.68E-11                           | 1.83E-12                           | 2.87E-11                              |
| ENE            | 7000                 | K-40    | 9.15E-05                | 1.65E-11                           | 1.30E-12                           | 1.78E-11                              |
| ENE            | 10000                | K-40    | 5.50E-05                | 9.91E-12                           | 9.01E-13                           | 1.08E-11                              |
| ENE            | 15000                | K-40    | 3.37E-05                | 6.07E-12                           | 5.97E-13                           | 6.67E-12                              |
| ENE            | 20000                | K-40    | 2.36E-05                | 4.25E-12                           | 4.44E-13                           | 4.69E-12                              |
| ENE            | 30000                | K-40    | 1.42E-05                | 2.56E-12                           | 2.90E-13                           | 2.85E-12                              |
| ENE            | 50000                | K-40    | 7.67E-06                | 1.38E-12                           | 1.71E-13                           | 1.55E-12                              |
| ENE            | 80000                | K-40    | 3.96E-06                | 7.13E-13                           | 1.01E-13                           | 8.14E-13                              |
| NE             | 100                  | K-40    | 2.22E-02                | 4.00E-09                           | 8.79E-11                           | 4.09E-09                              |
| NE             | 150                  | K-40    | 1.62E-02                | 2.92E-09                           | 5.86E-11                           | 2.98E-09                              |

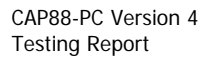


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CONCEN  
Page 7

ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 200                  | K-40    | 1.22E-02                | 2.20E-09                           | 4.39E-11                           | 2.25E-09                              |
| NE             | 300                  | K-40    | 7.88E-03                | 1.42E-09                           | 2.92E-11                           | 1.45E-09                              |
| NE             | 400                  | K-40    | 5.76E-03                | 1.04E-09                           | 2.19E-11                           | 1.06E-09                              |
| NE             | 500                  | K-40    | 4.45E-03                | 8.00E-10                           | 1.75E-11                           | 8.18E-10                              |
| NE             | 700                  | K-40    | 2.86E-03                | 5.14E-10                           | 1.25E-11                           | 5.27E-10                              |
| NE             | 1000                 | K-40    | 1.66E-03                | 3.00E-10                           | 8.72E-12                           | 3.08E-10                              |
| NE             | 1500                 | K-40    | 8.95E-04                | 1.61E-10                           | 5.80E-12                           | 1.67E-10                              |
| NE             | 2000                 | K-40    | 5.67E-04                | 1.02E-10                           | 4.34E-12                           | 1.06E-10                              |
| NE             | 3000                 | K-40    | 2.95E-04                | 5.30E-11                           | 2.88E-12                           | 5.59E-11                              |
| NE             | 4000                 | K-40    | 1.94E-04                | 3.49E-11                           | 2.15E-12                           | 3.70E-11                              |
| NE             | 5000                 | K-40    | 1.41E-04                | 2.53E-11                           | 1.72E-12                           | 2.70E-11                              |
| NE             | 7000                 | K-40    | 8.64E-05                | 1.56E-11                           | 1.22E-12                           | 1.68E-11                              |
| NE             | 10000                | K-40    | 5.20E-05                | 9.36E-12                           | 8.49E-13                           | 1.02E-11                              |
| NE             | 15000                | K-40    | 3.19E-05                | 5.74E-12                           | 5.63E-13                           | 6.30E-12                              |
| NE             | 20000                | K-40    | 2.23E-05                | 4.02E-12                           | 4.19E-13                           | 4.44E-12                              |
| NE             | 30000                | K-40    | 1.35E-05                | 2.42E-12                           | 2.74E-13                           | 2.70E-12                              |
| NE             | 50000                | K-40    | 7.29E-06                | 1.31E-12                           | 1.61E-13                           | 1.47E-12                              |
| NE             | 80000                | K-40    | 3.79E-06                | 6.82E-13                           | 9.58E-14                           | 7.78E-13                              |
| NNE            | 100                  | K-40    | 2.11E-02                | 3.80E-09                           | 8.30E-11                           | 3.88E-09                              |
| NNE            | 150                  | K-40    | 1.54E-02                | 2.77E-09                           | 5.53E-11                           | 2.82E-09                              |
| NNE            | 200                  | K-40    | 1.16E-02                | 2.09E-09                           | 4.15E-11                           | 2.13E-09                              |
| NNE            | 300                  | K-40    | 7.45E-03                | 1.34E-09                           | 2.76E-11                           | 1.37E-09                              |
| NNE            | 400                  | K-40    | 5.45E-03                | 9.81E-10                           | 2.07E-11                           | 1.00E-09                              |
| NNE            | 500                  | K-40    | 4.21E-03                | 7.57E-10                           | 1.65E-11                           | 7.73E-10                              |
| NNE            | 700                  | K-40    | 2.70E-03                | 4.86E-10                           | 1.18E-11                           | 4.98E-10                              |
| NNE            | 1000                 | K-40    | 1.57E-03                | 2.83E-10                           | 8.24E-12                           | 2.92E-10                              |
| NNE            | 1500                 | K-40    | 8.46E-04                | 1.52E-10                           | 5.48E-12                           | 1.58E-10                              |
| NNE            | 2000                 | K-40    | 5.37E-04                | 9.66E-11                           | 4.10E-12                           | 1.01E-10                              |
| NNE            | 3000                 | K-40    | 2.79E-04                | 5.02E-11                           | 2.73E-12                           | 5.29E-11                              |
| NNE            | 4000                 | K-40    | 1.83E-04                | 3.30E-11                           | 2.04E-12                           | 3.50E-11                              |
| NNE            | 5000                 | K-40    | 1.33E-04                | 2.40E-11                           | 1.63E-12                           | 2.56E-11                              |
| NNE            | 7000                 | K-40    | 8.18E-05                | 1.47E-11                           | 1.16E-12                           | 1.59E-11                              |
| NNE            | 10000                | K-40    | 4.93E-05                | 8.87E-12                           | 8.04E-13                           | 9.67E-12                              |
| NNE            | 15000                | K-40    | 3.02E-05                | 5.44E-12                           | 5.33E-13                           | 5.98E-12                              |
| NNE            | 20000                | K-40    | 2.12E-05                | 3.82E-12                           | 3.97E-13                           | 4.21E-12                              |
| NNE            | 30000                | K-40    | 1.28E-05                | 2.31E-12                           | 2.60E-13                           | 2.57E-12                              |
| NNE            | 50000                | K-40    | 6.95E-06                | 1.25E-12                           | 1.53E-13                           | 1.40E-12                              |
| NNE            | 80000                | K-40    | 3.64E-06                | 6.55E-13                           | 9.11E-14                           | 7.46E-13                              |



Version 4.0

Clean Air Act Assessment Package - 1988

Non-Radon Individual Assessment  
Fri Jun 07 17:30:55 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: IL                               Zip: 62701
```

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_001.
Dataset Date:  Jun 7, 2013 05:26 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



Fri Jun 07 17:30:55 2013

CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR K-40  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 100       | 150       | 200       | 300       | 400       | 500       | 700       |
| N                 | 3.015E-05 | 2.380E-05 | 1.892E-05 | 1.278E-05 | 9.491E-06 | 7.402E-06 | 4.810E-06 |
| NNW               | 2.454E-05 | 1.888E-05 | 1.477E-05 | 9.840E-06 | 7.268E-06 | 5.653E-06 | 3.664E-06 |
| NW                | 2.062E-05 | 1.561E-05 | 1.210E-05 | 7.998E-06 | 5.890E-06 | 4.573E-06 | 2.959E-06 |
| WNW               | 1.777E-05 | 1.331E-05 | 1.025E-05 | 6.743E-06 | 4.956E-06 | 3.843E-06 | 2.484E-06 |
| W                 | 1.560E-05 | 1.160E-05 | 8.897E-06 | 5.830E-06 | 4.279E-06 | 3.316E-06 | 2.141E-06 |
| WSW               | 1.391E-05 | 1.027E-05 | 7.855E-06 | 5.134E-06 | 3.765E-06 | 2.915E-06 | 1.881E-06 |
| SW                | 1.254E-05 | 9.218E-06 | 7.034E-06 | 4.588E-06 | 3.362E-06 | 2.602E-06 | 1.678E-06 |
| SSW               | 1.142E-05 | 8.362E-06 | 6.369E-06 | 4.148E-06 | 3.038E-06 | 2.350E-06 | 1.514E-06 |
| S                 | 1.048E-05 | 7.667E-06 | 5.818E-06 | 3.785E-06 | 2.771E-06 | 2.142E-06 | 1.380E-06 |
| SSE               | 9.685E-06 | 7.079E-06 | 5.356E-06 | 3.481E-06 | 2.547E-06 | 1.969E-06 | 1.267E-06 |
| SE                | 9.001E-06 | 6.575E-06 | 4.962E-06 | 3.223E-06 | 2.357E-06 | 1.822E-06 | 1.172E-06 |
| ESE               | 8.406E-06 | 6.136E-06 | 4.629E-06 | 2.999E-06 | 2.194E-06 | 1.695E-06 | 1.090E-06 |
| E                 | 7.885E-06 | 5.753E-06 | 4.340E-06 | 2.806E-06 | 2.052E-06 | 1.584E-06 | 1.019E-06 |
| ENE               | 7.426E-06 | 5.416E-06 | 4.085E-06 | 2.636E-06 | 1.927E-06 | 1.488E-06 | 9.565E-07 |
| NE                | 7.015E-06 | 5.115E-06 | 3.858E-06 | 2.485E-06 | 1.816E-06 | 1.402E-06 | 9.012E-07 |
| NNE               | 6.649E-06 | 4.846E-06 | 3.655E-06 | 2.351E-06 | 1.718E-06 | 1.326E-06 | 8.521E-07 |

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 1500      | 2000      | 3000      | 4000      | 5000      | 7000      |
| N                 | 2.807E-06 | 1.490E-06 | 9.307E-07 | 4.723E-07 | 3.005E-07 | 2.138E-07 | 1.247E-07 |
| NNW               | 2.139E-06 | 1.140E-06 | 7.156E-07 | 3.658E-07 | 2.351E-07 | 1.683E-07 | 9.962E-08 |
| NW                | 1.727E-06 | 9.232E-07 | 5.810E-07 | 2.983E-07 | 1.929E-07 | 1.385E-07 | 8.280E-08 |
| WNW               | 1.450E-06 | 7.760E-07 | 4.893E-07 | 2.519E-07 | 1.635E-07 | 1.178E-07 | 7.083E-08 |
| W                 | 1.249E-06 | 6.694E-07 | 4.227E-07 | 2.180E-07 | 1.419E-07 | 1.024E-07 | 6.187E-08 |
| WSW               | 1.097E-06 | 5.884E-07 | 3.719E-07 | 1.921E-07 | 1.253E-07 | 9.053E-08 | 5.489E-08 |
| SW                | 9.786E-07 | 5.251E-07 | 3.321E-07 | 1.717E-07 | 1.123E-07 | 8.116E-08 | 4.934E-08 |
| SSW               | 8.832E-07 | 4.741E-07 | 3.000E-07 | 1.553E-07 | 1.016E-07 | 7.354E-08 | 4.481E-08 |
| S                 | 8.045E-07 | 4.320E-07 | 2.735E-07 | 1.417E-07 | 9.283E-08 | 6.722E-08 | 4.103E-08 |
| SSE               | 7.389E-07 | 3.969E-07 | 2.514E-07 | 1.303E-07 | 8.545E-08 | 6.191E-08 | 3.784E-08 |
| SE                | 6.833E-07 | 3.671E-07 | 2.326E-07 | 1.206E-07 | 7.916E-08 | 5.737E-08 | 3.511E-08 |
| ESE               | 6.353E-07 | 3.414E-07 | 2.163E-07 | 1.122E-07 | 7.371E-08 | 5.345E-08 | 3.275E-08 |
| E                 | 5.937E-07 | 3.191E-07 | 2.022E-07 | 1.050E-07 | 6.898E-08 | 5.004E-08 | 3.068E-08 |
| ENE               | 5.573E-07 | 2.996E-07 | 1.899E-07 | 9.858E-08 | 6.482E-08 | 4.703E-08 | 2.887E-08 |
| NE                | 5.250E-07 | 2.822E-07 | 1.789E-07 | 9.292E-08 | 6.113E-08 | 4.436E-08 | 2.725E-08 |
| NNE               | 4.963E-07 | 2.668E-07 | 1.692E-07 | 8.789E-08 | 5.784E-08 | 4.198E-08 | 2.580E-08 |



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CHIQ  
Page 2

GROUND-LEVEL CHI/Q VALUES FOR K-40  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

---

| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 10000     | 15000     | 20000     | 30000     | 50000     | 80000     |
| N                 | 7.070E-08 | 4.130E-08 | 2.700E-08 | 1.375E-08 | 6.491E-09 | 2.283E-09 |
| NNW               | 5.749E-08 | 3.407E-08 | 2.272E-08 | 1.212E-08 | 5.947E-09 | 2.279E-09 |
| NW                | 4.830E-08 | 2.888E-08 | 1.950E-08 | 1.072E-08 | 5.390E-09 | 2.204E-09 |
| WNW               | 4.162E-08 | 2.503E-08 | 1.705E-08 | 9.567E-09 | 4.892E-09 | 2.101E-09 |
| W                 | 3.655E-08 | 2.207E-08 | 1.512E-08 | 8.618E-09 | 4.461E-09 | 1.990E-09 |
| WSW               | 3.255E-08 | 1.973E-08 | 1.358E-08 | 7.828E-09 | 4.090E-09 | 1.881E-09 |
| SW                | 2.935E-08 | 1.783E-08 | 1.232E-08 | 7.167E-09 | 3.772E-09 | 1.777E-09 |
| SSW               | 2.672E-08 | 1.626E-08 | 1.127E-08 | 6.605E-09 | 3.498E-09 | 1.681E-09 |
| S                 | 2.452E-08 | 1.495E-08 | 1.038E-08 | 6.122E-09 | 3.258E-09 | 1.592E-09 |
| SSE               | 2.265E-08 | 1.383E-08 | 9.624E-09 | 5.705E-09 | 3.048E-09 | 1.511E-09 |
| SE                | 2.105E-08 | 1.287E-08 | 8.969E-09 | 5.340E-09 | 2.863E-09 | 1.437E-09 |
| ESE               | 1.965E-08 | 1.203E-08 | 8.396E-09 | 5.017E-09 | 2.698E-09 | 1.368E-09 |
| E                 | 1.844E-08 | 1.129E-08 | 7.892E-09 | 4.732E-09 | 2.551E-09 | 1.306E-09 |
| ENE               | 1.736E-08 | 1.064E-08 | 7.445E-09 | 4.477E-09 | 2.419E-09 | 1.249E-09 |
| NE                | 1.640E-08 | 1.006E-08 | 7.045E-09 | 4.247E-09 | 2.300E-09 | 1.196E-09 |
| NNE               | 1.554E-08 | 9.537E-09 | 6.686E-09 | 4.040E-09 | 2.192E-09 | 1.147E-09 |

---





## ***Appendix B: Test Case 2 Inputs and Reports***

### **B.1 Inputs**

#### ***B.1.1 Dataset***

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Changes Last Saved 6/7/2013 6:27:00 PM  
Reports Last Generated 6/7/2013 6:27:00 PM

ERRORS

CHANGES



### B.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

|          |   |  |      |
|----------|---|--|------|
| Name     | Springfield Nuclear Power Plant             | Emission Year                                  | 1990 |
| Address  | 100 Industrial Way                          | Source Category                                |      |
|          |   |  |      |
| City     | Springfield                                 |  |      |
| Zip      | 40069                                       | (Note: State is found on the Agricultural tab) |      |
| Comments | Intended for Software Testing Purposes Only |  |      |
|          | Version 4.0, Release Candidate 3            |  |      |

|        |         |
|--------|---------|
| ERRORS | CHANGES |
|        |         |



### B.1.3 Population

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Individual Population Age: Fifteen Build up time: 100 years

☒ Create dose and risk summaries  
☒ Create dose and risk factors  
☒ Create concentration table  
☒ Create Chi/Q table

Midpoints 19

|       |          |          |          |          |          |
|-------|----------|----------|----------|----------|----------|
| 1 - 5 | 200.00   | 300.00   | 400.00   | 500.00   | 700.00   |
| 6-10  | 1000.00  | 1500.00  | 2000.00  | 3000.00  | 4000.00  |
| 11-15 | 5000.00  | 7000.00  | 10000.00 | 15000.00 | 20000.00 |
| 16-20 | 30000.00 | 40000.00 | 50000.00 | 80000.00 | 0.00     |

Maximum Exposed Individual

Direction: auto Midpoint index: 0 ☒ Auto-determine

ERRORS

CHANGES



### B.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.

File SPRG1990 Springfield

|                            |         |                |
|----------------------------|---------|----------------|
| Annual Precipitation       | 100.00  | cm/year        |
| Annual Ambient Temperature | 10.00   | Celsius        |
| Lid Height                 | 1000.00 | meters         |
| Absolute Humidity          | 8.00    | grams/cu meter |

ERRORS

CHANGES



### B.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population Meteorological **Sources** Agricultural Nuclides Reports

Source Type Area

Sources 2

|           | 1      | 2      |
|-----------|--------|--------|
| Height(m) | 0.00   | 0.00   |
| Area(m2)  | 100.00 | 150.00 |

Plume Type Momentum

Enter the exit velocity for each source

|            | 1    | 2    |
|------------|------|------|
| meters/sec | 0.10 | 0.20 |

ERRORS

CHANGES



### B.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source: Rural

|                               | Vegetable | Milk | Meat |
|-------------------------------|-----------|------|------|
| Fraction home produced        | 0.7       | 0.40 | 0.44 |
| Fraction from assessment area | 0.3       | 0.60 | 0.56 |
| Fraction imported             | 0.0       | 0.0  | 0.0  |

Agriculture State: Kentucky

|   |           |       |
|---|-----------|-------|
| Beef cattle density                     | 2.650e-01 | #/ha2 |
| Milk cattle density                     | 2.570e-02 | #/ha2 |
| Land fraction cultivated for vegetables | 3.980e-03 |       |

ERRORS

CHANGES



### B.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_002.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length max ☐ Radon Only Ac-223 Add

Released Nuclide Count 2 Total Nuclide Count 2 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form   | Type | Size  | RR1       | RR2       |
|-----|---------|-------------|------|-------|-----------|-----------|
| 0   | Na-22   | Particulate | F    | 1.... | 1.000e+00 | 1.000e+00 |
| 0   | Na-24   | Particulate | F    | 1.... | 1.000e+03 | 1.000e+03 |

ERRORS

CHANGES



## B.2 Reports

### B.2.1 Synopsis Report

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY                      Zip: 40069

Source Category:  
Source Type: Area  
Emission Year: 1990  
DOSE Age Group: Fifteen

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Effective Dose Equivalent  
(mrem/year)

---

6.29E+01

---

At This Location:      200 Meters North Northwest

Dataset Name: Test\_002.  
Dataset Date: Jun 7, 2013 06:27 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind





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SYNOPSIS  
Page 1

#### MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 200 Meters North Northwest  
Lifetime Fatal Cancer Risk: 3.34E-05

#### ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

| Organ    | Dose<br>Equivalent<br>(mrem/y) |
|----------|--------------------------------|
| Adrenal  | 5.39E+01                       |
| UB_Wall  | 6.06E+01                       |
| Bone_Sur | 8.44E+01                       |
| Brain    | 5.84E+01                       |
| Breasts  | 6.12E+01                       |
| St_Wall  | 5.84E+01                       |
| SI_Wall  | 5.62E+01                       |
| ULI_Wall | 5.66E+01                       |
| LLI_Wall | 5.77E+01                       |
| Kidneys  | 5.77E+01                       |
| Liver    | 5.71E+01                       |
| Muscle   | 6.22E+01                       |
| Ovaries  | 5.57E+01                       |
| Pancreas | 5.46E+01                       |
| R_Marrow | 6.37E+01                       |
| Skin     | 1.12E+02                       |
| Spleen   | 5.72E+01                       |
| Testes   | 6.22E+01                       |
| Thymus   | 5.76E+01                       |
| Thyroid  | 5.92E+01                       |
| GB_Wall  | 5.41E+01                       |
| Ht_Wall  | 5.62E+01                       |
| Uterus   | 5.57E+01                       |
| ET_Reg   | 1.31E+02                       |
| Lung_66  | 6.01E+01                       |
| Effectiv | 6.29E+01                       |

#### RADIONUCLIDE EMISSIONS DURING THE YEAR 1990

| Nuclide | Type | Size  | Source     | Source     | TOTAL   |
|---------|------|-------|------------|------------|---------|
|         |      |       | #1<br>Ci/y | #2<br>Ci/y |         |
| Na-22   | F    | 1.000 | 1.0E+00    | 1.0E+00    | 2.0E+00 |
| Na-24   | F    | 1.000 | 1.0E+03    | 1.0E+03    | 2.0E+03 |

#### SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 100.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m



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SYNOPSIS  
Page 2

#### SOURCE INFORMATION

| Source Number:     | 1      | 2      |
|--------------------|--------|--------|
| Source Height (m): | 0.00   | 0.00   |
| Area (sq m):       | 100.00 | 150.00 |
| Plume Rise         |        |        |
| Momentum (m/s):    | 0.10   | 0.20   |
| (Exit Velocity)    |        |        |

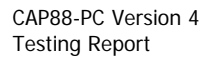
#### AGRICULTURAL DATA

|                                | Vegetable | Milk  | Meat  |
|--------------------------------|-----------|-------|-------|
| Fraction Home Produced:        | 0.700     | 0.400 | 0.440 |
| Fraction From Assessment Area: | 0.300     | 0.600 | 0.560 |
| Fraction Imported:             | 0.000     | 0.000 | 0.000 |

Food Arrays were not generated for this run.  
Default Values used.

#### DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

|       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|
| 200   | 300   | 400   | 500   | 700   | 1000  | 1500  |
| 2000  | 3000  | 4000  | 5000  | 7000  | 10000 | 15000 |
| 20000 | 30000 | 40000 | 50000 | 80000 |       |       |



Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY Zip: 40069

```
Source Category:
Source Type:    Area
Emission Year:  1990
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_002.
Dataset Date:  Jun 7, 2013 06:27 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| Na-22   | F                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |
| Na-24   | F                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| Na-22   | 7.29E-04                 | 5.48E-05 | 0.00E+00 | 4.00E-02             | 8.00E-02 |
| Na-24   | 1.11E+00                 | 5.48E-05 | 0.00E+00 | 4.00E-02             | 8.00E-02 |

FOOTNOTES:

(1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)

(2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)



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GENERAL  
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| Na-22   | 2.00E-01                       | 5.00E-02   | 1.00E+00           | 1.00E+00  |
| Na-24   | 2.00E-01                       | 5.00E-02   | 1.00E+00           | 1.00E+00  |

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)



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GENERAL  
Page 4

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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

|  |          |
|--|----------|
| HUMAN INHALATION RATE                              |          |
| Cubic meters/yr                                    | 5.57E+03 |
| SOIL PARAMETERS                                    |          |
| Effective surface density (kg/sq m, dry weight)    |          |
| (Assumes 15 cm plow layer)                         | 2.15E+02 |
| BUILDUP TIMES                                      |          |
| For activity in soil (years)                       | 1.00E+02 |
| For radionuclides deposited on ground/water (days) | 3.65E+04 |
| DELAY TIMES  |          |
| Ingestion of pasture grass by animals (hr)         | 0.00E+00 |
| Ingestion of stored feed by animals (hr)           | 2.16E+03 |
| Ingestion of leafy vegetables by man (hr)          | 3.36E+02 |
| Ingestion of produce by man (hr)                   | 3.36E+02 |
| Transport time from animal feed-milk-man (day)     | 2.00E+00 |
| Time from slaughter to consumption (day)           | 2.00E+01 |
| WEATHERING   |          |
| Removal rate constant for physical loss (per hr)   | 2.90E-03 |
| CROP EXPOSURE DURATION                             |          |
| Pasture grass (hr)                                 | 7.20E+02 |
| Crops/leafy vegetables (hr)                        | 1.44E+03 |
| AGRICULTURAL PRODUCTIVITY                          |          |
| Grass-cow-milk-man pathway (kg/sq m)               | 2.80E-01 |
| Produce/leafy veg for human consumption (kg/sq m)  | 7.16E-01 |
| FALLOUT INTERCEPTION FRACTIONS                     |          |
| Vegetables   | 2.00E-01 |
| Pasture  | 5.70E-01 |
| GRAZING PARAMETERS                                 |          |
| Fraction of year animals graze on pasture          | 4.00E-01 |
| Fraction of daily feed that is pasture grass       |          |
| when animal grazes on pasture                      | 4.30E-01 |

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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 7.00E-01

Meat 4.40E-01

Milk 4.00E-01

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside  
area listed below are actual fixed values.)

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 6.08E+01

Milk ingestion (L/y) 9.00E+01

Meat ingestion (kg/y) 7.70E+01

Leafy vegetable ingestion (kg/y) 6.22E+00

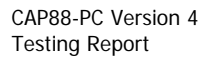
SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

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Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: KY                               Zip: 40069
```

```
Source Category:
Source Type: Area
Emission Year: 1990
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_002.
Dataset Date:  Jun 7, 2013 06:27 PM
Wind File:     C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |



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WEATHER  
Page 2

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

| Pasquill Stability Class |        |        |        |        |        |        |        |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|
| Dir                      | A      | B      | C      | D      | E      | F      | G      |
| N                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL                    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 100.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *B.2.4 Dose and Risk Equivalent Summaries*

### D O S E   A N D   R I S K   E Q U I V A L E N T   S U M M A R I E S

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY                      Zip: 40069

Source Category:  
Source Type: Area  
Emission Year: 1990  
DOSE Age Group: Fifteen

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_002.  
Dataset Date: Jun 7, 2013 06:27 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.wnd



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SUMMARY  
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem/y) |
|----------|------------------------------------|
| Adrenal  | 5.39E+01                           |
| UB_Wall  | 6.06E+01                           |
| Bone_Sur | 8.44E+01                           |
| Brain    | 5.84E+01                           |
| Breasts  | 6.12E+01                           |
| St_Wall  | 5.84E+01                           |
| SI_Wall  | 5.62E+01                           |
| ULI_Wall | 5.66E+01                           |
| LLI_Wall | 5.77E+01                           |
| Kidneys  | 5.77E+01                           |
| Liver    | 5.71E+01                           |
| Muscle   | 6.22E+01                           |
| Ovaries  | 5.57E+01                           |
| Pancreas | 5.46E+01                           |
| R_Marrow | 6.37E+01                           |
| Skin     | 1.12E+02                           |
| Spleen   | 5.72E+01                           |
| Testes   | 6.22E+01                           |
| Thymus   | 5.76E+01                           |
| Thyroid  | 5.92E+01                           |
| GB_Wall  | 5.41E+01                           |
| Ht_Wall  | 5.62E+01                           |
| Uterus   | 5.57E+01                           |
| ET_Reg   | 1.31E+02                           |
| Lung_66  | 6.01E+01                           |
| Effectiv | 6.29E+01                           |

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem/y) |
|----------------|------------------------------------|
| INGESTION      | 3.63E+00                           |
| INHALATION     | 3.43E+00                           |
| AIR IMMERSION  | 1.41E+01                           |
| GROUND SURFACE | 4.18E+01                           |
| INTERNAL       | 7.07E+00                           |
| EXTERNAL       | 5.59E+01                           |
| TOTAL          | 6.29E+01                           |



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SUMMARY  
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclide | Selected<br>Individual<br>(mrem/y) |
|---------|------------------------------------|
| Na-22   | 2.22E+01                           |
| Na-24   | 4.08E+01                           |
| TOTAL   | 6.29E+01                           |



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SUMMARY  
Page 3

CANCER RISK SUMMARY

| Cancer | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|--------|--|
|        |  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|----------------|--|
| INGESTION      | 2.66E-06   |
| INHALATION     | 1.66E-07   |
| AIR IMMERSION  | 7.80E-06   |
| GROUND SURFACE | 2.28E-05   |
| INTERNAL       | 2.83E-06   |
| EXTERNAL       | 3.06E-05   |
| TOTAL          | 3.34E-05   |



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SUMMARY  
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NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|---------|--|
| Na-22   | 1.18E-05   |
| Na-24   | 2.16E-05   |
| TOTAL   | 3.34E-05   |





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SUMMARY  
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 200          | 300     | 400     | 500     | 700     | 1000    | 1500    |
| N         | 6.2E+01      | 4.5E+01 | 3.4E+01 | 2.7E+01 | 1.9E+01 | 1.3E+01 | 7.9E+00 |
| NNW       | 6.3E+01      | 4.3E+01 | 3.2E+01 | 2.6E+01 | 1.8E+01 | 1.1E+01 | 6.8E+00 |
| NW        | 6.2E+01      | 4.2E+01 | 3.1E+01 | 2.4E+01 | 1.6E+01 | 1.0E+01 | 6.0E+00 |
| WNW       | 6.2E+01      | 4.1E+01 | 3.0E+01 | 2.3E+01 | 1.5E+01 | 9.0E+00 | 5.3E+00 |
| W         | 6.1E+01      | 3.9E+01 | 2.8E+01 | 2.1E+01 | 1.3E+01 | 8.2E+00 | 4.8E+00 |
| WSW       | 6.0E+01      | 3.8E+01 | 2.6E+01 | 2.0E+01 | 1.2E+01 | 7.5E+00 | 4.4E+00 |
| SW        | 5.9E+01      | 3.7E+01 | 2.5E+01 | 1.8E+01 | 1.2E+01 | 6.9E+00 | 4.1E+00 |
| SSW       | 5.8E+01      | 3.5E+01 | 2.4E+01 | 1.7E+01 | 1.1E+01 | 6.4E+00 | 3.8E+00 |
| S         | 5.6E+01      | 3.3E+01 | 2.2E+01 | 1.6E+01 | 1.0E+01 | 6.0E+00 | 3.5E+00 |
| SSE       | 5.5E+01      | 3.2E+01 | 2.1E+01 | 1.6E+01 | 9.5E+00 | 5.6E+00 | 3.3E+00 |
| SSE       | 5.3E+01      | 3.1E+01 | 2.0E+01 | 1.5E+01 | 9.0E+00 | 5.3E+00 | 3.1E+00 |
| ESE       | 5.2E+01      | 3.0E+01 | 2.0E+01 | 1.4E+01 | 8.6E+00 | 5.0E+00 | 2.9E+00 |
| E         | 5.0E+01      | 2.8E+01 | 1.9E+01 | 1.4E+01 | 8.1E+00 | 4.7E+00 | 2.8E+00 |
| ENE       | 4.9E+01      | 2.7E+01 | 1.8E+01 | 1.3E+01 | 7.7E+00 | 4.5E+00 | 2.7E+00 |
| NE        | 4.7E+01      | 2.6E+01 | 1.7E+01 | 1.2E+01 | 7.4E+00 | 4.3E+00 | 2.5E+00 |
| NNE       | 4.6E+01      | 2.6E+01 | 1.7E+01 | 1.2E+01 | 7.1E+00 | 4.1E+00 | 2.4E+00 |

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 2000         | 3000    | 4000    | 5000    | 7000    | 10000   | 15000   |
| N         | 5.6E+00      | 3.4E+00 | 2.5E+00 | 2.0E+00 | 1.4E+00 | 1.1E+00 | 8.4E-01 |
| NNW       | 4.8E+00      | 2.9E+00 | 2.2E+00 | 1.7E+00 | 1.3E+00 | 9.8E-01 | 7.9E-01 |
| NW        | 4.2E+00      | 2.6E+00 | 1.9E+00 | 1.5E+00 | 1.2E+00 | 9.2E-01 | 7.6E-01 |
| WNW       | 3.7E+00      | 2.3E+00 | 1.7E+00 | 1.4E+00 | 1.1E+00 | 8.7E-01 | 7.3E-01 |
| W         | 3.4E+00      | 2.1E+00 | 1.6E+00 | 1.3E+00 | 1.0E+00 | 8.3E-01 | 7.1E-01 |
| WSW       | 3.1E+00      | 1.9E+00 | 1.5E+00 | 1.2E+00 | 9.6E-01 | 8.0E-01 | 6.9E-01 |
| SW        | 2.8E+00      | 1.8E+00 | 1.4E+00 | 1.2E+00 | 9.2E-01 | 7.7E-01 | 6.7E-01 |
| SSW       | 2.6E+00      | 1.7E+00 | 1.3E+00 | 1.1E+00 | 8.9E-01 | 7.5E-01 | 6.6E-01 |
| S         | 2.5E+00      | 1.6E+00 | 1.2E+00 | 1.0E+00 | 8.6E-01 | 7.3E-01 | 6.5E-01 |
| SSE       | 2.3E+00      | 1.5E+00 | 1.2E+00 | 1.0E+00 | 8.3E-01 | 7.2E-01 | 6.4E-01 |
| SSE       | 2.2E+00      | 1.4E+00 | 1.1E+00 | 9.8E-01 | 8.1E-01 | 7.0E-01 | 6.4E-01 |
| ESE       | 2.1E+00      | 1.4E+00 | 1.1E+00 | 9.5E-01 | 7.9E-01 | 6.9E-01 | 6.3E-01 |
| E         | 2.0E+00      | 1.3E+00 | 1.1E+00 | 9.2E-01 | 7.8E-01 | 6.8E-01 | 6.2E-01 |
| ENE       | 1.9E+00      | 1.3E+00 | 1.0E+00 | 9.0E-01 | 7.6E-01 | 6.7E-01 | 6.2E-01 |
| NE        | 1.8E+00      | 1.2E+00 | 1.0E+00 | 8.8E-01 | 7.5E-01 | 6.6E-01 | 6.1E-01 |
| NNE       | 1.8E+00      | 1.2E+00 | 9.7E-01 | 8.6E-01 | 7.4E-01 | 6.6E-01 | 6.1E-01 |



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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|
|           | 20000        | 30000   | 40000   | 50000   | 80000   |
| N         | 7.2E-01      | 6.2E-01 | 5.8E-01 | 5.6E-01 | 5.4E-01 |
| NNW       | 7.0E-01      | 6.2E-01 | 5.8E-01 | 5.6E-01 | 5.4E-01 |
| NW        | 6.8E-01      | 6.1E-01 | 5.8E-01 | 5.6E-01 | 5.4E-01 |
| WNW       | 6.6E-01      | 6.0E-01 | 5.7E-01 | 5.6E-01 | 5.4E-01 |
| W         | 6.5E-01      | 5.9E-01 | 5.7E-01 | 5.6E-01 | 5.4E-01 |
| WSW       | 6.4E-01      | 5.9E-01 | 5.7E-01 | 5.6E-01 | 5.4E-01 |
| SW        | 6.3E-01      | 5.8E-01 | 5.7E-01 | 5.5E-01 | 5.4E-01 |
| SSW       | 6.2E-01      | 5.8E-01 | 5.6E-01 | 5.5E-01 | 5.4E-01 |
| S         | 6.1E-01      | 5.8E-01 | 5.6E-01 | 5.5E-01 | 5.4E-01 |
| SSE       | 6.1E-01      | 5.7E-01 | 5.6E-01 | 5.5E-01 | 5.4E-01 |
| SSE       | 6.0E-01      | 5.7E-01 | 5.6E-01 | 5.5E-01 | 5.4E-01 |
| ESE       | 6.0E-01      | 5.7E-01 | 5.6E-01 | 5.5E-01 | 5.4E-01 |
| E         | 5.9E-01      | 5.7E-01 | 5.5E-01 | 5.5E-01 | 5.4E-01 |
| ENE       | 5.9E-01      | 5.6E-01 | 5.5E-01 | 5.5E-01 | 5.4E-01 |
| NE        | 5.9E-01      | 5.6E-01 | 5.5E-01 | 5.4E-01 | 5.4E-01 |
| NNE       | 5.8E-01      | 5.6E-01 | 5.5E-01 | 5.4E-01 | 5.3E-01 |



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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 200          | 300     | 400     | 500     | 700     | 1000    | 1500    |
| N         | 3.3E-05      | 2.4E-05 | 1.8E-05 | 1.5E-05 | 1.0E-05 | 7.0E-06 | 4.3E-06 |
| NNW       | 3.3E-05      | 2.3E-05 | 1.7E-05 | 1.4E-05 | 9.4E-06 | 6.1E-06 | 3.7E-06 |
| NW        | 3.3E-05      | 2.2E-05 | 1.6E-05 | 1.3E-05 | 8.5E-06 | 5.4E-06 | 3.3E-06 |
| WNW       | 3.3E-05      | 2.2E-05 | 1.6E-05 | 1.2E-05 | 7.8E-06 | 4.9E-06 | 3.0E-06 |
| W         | 3.2E-05      | 2.1E-05 | 1.5E-05 | 1.1E-05 | 7.2E-06 | 4.4E-06 | 2.7E-06 |
| WSW       | 3.2E-05      | 2.0E-05 | 1.4E-05 | 1.0E-05 | 6.6E-06 | 4.1E-06 | 2.5E-06 |
| SW        | 3.1E-05      | 1.9E-05 | 1.3E-05 | 9.8E-06 | 6.2E-06 | 3.8E-06 | 2.3E-06 |
| SSW       | 3.0E-05      | 1.9E-05 | 1.3E-05 | 9.3E-06 | 5.8E-06 | 3.5E-06 | 2.1E-06 |
| S         | 3.0E-05      | 1.8E-05 | 1.2E-05 | 8.8E-06 | 5.5E-06 | 3.3E-06 | 2.0E-06 |
| SSE       | 2.9E-05      | 1.7E-05 | 1.1E-05 | 8.3E-06 | 5.2E-06 | 3.1E-06 | 1.9E-06 |
| SSE       | 2.8E-05      | 1.6E-05 | 1.1E-05 | 7.9E-06 | 4.9E-06 | 2.9E-06 | 1.8E-06 |
| ESE       | 2.7E-05      | 1.6E-05 | 1.0E-05 | 7.6E-06 | 4.6E-06 | 2.8E-06 | 1.7E-06 |
| E         | 2.6E-05      | 1.5E-05 | 1.0E-05 | 7.2E-06 | 4.4E-06 | 2.6E-06 | 1.6E-06 |
| ENE       | 2.6E-05      | 1.5E-05 | 9.6E-06 | 6.9E-06 | 4.2E-06 | 2.5E-06 | 1.5E-06 |
| NE        | 2.5E-05      | 1.4E-05 | 9.2E-06 | 6.6E-06 | 4.0E-06 | 2.4E-06 | 1.5E-06 |
| NNE       | 2.4E-05      | 1.4E-05 | 8.9E-06 | 6.4E-06 | 3.8E-06 | 2.3E-06 | 1.4E-06 |

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 2000         | 3000    | 4000    | 5000    | 7000    | 10000   | 15000   |
| N         | 3.1E-06      | 2.0E-06 | 1.5E-06 | 1.2E-06 | 8.9E-07 | 7.0E-07 | 5.7E-07 |
| NNW       | 2.7E-06      | 1.7E-06 | 1.3E-06 | 1.0E-06 | 8.1E-07 | 6.5E-07 | 5.4E-07 |
| NW        | 2.3E-06      | 1.5E-06 | 1.1E-06 | 9.5E-07 | 7.5E-07 | 6.1E-07 | 5.3E-07 |
| WNW       | 2.1E-06      | 1.3E-06 | 1.0E-06 | 8.8E-07 | 7.0E-07 | 5.8E-07 | 5.1E-07 |
| W         | 1.9E-06      | 1.2E-06 | 9.6E-07 | 8.2E-07 | 6.6E-07 | 5.6E-07 | 5.0E-07 |
| WSW       | 1.8E-06      | 1.1E-06 | 9.0E-07 | 7.7E-07 | 6.4E-07 | 5.5E-07 | 4.9E-07 |
| SW        | 1.6E-06      | 1.1E-06 | 8.5E-07 | 7.4E-07 | 6.1E-07 | 5.3E-07 | 4.8E-07 |
| SSW       | 1.5E-06      | 1.0E-06 | 8.1E-07 | 7.1E-07 | 6.0E-07 | 5.2E-07 | 4.8E-07 |
| S         | 1.4E-06      | 9.6E-07 | 7.8E-07 | 6.8E-07 | 5.8E-07 | 5.1E-07 | 4.7E-07 |
| SSE       | 1.3E-06      | 9.2E-07 | 7.5E-07 | 6.6E-07 | 5.7E-07 | 5.0E-07 | 4.6E-07 |
| SSE       | 1.3E-06      | 8.8E-07 | 7.3E-07 | 6.4E-07 | 5.5E-07 | 5.0E-07 | 4.6E-07 |
| ESE       | 1.2E-06      | 8.5E-07 | 7.0E-07 | 6.3E-07 | 5.4E-07 | 4.9E-07 | 4.6E-07 |
| E         | 1.2E-06      | 8.2E-07 | 6.8E-07 | 6.1E-07 | 5.4E-07 | 4.9E-07 | 4.5E-07 |
| ENE       | 1.1E-06      | 8.0E-07 | 6.7E-07 | 6.0E-07 | 5.3E-07 | 4.8E-07 | 4.5E-07 |
| NE        | 1.1E-06      | 7.7E-07 | 6.5E-07 | 5.9E-07 | 5.2E-07 | 4.8E-07 | 4.5E-07 |
| NNE       | 1.1E-06      | 7.5E-07 | 6.4E-07 | 5.8E-07 | 5.1E-07 | 4.7E-07 | 4.5E-07 |



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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

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| Distance (m) |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|
| <hr/>        |         |         |         |         |         |
| Direction    | 20000   | 30000   | 40000   | 50000   | 80000   |
| <hr/>        |         |         |         |         |         |
| N            | 5.1E-07 | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| NNW          | 5.0E-07 | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| NW           | 4.8E-07 | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| WNW          | 4.8E-07 | 4.4E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| W            | 4.7E-07 | 4.4E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| WSW          | 4.6E-07 | 4.4E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 |
| SW           | 4.6E-07 | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 |
| SSW          | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 |
| S            | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 |
| SSE          | 4.5E-07 | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 |
| SSE          | 4.4E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |
| ESE          | 4.4E-07 | 4.3E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |
| E            | 4.4E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |
| ENE          | 4.4E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |
| NE           | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |
| NNE          | 4.3E-07 | 4.2E-07 | 4.2E-07 | 4.1E-07 | 4.1E-07 |

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### *B.2.5 Dose and Risk Conversion Factors*

#### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY                      Zip: 40069

Source Category:  
Source Type: Area  
Emission Year: 1990  
DOSE Age Group: Fifteen

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_002.  
Dataset Date: Jun 7, 2013 06:27 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.wnd



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FACTOR  
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#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie/year intake rate, where the average lifetime is 70.7565 years.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units   |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries                |
| Inhalation | lifetime risk/100,000 picoCuries                |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie-years  |
| Surface    | lifetime risk-square cm/100,000 picoCurie-years |



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FACTOR  
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\* NUCLIDE Na-22 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Fifteen

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.510E-05 | 4.133E-06  | 1.032E+10        | 2.097E+06         |
| UB_Wall  | 1.798E-05 | 4.914E-06  | 1.031E+10        | 2.295E+06         |
| Bone_Sur | 2.609E-05 | 7.185E-06  | 1.934E+10        | 3.378E+06         |
| Brain    | 1.140E-05 | 3.205E-06  | 1.328E+10        | 2.225E+06         |
| Breasts  | 8.658E-06 | 2.400E-06  | 1.398E+10        | 2.447E+06         |
| St_Wall  | 1.302E-05 | 3.162E-06  | 1.104E+10        | 2.237E+06         |
| SI_Wall  | 1.343E-05 | 3.637E-06  | 1.004E+10        | 2.214E+06         |
| ULI_Wall | 1.243E-05 | 3.326E-06  | 1.037E+10        | 2.237E+06         |
| LLI_Wall | 1.391E-05 | 3.659E-06  | 1.022E+10        | 2.295E+06         |
| Kidneys  | 1.295E-05 | 3.533E-06  | 1.110E+10        | 2.272E+06         |
| Liver    | 1.203E-05 | 3.293E-06  | 1.118E+10        | 2.248E+06         |
| Muscle   | 1.140E-05 | 3.201E-06  | 1.200E+10        | 2.540E+06         |
| Ovaries  | 1.413E-05 | 3.844E-06  | 1.008E+10        | 2.214E+06         |
| Pancreas | 1.384E-05 | 3.737E-06  | 9.926E+09        | 2.085E+06         |
| R_Marrow | 2.072E-05 | 5.713E-06  | 1.212E+10        | 2.400E+06         |
| Skin     | 8.362E-06 | 2.317E-06  | 1.549E+10        | 3.017E+06         |
| Spleen   | 1.225E-05 | 3.330E-06  | 1.123E+10        | 2.248E+06         |
| Testes   | 1.047E-05 | 2.861E-06  | 1.235E+10        | 2.563E+06         |
| Thymus   | 1.140E-05 | 3.248E-06  | 1.158E+10        | 2.225E+06         |
| Thyroid  | 1.199E-05 | 3.374E-06  | 1.258E+10        | 2.388E+06         |
| GB_Wall  | 1.140E-05 | 3.101E-06  | 1.026E+10        | 2.120E+06         |
| Ht_Wall  | 1.151E-05 | 3.172E-06  | 1.097E+10        | 2.214E+06         |
| Uterus   | 1.376E-05 | 3.744E-06  | 9.786E+09        | 2.190E+06         |
| ET_Reg   | 1.199E-05 | 3.632E-05  | 9.926E+09        | 2.085E+06         |
| Lung_66  | 1.158E-05 | 3.303E-06  | 1.235E+10        | 2.353E+06         |
| Effectiv | 1.387E-05 | 4.592E-06  | 1.188E+10        | 2.388E+06         |

RISK CONVERSION FACTORS FOR: Fifteen

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 8.769E-10 | 5.491E-10  | 1.200E+01        | 2.330E-03         |
| Stomach  | 3.256E-08 | 3.804E-09  | 4.462E+01        | 9.029E-03         |
| Colon    | 5.513E-07 | 7.944E-09  | 1.064E+02        | 2.330E-02         |
| Liver    | 1.850E-09 | 7.755E-10  | 1.689E+01        | 3.413E-03         |
| LUNG     | 8.399E-09 | 5.043E-09  | 1.212E+02        | 2.307E-02         |
| Bone     | 6.253E-10 | 1.088E-10  | 1.841E+00        | 3.204E-04         |
| Skin     | 7.807E-11 | 4.470E-11  | 1.549E+00        | 3.006E-04         |
| Breast   | 3.212E-09 | 2.328E-09  | 6.757E+01        | 1.177E-02         |
| Ovary    | 4.921E-09 | 7.922E-10  | 1.433E+01        | 3.145E-03         |
| Bladder  | 6.771E-09 | 1.765E-09  | 2.493E+01        | 5.545E-03         |
| Kidneys  | 7.363E-10 | 2.893E-10  | 5.778E+00        | 1.177E-03         |
| Thyroid  | 2.420E-10 | 2.008E-10  | 4.008E+00        | 7.607E-04         |
| Leukemia | 2.505E-08 | 3.293E-09  | 6.804E+01        | 1.351E-02         |
| Residual | 1.802E-08 | 1.442E-08  | 1.596E+02        | 3.332E-02         |
| Total    | 6.549E-07 | 4.137E-08  | 6.489E+02        | 1.305E-01         |



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FACTOR  
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\* NUCLIDE Na-24 :Particulate \*  
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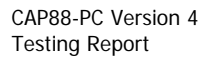
DOSE RATE CONVERSION FACTORS FOR: Fifteen

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.510E-06 | 4.170E-07  | 2.144E+10        | 3.588E+06         |
| UB_Wall  | 1.791E-06 | 4.969E-07  | 2.213E+10        | 4.252E+06         |
| Bone_Sur | 2.242E-06 | 6.756E-07  | 3.344E+10        | 5.371E+06         |
| Brain    | 1.099E-06 | 3.844E-07  | 2.679E+10        | 3.844E+06         |
| Breasts  | 9.916E-07 | 3.064E-07  | 2.749E+10        | 4.136E+06         |
| St_Wall  | 5.513E-06 | 6.523E-07  | 2.307E+10        | 3.903E+06         |
| SI_Wall  | 1.543E-06 | 3.907E-07  | 2.144E+10        | 3.926E+06         |
| ULI_Wall | 1.746E-06 | 3.926E-07  | 2.190E+10        | 3.949E+06         |
| LLI_Wall | 1.776E-06 | 3.911E-07  | 2.167E+10        | 4.019E+06         |
| Kidneys  | 1.384E-06 | 3.759E-07  | 2.295E+10        | 3.984E+06         |
| Liver    | 1.313E-06 | 3.683E-07  | 2.330E+10        | 3.926E+06         |
| Muscle   | 1.203E-06 | 3.959E-07  | 2.447E+10        | 4.322E+06         |
| Ovaries  | 1.469E-06 | 3.941E-07  | 2.179E+10        | 3.763E+06         |
| Pancreas | 1.769E-06 | 4.236E-07  | 2.144E+10        | 3.775E+06         |
| R_Marrow | 1.806E-06 | 5.424E-07  | 2.516E+10        | 4.194E+06         |
| Skin     | 9.250E-07 | 2.853E-07  | 3.215E+10        | 1.200E+07         |
| Spleen   | 1.491E-06 | 3.789E-07  | 2.330E+10        | 3.914E+06         |
| Testes   | 1.129E-06 | 3.154E-07  | 2.470E+10        | 4.345E+06         |
| Thymus   | 1.221E-06 | 4.484E-07  | 2.435E+10        | 3.914E+06         |
| Thyroid  | 1.225E-06 | 4.192E-07  | 2.563E+10        | 3.833E+06         |
| GB_Wall  | 1.306E-06 | 3.484E-07  | 2.213E+10        | 3.728E+06         |
| Ht_Wall  | 1.313E-06 | 3.878E-07  | 2.295E+10        | 3.856E+06         |
| Uterus   | 1.428E-06 | 3.900E-07  | 2.120E+10        | 3.879E+06         |
| ET_Reg   | 1.225E-06 | 2.423E-05  | 2.144E+10        | 3.775E+06         |
| Lung_66  | 1.217E-06 | 4.821E-07  | 2.516E+10        | 4.066E+06         |
| Effectiv | 1.950E-06 | 1.054E-06  | 2.423E+10        | 4.182E+06         |

RISK CONVERSION FACTORS FOR: Fifteen

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 1.617E-09 | 7.504E-11  | 2.551E+01        | 4.112E-03         |
| Stomach  | 2.372E-08 | 7.615E-10  | 9.308E+01        | 1.573E-02         |
| Colon    | 8.399E-07 | 8.913E-10  | 2.248E+02        | 4.112E-02         |
| Liver    | 3.848E-09 | 8.636E-11  | 3.530E+01        | 5.953E-03         |
| LUNG     | 1.528E-08 | 7.352E-10  | 2.458E+02        | 3.973E-02         |
| Bone     | 4.255E-10 | 1.018E-11  | 3.180E+00        | 5.103E-04         |
| Skin     | 1.484E-10 | 5.498E-12  | 3.204E+00        | 1.200E-03         |
| Breast   | 5.439E-09 | 2.967E-10  | 1.328E+02        | 2.004E-02         |
| Ovary    | 1.539E-08 | 8.110E-11  | 3.099E+01        | 5.347E-03         |
| Bladder  | 1.221E-08 | 1.768E-10  | 5.347E+01        | 1.029E-02         |
| Kidneys  | 1.598E-09 | 3.084E-11  | 1.188E+01        | 2.074E-03         |
| Thyroid  | 4.366E-10 | 2.525E-11  | 8.155E+00        | 1.223E-03         |
| Leukemia | 3.386E-08 | 3.040E-10  | 1.410E+02        | 2.353E-02         |
| Residual | 3.681E-08 | 1.605E-09  | 3.344E+02        | 5.802E-02         |
| Total    | 9.916E-07 | 5.084E-09  | 1.340E+03        | 2.283E-01         |





Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY Zip: 40069

```
Source Category:
  Source Type:   Area
  Emission Year: 1990
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_002.
Dataset Date:  Jun 7, 2013 06:27 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 200                  | Na-22   | 5.30E-01                | 9.54E-08                           | 4.96E-08                           | 1.45E-07                              |
| N              | 200                  | Na-24   | 5.28E+02                | 9.51E-05                           | 4.95E-05                           | 1.45E-04                              |
| N              | 300                  | Na-22   | 3.87E-01                | 6.97E-08                           | 3.30E-08                           | 1.03E-07                              |
| N              | 300                  | Na-24   | 3.86E+02                | 6.95E-05                           | 3.28E-05                           | 1.02E-04                              |
| N              | 400                  | Na-22   | 2.95E-01                | 5.32E-08                           | 2.47E-08                           | 7.78E-08                              |
| N              | 400                  | Na-24   | 2.94E+02                | 5.29E-05                           | 2.45E-05                           | 7.74E-05                              |
| N              | 500                  | Na-22   | 2.36E-01                | 4.25E-08                           | 1.97E-08                           | 6.22E-08                              |
| N              | 500                  | Na-24   | 2.35E+02                | 4.23E-05                           | 1.95E-05                           | 6.18E-05                              |
| N              | 700                  | Na-22   | 1.66E-01                | 2.98E-08                           | 1.40E-08                           | 4.38E-08                              |
| N              | 700                  | Na-24   | 1.64E+02                | 2.95E-05                           | 1.38E-05                           | 4.34E-05                              |
| N              | 1000                 | Na-22   | 1.08E-01                | 1.94E-08                           | 9.68E-09                           | 2.91E-08                              |
| N              | 1000                 | Na-24   | 1.06E+02                | 1.92E-05                           | 9.55E-06                           | 2.87E-05                              |
| N              | 1500                 | Na-22   | 6.26E-02                | 1.13E-08                           | 6.36E-09                           | 1.76E-08                              |
| N              | 1500                 | Na-24   | 6.14E+01                | 1.11E-05                           | 6.24E-06                           | 1.73E-05                              |
| N              | 2000                 | Na-22   | 4.17E-02                | 7.51E-09                           | 4.71E-09                           | 1.22E-08                              |
| N              | 2000                 | Na-24   | 4.07E+01                | 7.32E-06                           | 4.59E-06                           | 1.19E-05                              |
| N              | 3000                 | Na-22   | 2.32E-02                | 4.17E-09                           | 3.07E-09                           | 7.23E-09                              |
| N              | 3000                 | Na-24   | 2.23E+01                | 4.01E-06                           | 2.95E-06                           | 6.96E-06                              |
| N              | 4000                 | Na-22   | 1.53E-02                | 2.75E-09                           | 2.24E-09                           | 4.99E-09                              |
| N              | 4000                 | Na-24   | 1.45E+01                | 2.61E-06                           | 2.13E-06                           | 4.74E-06                              |
| N              | 5000                 | Na-22   | 1.11E-02                | 2.00E-09                           | 1.76E-09                           | 3.76E-09                              |
| N              | 5000                 | Na-24   | 1.04E+01                | 1.88E-06                           | 1.65E-06                           | 3.53E-06                              |
| N              | 7000                 | Na-22   | 6.72E-03                | 1.21E-09                           | 1.20E-09                           | 2.41E-09                              |
| N              | 7000                 | Na-24   | 6.14E+00                | 1.10E-06                           | 1.10E-06                           | 2.20E-06                              |
| N              | 10000                | Na-22   | 3.91E-03                | 7.04E-10                           | 7.95E-10                           | 1.50E-09                              |
| N              | 10000                | Na-24   | 3.44E+00                | 6.19E-07                           | 6.99E-07                           | 1.32E-06                              |
| N              | 15000                | Na-22   | 2.22E-03                | 3.99E-10                           | 4.91E-10                           | 8.90E-10                              |
| N              | 15000                | Na-24   | 1.83E+00                | 3.29E-07                           | 4.05E-07                           | 7.34E-07                              |
| N              | 20000                | Na-22   | 1.41E-03                | 2.53E-10                           | 3.39E-10                           | 5.92E-10                              |
| N              | 20000                | Na-24   | 1.09E+00                | 1.96E-07                           | 2.62E-07                           | 4.58E-07                              |
| N              | 30000                | Na-22   | 6.89E-04                | 1.24E-10                           | 1.91E-10                           | 3.15E-10                              |
| N              | 30000                | Na-24   | 4.68E-01                | 8.43E-08                           | 1.30E-07                           | 2.14E-07                              |
| N              | 40000                | Na-22   | 4.27E-04                | 7.68E-11                           | 1.25E-10                           | 2.02E-10                              |
| N              | 40000                | Na-24   | 2.55E-01                | 4.59E-08                           | 7.49E-08                           | 1.21E-07                              |
| N              | 50000                | Na-22   | 2.76E-04                | 4.96E-11                           | 8.68E-11                           | 1.36E-10                              |
| N              | 50000                | Na-24   | 1.45E-01                | 2.61E-08                           | 4.56E-08                           | 7.17E-08                              |
| N              | 80000                | Na-22   | 7.93E-05                | 1.43E-11                           | 3.43E-11                           | 4.85E-11                              |
| N              | 80000                | Na-24   | 2.83E-02                | 5.10E-09                           | 1.22E-08                           | 1.73E-08                              |
| NNW            | 200                  | Na-22   | 5.83E-01                | 1.05E-07                           | 3.72E-08                           | 1.42E-07                              |
| NNW            | 200                  | Na-24   | 5.82E+02                | 1.05E-04                           | 3.71E-05                           | 1.42E-04                              |
| NNW            | 300                  | Na-22   | 4.00E-01                | 7.20E-08                           | 2.47E-08                           | 9.68E-08                              |
| NNW            | 300                  | Na-24   | 3.99E+02                | 7.18E-05                           | 2.47E-05                           | 9.65E-05                              |
| NNW            | 400                  | Na-22   | 2.99E-01                | 5.39E-08                           | 1.85E-08                           | 7.24E-08                              |
| NNW            | 400                  | Na-24   | 2.98E+02                | 5.37E-05                           | 1.84E-05                           | 7.21E-05                              |
| NNW            | 500                  | Na-22   | 2.36E-01                | 4.25E-08                           | 1.48E-08                           | 5.72E-08                              |
| NNW            | 500                  | Na-24   | 2.35E+02                | 4.23E-05                           | 1.47E-05                           | 5.70E-05                              |
| NNW            | 700                  | Na-22   | 1.58E-01                | 2.85E-08                           | 1.05E-08                           | 3.90E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNW            | 700                  | Na-24   | 1.57E+02                | 2.83E-05                           | 1.04E-05                           | 3.87E-05                              |
| NNW            | 1000                 | Na-22   | 9.74E-02                | 1.75E-08                           | 7.28E-09                           | 2.48E-08                              |
| NNW            | 1000                 | Na-24   | 9.65E+01                | 1.74E-05                           | 7.21E-06                           | 2.46E-05                              |
| NNW            | 1500                 | Na-22   | 5.51E-02                | 9.92E-09                           | 4.79E-09                           | 1.47E-08                              |
| NNW            | 1500                 | Na-24   | 5.43E+01                | 9.78E-06                           | 4.72E-06                           | 1.45E-05                              |
| NNW            | 2000                 | Na-22   | 3.63E-02                | 6.54E-09                           | 3.56E-09                           | 1.01E-08                              |
| NNW            | 2000                 | Na-24   | 3.56E+01                | 6.41E-06                           | 3.49E-06                           | 9.90E-06                              |
| NNW            | 3000                 | Na-22   | 1.98E-02                | 3.56E-09                           | 2.33E-09                           | 5.89E-09                              |
| NNW            | 3000                 | Na-24   | 1.92E+01                | 3.46E-06                           | 2.26E-06                           | 5.72E-06                              |
| NNW            | 4000                 | Na-22   | 1.30E-02                | 2.34E-09                           | 1.71E-09                           | 4.05E-09                              |
| NNW            | 4000                 | Na-24   | 1.25E+01                | 2.25E-06                           | 1.65E-06                           | 3.90E-06                              |
| NNW            | 5000                 | Na-22   | 9.43E-03                | 1.70E-09                           | 1.35E-09                           | 3.05E-09                              |
| NNW            | 5000                 | Na-24   | 8.99E+00                | 1.62E-06                           | 1.28E-06                           | 2.90E-06                              |
| NNW            | 7000                 | Na-22   | 5.69E-03                | 1.02E-09                           | 9.30E-10                           | 1.95E-09                              |
| NNW            | 7000                 | Na-24   | 5.32E+00                | 9.57E-07                           | 8.69E-07                           | 1.83E-06                              |
| NNW            | 10000                | Na-22   | 3.31E-03                | 5.96E-10                           | 6.22E-10                           | 1.22E-09                              |
| NNW            | 10000                | Na-24   | 3.01E+00                | 5.41E-07                           | 5.65E-07                           | 1.11E-06                              |
| NNW            | 15000                | Na-22   | 1.91E-03                | 3.44E-10                           | 3.91E-10                           | 7.36E-10                              |
| NNW            | 15000                | Na-24   | 1.65E+00                | 2.98E-07                           | 3.39E-07                           | 6.36E-07                              |
| NNW            | 20000                | Na-22   | 1.24E-03                | 2.24E-10                           | 2.75E-10                           | 4.99E-10                              |
| NNW            | 20000                | Na-24   | 1.02E+00                | 1.84E-07                           | 2.27E-07                           | 4.11E-07                              |
| NNW            | 30000                | Na-22   | 6.35E-04                | 1.14E-10                           | 1.61E-10                           | 2.75E-10                              |
| NNW            | 30000                | Na-24   | 4.75E-01                | 8.55E-08                           | 1.20E-07                           | 2.06E-07                              |
| NNW            | 40000                | Na-22   | 4.07E-04                | 7.33E-11                           | 1.09E-10                           | 1.82E-10                              |
| NNW            | 40000                | Na-24   | 2.77E-01                | 4.98E-08                           | 7.41E-08                           | 1.24E-07                              |
| NNW            | 50000                | Na-22   | 2.74E-04                | 4.93E-11                           | 7.82E-11                           | 1.28E-10                              |
| NNW            | 50000                | Na-24   | 1.69E-01                | 3.05E-08                           | 4.83E-08                           | 7.87E-08                              |
| NNW            | 80000                | Na-22   | 8.87E-05                | 1.60E-11                           | 3.40E-11                           | 5.00E-11                              |
| NNW            | 80000                | Na-24   | 4.10E-02                | 7.38E-09                           | 1.57E-08                           | 2.31E-08                              |
| NW             | 200                  | Na-22   | 6.04E-01                | 1.09E-07                           | 2.98E-08                           | 1.38E-07                              |
| NW             | 200                  | Na-24   | 6.03E+02                | 1.09E-04                           | 2.97E-05                           | 1.38E-04                              |
| NW             | 300                  | Na-22   | 4.04E-01                | 7.28E-08                           | 1.98E-08                           | 9.26E-08                              |
| NW             | 300                  | Na-24   | 4.03E+02                | 7.26E-05                           | 1.97E-05                           | 9.23E-05                              |
| NW             | 400                  | Na-22   | 2.97E-01                | 5.35E-08                           | 1.48E-08                           | 6.83E-08                              |
| NW             | 400                  | Na-24   | 2.96E+02                | 5.34E-05                           | 1.47E-05                           | 6.81E-05                              |
| NW             | 500                  | Na-22   | 2.29E-01                | 4.12E-08                           | 1.18E-08                           | 5.30E-08                              |
| NW             | 500                  | Na-24   | 2.28E+02                | 4.10E-05                           | 1.18E-05                           | 5.28E-05                              |
| NW             | 700                  | Na-22   | 1.47E-01                | 2.65E-08                           | 8.39E-09                           | 3.48E-08                              |
| NW             | 700                  | Na-24   | 1.46E+02                | 2.63E-05                           | 8.34E-06                           | 3.47E-05                              |
| NW             | 1000                 | Na-22   | 8.79E-02                | 1.58E-08                           | 5.83E-09                           | 2.17E-08                              |
| NW             | 1000                 | Na-24   | 8.72E+01                | 1.57E-05                           | 5.78E-06                           | 2.15E-05                              |
| NW             | 1500                 | Na-22   | 4.91E-02                | 8.83E-09                           | 3.85E-09                           | 1.27E-08                              |
| NW             | 1500                 | Na-24   | 4.85E+01                | 8.73E-06                           | 3.80E-06                           | 1.25E-05                              |
| NW             | 2000                 | Na-22   | 3.20E-02                | 5.75E-09                           | 2.86E-09                           | 8.61E-09                              |
| NW             | 2000                 | Na-24   | 3.15E+01                | 5.66E-06                           | 2.81E-06                           | 8.48E-06                              |
| NW             | 3000                 | Na-22   | 1.71E-02                | 3.08E-09                           | 1.88E-09                           | 4.96E-09                              |
| NW             | 3000                 | Na-24   | 1.67E+01                | 3.01E-06                           | 1.83E-06                           | 4.84E-06                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 4000                 | Na-22   | 1.12E-02                | 2.02E-09                           | 1.38E-09                           | 3.40E-09                              |
| NW             | 4000                 | Na-24   | 1.09E+01                | 1.95E-06                           | 1.34E-06                           | 3.30E-06                              |
| NW             | 5000                 | Na-22   | 8.10E-03                | 1.46E-09                           | 1.09E-09                           | 2.55E-09                              |
| NW             | 5000                 | Na-24   | 7.79E+00                | 1.40E-06                           | 1.05E-06                           | 2.45E-06                              |
| NW             | 7000                 | Na-22   | 4.88E-03                | 8.78E-10                           | 7.59E-10                           | 1.64E-09                              |
| NW             | 7000                 | Na-24   | 4.62E+00                | 8.32E-07                           | 7.19E-07                           | 1.55E-06                              |
| NW             | 10000                | Na-22   | 2.85E-03                | 5.12E-10                           | 5.12E-10                           | 1.02E-09                              |
| NW             | 10000                | Na-24   | 2.63E+00                | 4.74E-07                           | 4.74E-07                           | 9.48E-07                              |
| NW             | 15000                | Na-22   | 1.66E-03                | 2.99E-10                           | 3.26E-10                           | 6.25E-10                              |
| NW             | 15000                | Na-24   | 1.48E+00                | 2.67E-07                           | 2.90E-07                           | 5.57E-07                              |
| NW             | 20000                | Na-22   | 1.10E-03                | 1.98E-10                           | 2.32E-10                           | 4.29E-10                              |
| NW             | 20000                | Na-24   | 9.40E-01                | 1.69E-07                           | 1.99E-07                           | 3.68E-07                              |
| NW             | 30000                | Na-22   | 5.79E-04                | 1.04E-10                           | 1.39E-10                           | 2.43E-10                              |
| NW             | 30000                | Na-24   | 4.59E-01                | 8.27E-08                           | 1.10E-07                           | 1.93E-07                              |
| NW             | 40000                | Na-22   | 3.80E-04                | 6.83E-11                           | 9.59E-11                           | 1.64E-10                              |
| NW             | 40000                | Na-24   | 2.79E-01                | 5.02E-08                           | 7.05E-08                           | 1.21E-07                              |
| NW             | 50000                | Na-22   | 2.62E-04                | 4.72E-11                           | 7.03E-11                           | 1.17E-10                              |
| NW             | 50000                | Na-24   | 1.78E-01                | 3.21E-08                           | 4.78E-08                           | 7.99E-08                              |
| NW             | 80000                | Na-22   | 9.30E-05                | 1.67E-11                           | 3.26E-11                           | 4.93E-11                              |
| NW             | 80000                | Na-24   | 5.01E-02                | 9.03E-09                           | 1.76E-08                           | 2.66E-08                              |
| WNW            | 200                  | Na-22   | 6.12E-01                | 1.10E-07                           | 2.48E-08                           | 1.35E-07                              |
| WNW            | 200                  | Na-24   | 6.11E+02                | 1.10E-04                           | 2.48E-05                           | 1.35E-04                              |
| WNW            | 300                  | Na-22   | 4.03E-01                | 7.26E-08                           | 1.65E-08                           | 8.91E-08                              |
| WNW            | 300                  | Na-24   | 4.02E+02                | 7.24E-05                           | 1.65E-05                           | 8.89E-05                              |
| WNW            | 400                  | Na-22   | 2.89E-01                | 5.21E-08                           | 1.23E-08                           | 6.44E-08                              |
| WNW            | 400                  | Na-24   | 2.89E+02                | 5.20E-05                           | 1.23E-05                           | 6.43E-05                              |
| WNW            | 500                  | Na-22   | 2.17E-01                | 3.91E-08                           | 9.84E-09                           | 4.90E-08                              |
| WNW            | 500                  | Na-24   | 2.17E+02                | 3.90E-05                           | 9.81E-06                           | 4.88E-05                              |
| WNW            | 700                  | Na-22   | 1.36E-01                | 2.44E-08                           | 7.00E-09                           | 3.14E-08                              |
| WNW            | 700                  | Na-24   | 1.35E+02                | 2.43E-05                           | 6.97E-06                           | 3.13E-05                              |
| WNW            | 1000                 | Na-22   | 7.99E-02                | 1.44E-08                           | 4.87E-09                           | 1.93E-08                              |
| WNW            | 1000                 | Na-24   | 7.94E+01                | 1.43E-05                           | 4.84E-06                           | 1.91E-05                              |
| WNW            | 1500                 | Na-22   | 4.40E-02                | 7.92E-09                           | 3.21E-09                           | 1.11E-08                              |
| WNW            | 1500                 | Na-24   | 4.36E+01                | 7.85E-06                           | 3.18E-06                           | 1.10E-05                              |
| WNW            | 2000                 | Na-22   | 2.84E-02                | 5.11E-09                           | 2.39E-09                           | 7.50E-09                              |
| WNW            | 2000                 | Na-24   | 2.80E+01                | 5.04E-06                           | 2.36E-06                           | 7.40E-06                              |
| WNW            | 3000                 | Na-22   | 1.50E-02                | 2.69E-09                           | 1.57E-09                           | 4.27E-09                              |
| WNW            | 3000                 | Na-24   | 1.47E+01                | 2.64E-06                           | 1.54E-06                           | 4.19E-06                              |
| WNW            | 4000                 | Na-22   | 9.77E-03                | 1.76E-09                           | 1.16E-09                           | 2.92E-09                              |
| WNW            | 4000                 | Na-24   | 9.52E+00                | 1.71E-06                           | 1.13E-06                           | 2.85E-06                              |
| WNW            | 5000                 | Na-22   | 7.05E-03                | 1.27E-09                           | 9.21E-10                           | 2.19E-09                              |
| WNW            | 5000                 | Na-24   | 6.83E+00                | 1.23E-06                           | 8.91E-07                           | 2.12E-06                              |
| WNW            | 7000                 | Na-22   | 4.25E-03                | 7.65E-10                           | 6.42E-10                           | 1.41E-09                              |
| WNW            | 7000                 | Na-24   | 4.06E+00                | 7.31E-07                           | 6.14E-07                           | 1.34E-06                              |
| WNW            | 10000                | Na-22   | 2.49E-03                | 4.48E-10                           | 4.35E-10                           | 8.83E-10                              |
| WNW            | 10000                | Na-24   | 2.33E+00                | 4.20E-07                           | 4.08E-07                           | 8.28E-07                              |
| WNW            | 15000                | Na-22   | 1.47E-03                | 2.64E-10                           | 2.79E-10                           | 5.43E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WNW            | 15000                | Na-24   | 1.33E+00                | 2.40E-07                           | 2.53E-07                           | 4.93E-07                              |
| WNW            | 20000                | Na-22   | 9.78E-04                | 1.76E-10                           | 2.00E-10                           | 3.77E-10                              |
| WNW            | 20000                | Na-24   | 8.60E-01                | 1.55E-07                           | 1.76E-07                           | 3.31E-07                              |
| WNW            | 30000                | Na-22   | 5.28E-04                | 9.51E-11                           | 1.22E-10                           | 2.17E-10                              |
| WNW            | 30000                | Na-24   | 4.36E-01                | 7.84E-08                           | 1.00E-07                           | 1.79E-07                              |
| WNW            | 40000                | Na-22   | 3.52E-04                | 6.33E-11                           | 8.54E-11                           | 1.49E-10                              |
| WNW            | 40000                | Na-24   | 2.72E-01                | 4.89E-08                           | 6.60E-08                           | 1.15E-07                              |
| WNW            | 50000                | Na-22   | 2.47E-04                | 4.45E-11                           | 6.35E-11                           | 1.08E-10                              |
| WNW            | 50000                | Na-24   | 1.79E-01                | 3.23E-08                           | 4.60E-08                           | 7.83E-08                              |
| WNW            | 80000                | Na-22   | 9.39E-05                | 1.69E-11                           | 3.07E-11                           | 4.76E-11                              |
| WNW            | 80000                | Na-24   | 5.61E-02                | 1.01E-08                           | 1.84E-08                           | 2.85E-08                              |
| W              | 200                  | Na-22   | 6.16E-01                | 1.11E-07                           | 2.13E-08                           | 1.32E-07                              |
| W              | 200                  | Na-24   | 6.15E+02                | 1.11E-04                           | 2.12E-05                           | 1.32E-04                              |
| W              | 300                  | Na-22   | 3.97E-01                | 7.15E-08                           | 1.41E-08                           | 8.56E-08                              |
| W              | 300                  | Na-24   | 3.96E+02                | 7.14E-05                           | 1.41E-05                           | 8.55E-05                              |
| W              | 400                  | Na-22   | 2.78E-01                | 5.00E-08                           | 1.06E-08                           | 6.06E-08                              |
| W              | 400                  | Na-24   | 2.77E+02                | 4.99E-05                           | 1.06E-05                           | 6.04E-05                              |
| W              | 500                  | Na-22   | 2.05E-01                | 3.69E-08                           | 8.44E-09                           | 4.53E-08                              |
| W              | 500                  | Na-24   | 2.04E+02                | 3.68E-05                           | 8.42E-06                           | 4.52E-05                              |
| W              | 700                  | Na-22   | 1.26E-01                | 2.27E-08                           | 6.00E-09                           | 2.87E-08                              |
| W              | 700                  | Na-24   | 1.25E+02                | 2.26E-05                           | 5.98E-06                           | 2.86E-05                              |
| W              | 1000                 | Na-22   | 7.31E-02                | 1.32E-08                           | 4.18E-09                           | 1.73E-08                              |
| W              | 1000                 | Na-24   | 7.27E+01                | 1.31E-05                           | 4.15E-06                           | 1.72E-05                              |
| W              | 1500                 | Na-22   | 3.97E-02                | 7.15E-09                           | 2.76E-09                           | 9.92E-09                              |
| W              | 1500                 | Na-24   | 3.94E+01                | 7.10E-06                           | 2.74E-06                           | 9.83E-06                              |
| W              | 2000                 | Na-22   | 2.54E-02                | 4.57E-09                           | 2.06E-09                           | 6.62E-09                              |
| W              | 2000                 | Na-24   | 2.51E+01                | 4.52E-06                           | 2.03E-06                           | 6.55E-06                              |
| W              | 3000                 | Na-22   | 1.33E-02                | 2.39E-09                           | 1.36E-09                           | 3.74E-09                              |
| W              | 3000                 | Na-24   | 1.30E+01                | 2.35E-06                           | 1.33E-06                           | 3.68E-06                              |
| W              | 4000                 | Na-22   | 8.64E-03                | 1.56E-09                           | 1.00E-09                           | 2.56E-09                              |
| W              | 4000                 | Na-24   | 8.45E+00                | 1.52E-06                           | 9.82E-07                           | 2.50E-06                              |
| W              | 5000                 | Na-22   | 6.23E-03                | 1.12E-09                           | 7.96E-10                           | 1.92E-09                              |
| W              | 5000                 | Na-24   | 6.06E+00                | 1.09E-06                           | 7.74E-07                           | 1.87E-06                              |
| W              | 7000                 | Na-22   | 3.76E-03                | 6.76E-10                           | 5.57E-10                           | 1.23E-09                              |
| W              | 7000                 | Na-24   | 3.62E+00                | 6.51E-07                           | 5.35E-07                           | 1.19E-06                              |
| W              | 10000                | Na-22   | 2.21E-03                | 3.97E-10                           | 3.79E-10                           | 7.76E-10                              |
| W              | 10000                | Na-24   | 2.09E+00                | 3.76E-07                           | 3.59E-07                           | 7.34E-07                              |
| W              | 15000                | Na-22   | 1.31E-03                | 2.35E-10                           | 2.44E-10                           | 4.80E-10                              |
| W              | 15000                | Na-24   | 1.20E+00                | 2.17E-07                           | 2.25E-07                           | 4.42E-07                              |
| W              | 20000                | Na-22   | 8.80E-04                | 1.58E-10                           | 1.77E-10                           | 3.35E-10                              |
| W              | 20000                | Na-24   | 7.88E-01                | 1.42E-07                           | 1.58E-07                           | 3.00E-07                              |
| W              | 30000                | Na-22   | 4.84E-04                | 8.71E-11                           | 1.09E-10                           | 1.96E-10                              |
| W              | 30000                | Na-24   | 4.10E-01                | 7.38E-08                           | 9.21E-08                           | 1.66E-07                              |
| W              | 40000                | Na-22   | 3.26E-04                | 5.86E-11                           | 7.69E-11                           | 1.35E-10                              |
| W              | 40000                | Na-24   | 2.61E-01                | 4.70E-08                           | 6.17E-08                           | 1.09E-07                              |
| W              | 50000                | Na-22   | 2.32E-04                | 4.18E-11                           | 5.77E-11                           | 9.95E-11                              |
| W              | 50000                | Na-24   | 1.76E-01                | 3.17E-08                           | 4.38E-08                           | 7.55E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 80000                | Na-22   | 9.28E-05                | 1.67E-11                           | 2.88E-11                           | 4.55E-11                              |
| W              | 80000                | Na-24   | 5.97E-02                | 1.07E-08                           | 1.86E-08                           | 2.93E-08                              |
| WSW            | 200                  | Na-22   | 6.16E-01                | 1.11E-07                           | 1.86E-08                           | 1.29E-07                              |
| WSW            | 200                  | Na-24   | 6.15E+02                | 1.11E-04                           | 1.86E-05                           | 1.29E-04                              |
| WSW            | 300                  | Na-22   | 3.87E-01                | 6.96E-08                           | 1.24E-08                           | 8.20E-08                              |
| WSW            | 300                  | Na-24   | 3.86E+02                | 6.95E-05                           | 1.23E-05                           | 8.19E-05                              |
| WSW            | 400                  | Na-22   | 2.65E-01                | 4.76E-08                           | 9.25E-09                           | 5.69E-08                              |
| WSW            | 400                  | Na-24   | 2.64E+02                | 4.75E-05                           | 9.23E-06                           | 5.68E-05                              |
| WSW            | 500                  | Na-22   | 1.93E-01                | 3.47E-08                           | 7.39E-09                           | 4.21E-08                              |
| WSW            | 500                  | Na-24   | 1.92E+02                | 3.46E-05                           | 7.37E-06                           | 4.20E-05                              |
| WSW            | 700                  | Na-22   | 1.17E-01                | 2.11E-08                           | 5.25E-09                           | 2.64E-08                              |
| WSW            | 700                  | Na-24   | 1.17E+02                | 2.10E-05                           | 5.24E-06                           | 2.63E-05                              |
| WSW            | 1000                 | Na-22   | 6.72E-02                | 1.21E-08                           | 3.66E-09                           | 1.58E-08                              |
| WSW            | 1000                 | Na-24   | 6.69E+01                | 1.20E-05                           | 3.64E-06                           | 1.57E-05                              |
| WSW            | 1500                 | Na-22   | 3.61E-02                | 6.50E-09                           | 2.42E-09                           | 8.92E-09                              |
| WSW            | 1500                 | Na-24   | 3.58E+01                | 6.45E-06                           | 2.40E-06                           | 8.85E-06                              |
| WSW            | 2000                 | Na-22   | 2.29E-02                | 4.12E-09                           | 1.80E-09                           | 5.92E-09                              |
| WSW            | 2000                 | Na-24   | 2.27E+01                | 4.08E-06                           | 1.79E-06                           | 5.87E-06                              |
| WSW            | 3000                 | Na-22   | 1.19E-02                | 2.13E-09                           | 1.19E-09                           | 3.32E-09                              |
| WSW            | 3000                 | Na-24   | 1.17E+01                | 2.10E-06                           | 1.17E-06                           | 3.28E-06                              |
| WSW            | 4000                 | Na-22   | 7.73E-03                | 1.39E-09                           | 8.83E-10                           | 2.27E-09                              |
| WSW            | 4000                 | Na-24   | 7.58E+00                | 1.36E-06                           | 8.66E-07                           | 2.23E-06                              |
| WSW            | 5000                 | Na-22   | 5.57E-03                | 1.00E-09                           | 7.01E-10                           | 1.70E-09                              |
| WSW            | 5000                 | Na-24   | 5.44E+00                | 9.79E-07                           | 6.84E-07                           | 1.66E-06                              |
| WSW            | 7000                 | Na-22   | 3.36E-03                | 6.05E-10                           | 4.91E-10                           | 1.10E-09                              |
| WSW            | 7000                 | Na-24   | 3.25E+00                | 5.85E-07                           | 4.75E-07                           | 1.06E-06                              |
| WSW            | 10000                | Na-22   | 1.98E-03                | 3.56E-10                           | 3.36E-10                           | 6.92E-10                              |
| WSW            | 10000                | Na-24   | 1.89E+00                | 3.39E-07                           | 3.20E-07                           | 6.59E-07                              |
| WSW            | 15000                | Na-22   | 1.18E-03                | 2.12E-10                           | 2.17E-10                           | 4.30E-10                              |
| WSW            | 15000                | Na-24   | 1.10E+00                | 1.97E-07                           | 2.02E-07                           | 4.00E-07                              |
| WSW            | 20000                | Na-22   | 7.99E-04                | 1.44E-10                           | 1.58E-10                           | 3.01E-10                              |
| WSW            | 20000                | Na-24   | 7.25E-01                | 1.31E-07                           | 1.43E-07                           | 2.74E-07                              |
| WSW            | 30000                | Na-22   | 4.46E-04                | 8.02E-11                           | 9.80E-11                           | 1.78E-10                              |
| WSW            | 30000                | Na-24   | 3.86E-01                | 6.94E-08                           | 8.48E-08                           | 1.54E-07                              |
| WSW            | 40000                | Na-22   | 3.02E-04                | 5.44E-11                           | 6.98E-11                           | 1.24E-10                              |
| WSW            | 40000                | Na-24   | 2.49E-01                | 4.49E-08                           | 5.76E-08                           | 1.02E-07                              |
| WSW            | 50000                | Na-22   | 2.18E-04                | 3.92E-11                           | 5.28E-11                           | 9.20E-11                              |
| WSW            | 50000                | Na-24   | 1.71E-01                | 3.08E-08                           | 4.15E-08                           | 7.23E-08                              |
| WSW            | 80000                | Na-22   | 9.07E-05                | 1.63E-11                           | 2.71E-11                           | 4.34E-11                              |
| WSW            | 80000                | Na-24   | 6.17E-02                | 1.11E-08                           | 1.84E-08                           | 2.95E-08                              |
| SW             | 200                  | Na-22   | 6.12E-01                | 1.10E-07                           | 1.65E-08                           | 1.27E-07                              |
| SW             | 200                  | Na-24   | 6.11E+02                | 1.10E-04                           | 1.65E-05                           | 1.27E-04                              |
| SW             | 300                  | Na-22   | 3.74E-01                | 6.73E-08                           | 1.10E-08                           | 7.83E-08                              |
| SW             | 300                  | Na-24   | 3.73E+02                | 6.72E-05                           | 1.10E-05                           | 7.82E-05                              |
| SW             | 400                  | Na-22   | 2.52E-01                | 4.53E-08                           | 8.23E-09                           | 5.35E-08                              |
| SW             | 400                  | Na-24   | 2.51E+02                | 4.52E-05                           | 8.21E-06                           | 5.34E-05                              |
| SW             | 500                  | Na-22   | 1.82E-01                | 3.28E-08                           | 6.57E-09                           | 3.93E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SW             | 500                  | Na-24   | 1.82E+02                | 3.27E-05                           | 6.55E-06                           | 3.93E-05                              |
| SW             | 700                  | Na-22   | 1.10E-01                | 1.97E-08                           | 4.67E-09                           | 2.44E-08                              |
| SW             | 700                  | Na-24   | 1.09E+02                | 1.97E-05                           | 4.66E-06                           | 2.43E-05                              |
| SW             | 1000                 | Na-22   | 6.21E-02                | 1.12E-08                           | 3.26E-09                           | 1.44E-08                              |
| SW             | 1000                 | Na-24   | 6.18E+01                | 1.11E-05                           | 3.24E-06                           | 1.44E-05                              |
| SW             | 1500                 | Na-22   | 3.30E-02                | 5.94E-09                           | 2.16E-09                           | 8.09E-09                              |
| SW             | 1500                 | Na-24   | 3.28E+01                | 5.90E-06                           | 2.14E-06                           | 8.04E-06                              |
| SW             | 2000                 | Na-22   | 2.08E-02                | 3.74E-09                           | 1.61E-09                           | 5.35E-09                              |
| SW             | 2000                 | Na-24   | 2.06E+01                | 3.71E-06                           | 1.59E-06                           | 5.31E-06                              |
| SW             | 3000                 | Na-22   | 1.07E-02                | 1.93E-09                           | 1.06E-09                           | 2.99E-09                              |
| SW             | 3000                 | Na-24   | 1.06E+01                | 1.90E-06                           | 1.05E-06                           | 2.95E-06                              |
| SW             | 4000                 | Na-22   | 6.98E-03                | 1.26E-09                           | 7.89E-10                           | 2.05E-09                              |
| SW             | 4000                 | Na-24   | 6.87E+00                | 1.24E-06                           | 7.75E-07                           | 2.01E-06                              |
| SW             | 5000                 | Na-22   | 5.03E-03                | 9.06E-10                           | 6.26E-10                           | 1.53E-09                              |
| SW             | 5000                 | Na-24   | 4.93E+00                | 8.87E-07                           | 6.13E-07                           | 1.50E-06                              |
| SW             | 7000                 | Na-22   | 3.04E-03                | 5.48E-10                           | 4.40E-10                           | 9.88E-10                              |
| SW             | 7000                 | Na-24   | 2.95E+00                | 5.32E-07                           | 4.27E-07                           | 9.58E-07                              |
| SW             | 10000                | Na-22   | 1.79E-03                | 3.23E-10                           | 3.01E-10                           | 6.24E-10                              |
| SW             | 10000                | Na-24   | 1.72E+00                | 3.09E-07                           | 2.89E-07                           | 5.98E-07                              |
| SW             | 15000                | Na-22   | 1.07E-03                | 1.93E-10                           | 1.96E-10                           | 3.89E-10                              |
| SW             | 15000                | Na-24   | 1.01E+00                | 1.81E-07                           | 1.84E-07                           | 3.65E-07                              |
| SW             | 20000                | Na-22   | 7.31E-04                | 1.32E-10                           | 1.43E-10                           | 2.74E-10                              |
| SW             | 20000                | Na-24   | 6.71E-01                | 1.21E-07                           | 1.31E-07                           | 2.52E-07                              |
| SW             | 30000                | Na-22   | 4.13E-04                | 7.43E-11                           | 8.92E-11                           | 1.63E-10                              |
| SW             | 30000                | Na-24   | 3.63E-01                | 6.53E-08                           | 7.84E-08                           | 1.44E-07                              |
| SW             | 40000                | Na-22   | 2.82E-04                | 5.07E-11                           | 6.39E-11                           | 1.15E-10                              |
| SW             | 40000                | Na-24   | 2.37E-01                | 4.27E-08                           | 5.39E-08                           | 9.66E-08                              |
| SW             | 50000                | Na-22   | 2.05E-04                | 3.68E-11                           | 4.86E-11                           | 8.55E-11                              |
| SW             | 50000                | Na-24   | 1.65E-01                | 2.97E-08                           | 3.93E-08                           | 6.90E-08                              |
| SW             | 80000                | Na-22   | 8.81E-05                | 1.59E-11                           | 2.54E-11                           | 4.13E-11                              |
| SW             | 80000                | Na-24   | 6.25E-02                | 1.13E-08                           | 1.81E-08                           | 2.93E-08                              |
| SSW            | 200                  | Na-22   | 6.04E-01                | 1.09E-07                           | 1.49E-08                           | 1.24E-07                              |
| SSW            | 200                  | Na-24   | 6.03E+02                | 1.09E-04                           | 1.49E-05                           | 1.23E-04                              |
| SSW            | 300                  | Na-22   | 3.60E-01                | 6.48E-08                           | 9.90E-09                           | 7.47E-08                              |
| SSW            | 300                  | Na-24   | 3.60E+02                | 6.47E-05                           | 9.88E-06                           | 7.46E-05                              |
| SSW            | 400                  | Na-22   | 2.40E-01                | 4.31E-08                           | 7.41E-09                           | 5.05E-08                              |
| SSW            | 400                  | Na-24   | 2.39E+02                | 4.30E-05                           | 7.39E-06                           | 5.04E-05                              |
| SSW            | 500                  | Na-22   | 1.72E-01                | 3.10E-08                           | 5.91E-09                           | 3.69E-08                              |
| SSW            | 500                  | Na-24   | 1.72E+02                | 3.10E-05                           | 5.90E-06                           | 3.69E-05                              |
| SSW            | 700                  | Na-22   | 1.03E-01                | 1.85E-08                           | 4.21E-09                           | 2.27E-08                              |
| SSW            | 700                  | Na-24   | 1.03E+02                | 1.85E-05                           | 4.20E-06                           | 2.27E-05                              |
| SSW            | 1000                 | Na-22   | 5.75E-02                | 1.04E-08                           | 2.93E-09                           | 1.33E-08                              |
| SSW            | 1000                 | Na-24   | 5.73E+01                | 1.03E-05                           | 2.92E-06                           | 1.32E-05                              |
| SSW            | 1500                 | Na-22   | 3.03E-02                | 5.46E-09                           | 1.94E-09                           | 7.40E-09                              |
| SSW            | 1500                 | Na-24   | 3.01E+01                | 5.43E-06                           | 1.93E-06                           | 7.36E-06                              |
| SSW            | 2000                 | Na-22   | 1.90E-02                | 3.43E-09                           | 1.45E-09                           | 4.88E-09                              |
| SSW            | 2000                 | Na-24   | 1.89E+01                | 3.40E-06                           | 1.44E-06                           | 4.84E-06                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 3000                 | Na-22   | 9.77E-03                | 1.76E-09                           | 9.59E-10                           | 2.72E-09                              |
| SSW            | 3000                 | Na-24   | 9.66E+00                | 1.74E-06                           | 9.48E-07                           | 2.69E-06                              |
| SSW            | 4000                 | Na-22   | 6.37E-03                | 1.15E-09                           | 7.12E-10                           | 1.86E-09                              |
| SSW            | 4000                 | Na-24   | 6.27E+00                | 1.13E-06                           | 7.02E-07                           | 1.83E-06                              |
| SSW            | 5000                 | Na-22   | 4.59E-03                | 8.26E-10                           | 5.66E-10                           | 1.39E-09                              |
| SSW            | 5000                 | Na-24   | 4.50E+00                | 8.10E-07                           | 5.55E-07                           | 1.37E-06                              |
| SSW            | 7000                 | Na-22   | 2.78E-03                | 5.00E-10                           | 3.98E-10                           | 8.98E-10                              |
| SSW            | 7000                 | Na-24   | 2.70E+00                | 4.87E-07                           | 3.88E-07                           | 8.74E-07                              |
| SSW            | 10000                | Na-22   | 1.64E-03                | 2.95E-10                           | 2.74E-10                           | 5.69E-10                              |
| SSW            | 10000                | Na-24   | 1.58E+00                | 2.84E-07                           | 2.63E-07                           | 5.47E-07                              |
| SSW            | 15000                | Na-22   | 9.85E-04                | 1.77E-10                           | 1.78E-10                           | 3.55E-10                              |
| SSW            | 15000                | Na-24   | 9.30E-01                | 1.67E-07                           | 1.68E-07                           | 3.35E-07                              |
| SSW            | 20000                | Na-22   | 6.73E-04                | 1.21E-10                           | 1.30E-10                           | 2.51E-10                              |
| SSW            | 20000                | Na-24   | 6.23E-01                | 1.12E-07                           | 1.20E-07                           | 2.33E-07                              |
| SSW            | 30000                | Na-22   | 3.84E-04                | 6.91E-11                           | 8.19E-11                           | 1.51E-10                              |
| SSW            | 30000                | Na-24   | 3.42E-01                | 6.15E-08                           | 7.29E-08                           | 1.34E-07                              |
| SSW            | 40000                | Na-22   | 2.63E-04                | 4.74E-11                           | 5.89E-11                           | 1.06E-10                              |
| SSW            | 40000                | Na-24   | 2.26E-01                | 4.06E-08                           | 5.05E-08                           | 9.11E-08                              |
| SSW            | 50000                | Na-22   | 1.93E-04                | 3.47E-11                           | 4.51E-11                           | 7.97E-11                              |
| SSW            | 50000                | Na-24   | 1.59E-01                | 2.86E-08                           | 3.72E-08                           | 6.57E-08                              |
| SSW            | 80000                | Na-22   | 8.53E-05                | 1.54E-11                           | 2.40E-11                           | 3.93E-11                              |
| SSW            | 80000                | Na-24   | 6.26E-02                | 1.13E-08                           | 1.76E-08                           | 2.89E-08                              |
| S              | 200                  | Na-22   | 5.93E-01                | 1.07E-07                           | 1.35E-08                           | 1.20E-07                              |
| S              | 200                  | Na-24   | 5.92E+02                | 1.07E-04                           | 1.35E-05                           | 1.20E-04                              |
| S              | 300                  | Na-22   | 3.46E-01                | 6.23E-08                           | 9.00E-09                           | 7.13E-08                              |
| S              | 300                  | Na-24   | 3.46E+02                | 6.22E-05                           | 8.99E-06                           | 7.12E-05                              |
| S              | 400                  | Na-22   | 2.28E-01                | 4.11E-08                           | 6.73E-09                           | 4.78E-08                              |
| S              | 400                  | Na-24   | 2.28E+02                | 4.10E-05                           | 6.72E-06                           | 4.78E-05                              |
| S              | 500                  | Na-22   | 1.64E-01                | 2.94E-08                           | 5.38E-09                           | 3.48E-08                              |
| S              | 500                  | Na-24   | 1.63E+02                | 2.94E-05                           | 5.37E-06                           | 3.48E-05                              |
| S              | 700                  | Na-22   | 9.67E-02                | 1.74E-08                           | 3.83E-09                           | 2.12E-08                              |
| S              | 700                  | Na-24   | 9.65E+01                | 1.74E-05                           | 3.82E-06                           | 2.12E-05                              |
| S              | 1000                 | Na-22   | 5.35E-02                | 9.63E-09                           | 2.67E-09                           | 1.23E-08                              |
| S              | 1000                 | Na-24   | 5.33E+01                | 9.59E-06                           | 2.66E-06                           | 1.23E-05                              |
| S              | 1500                 | Na-22   | 2.80E-02                | 5.04E-09                           | 1.77E-09                           | 6.81E-09                              |
| S              | 1500                 | Na-24   | 2.79E+01                | 5.02E-06                           | 1.76E-06                           | 6.78E-06                              |
| S              | 2000                 | Na-22   | 1.75E-02                | 3.15E-09                           | 1.32E-09                           | 4.47E-09                              |
| S              | 2000                 | Na-24   | 1.74E+01                | 3.13E-06                           | 1.31E-06                           | 4.44E-06                              |
| S              | 3000                 | Na-22   | 8.97E-03                | 1.61E-09                           | 8.74E-10                           | 2.49E-09                              |
| S              | 3000                 | Na-24   | 8.87E+00                | 1.60E-06                           | 8.64E-07                           | 2.46E-06                              |
| S              | 4000                 | Na-22   | 5.85E-03                | 1.05E-09                           | 6.50E-10                           | 1.70E-09                              |
| S              | 4000                 | Na-24   | 5.76E+00                | 1.04E-06                           | 6.41E-07                           | 1.68E-06                              |
| S              | 5000                 | Na-22   | 4.21E-03                | 7.59E-10                           | 5.17E-10                           | 1.28E-09                              |
| S              | 5000                 | Na-24   | 4.14E+00                | 7.45E-07                           | 5.08E-07                           | 1.25E-06                              |
| S              | 7000                 | Na-22   | 2.55E-03                | 4.60E-10                           | 3.64E-10                           | 8.24E-10                              |
| S              | 7000                 | Na-24   | 2.49E+00                | 4.48E-07                           | 3.55E-07                           | 8.04E-07                              |
| S              | 10000                | Na-22   | 1.51E-03                | 2.72E-10                           | 2.50E-10                           | 5.22E-10                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| S              | 10000                | Na-24   | 1.46E+00                | 2.63E-07                           | 2.42E-07                           | 5.04E-07                              |
| S              | 15000                | Na-22   | 9.10E-04                | 1.64E-10                           | 1.63E-10                           | 3.27E-10                              |
| S              | 15000                | Na-24   | 8.63E-01                | 1.55E-07                           | 1.55E-07                           | 3.10E-07                              |
| S              | 20000                | Na-22   | 6.24E-04                | 1.12E-10                           | 1.20E-10                           | 2.32E-10                              |
| S              | 20000                | Na-24   | 5.82E-01                | 1.05E-07                           | 1.11E-07                           | 2.16E-07                              |
| S              | 30000                | Na-22   | 3.59E-04                | 6.45E-11                           | 7.56E-11                           | 1.40E-10                              |
| S              | 30000                | Na-24   | 3.23E-01                | 5.81E-08                           | 6.81E-08                           | 1.26E-07                              |
| S              | 40000                | Na-22   | 2.47E-04                | 4.45E-11                           | 5.47E-11                           | 9.91E-11                              |
| S              | 40000                | Na-24   | 2.15E-01                | 3.87E-08                           | 4.75E-08                           | 8.61E-08                              |
| S              | 50000                | Na-22   | 1.82E-04                | 3.27E-11                           | 4.20E-11                           | 7.46E-11                              |
| S              | 50000                | Na-24   | 1.52E-01                | 2.74E-08                           | 3.52E-08                           | 6.26E-08                              |
| S              | 80000                | Na-22   | 8.23E-05                | 1.48E-11                           | 2.26E-11                           | 3.74E-11                              |
| S              | 80000                | Na-24   | 6.22E-02                | 1.12E-08                           | 1.71E-08                           | 2.83E-08                              |
| SSE            | 200                  | Na-22   | 5.80E-01                | 1.04E-07                           | 1.24E-08                           | 1.17E-07                              |
| SSE            | 200                  | Na-24   | 5.79E+02                | 1.04E-04                           | 1.24E-05                           | 1.17E-04                              |
| SSE            | 300                  | Na-22   | 3.33E-01                | 5.99E-08                           | 8.25E-09                           | 6.81E-08                              |
| SSE            | 300                  | Na-24   | 3.32E+02                | 5.98E-05                           | 8.24E-06                           | 6.81E-05                              |
| SSE            | 400                  | Na-22   | 2.18E-01                | 3.93E-08                           | 6.17E-09                           | 4.54E-08                              |
| SSE            | 400                  | Na-24   | 2.18E+02                | 3.92E-05                           | 6.17E-06                           | 4.54E-05                              |
| SSE            | 500                  | Na-22   | 1.56E-01                | 2.80E-08                           | 4.93E-09                           | 3.29E-08                              |
| SSE            | 500                  | Na-24   | 1.55E+02                | 2.80E-05                           | 4.92E-06                           | 3.29E-05                              |
| SSE            | 700                  | Na-22   | 9.11E-02                | 1.64E-08                           | 3.51E-09                           | 1.99E-08                              |
| SSE            | 700                  | Na-24   | 9.09E+01                | 1.64E-05                           | 3.50E-06                           | 1.99E-05                              |
| SSE            | 1000                 | Na-22   | 4.99E-02                | 8.99E-09                           | 2.45E-09                           | 1.14E-08                              |
| SSE            | 1000                 | Na-24   | 4.98E+01                | 8.96E-06                           | 2.44E-06                           | 1.14E-05                              |
| SSE            | 1500                 | Na-22   | 2.60E-02                | 4.68E-09                           | 1.62E-09                           | 6.31E-09                              |
| SSE            | 1500                 | Na-24   | 2.59E+01                | 4.66E-06                           | 1.62E-06                           | 6.27E-06                              |
| SSE            | 2000                 | Na-22   | 1.62E-02                | 2.92E-09                           | 1.21E-09                           | 4.13E-09                              |
| SSE            | 2000                 | Na-24   | 1.61E+01                | 2.90E-06                           | 1.20E-06                           | 4.11E-06                              |
| SSE            | 3000                 | Na-22   | 8.29E-03                | 1.49E-09                           | 8.03E-10                           | 2.29E-09                              |
| SSE            | 3000                 | Na-24   | 8.21E+00                | 1.48E-06                           | 7.95E-07                           | 2.27E-06                              |
| SSE            | 4000                 | Na-22   | 5.40E-03                | 9.73E-10                           | 5.97E-10                           | 1.57E-09                              |
| SSE            | 4000                 | Na-24   | 5.33E+00                | 9.60E-07                           | 5.90E-07                           | 1.55E-06                              |
| SSE            | 5000                 | Na-22   | 3.90E-03                | 7.01E-10                           | 4.75E-10                           | 1.18E-09                              |
| SSE            | 5000                 | Na-24   | 3.83E+00                | 6.90E-07                           | 4.68E-07                           | 1.16E-06                              |
| SSE            | 7000                 | Na-22   | 2.36E-03                | 4.25E-10                           | 3.35E-10                           | 7.60E-10                              |
| SSE            | 7000                 | Na-24   | 2.31E+00                | 4.16E-07                           | 3.28E-07                           | 7.44E-07                              |
| SSE            | 10000                | Na-22   | 1.40E-03                | 2.52E-10                           | 2.31E-10                           | 4.83E-10                              |
| SSE            | 10000                | Na-24   | 1.36E+00                | 2.44E-07                           | 2.23E-07                           | 4.68E-07                              |
| SSE            | 15000                | Na-22   | 8.45E-04                | 1.52E-10                           | 1.51E-10                           | 3.03E-10                              |
| SSE            | 15000                | Na-24   | 8.05E-01                | 1.45E-07                           | 1.44E-07                           | 2.89E-07                              |
| SSE            | 20000                | Na-22   | 5.81E-04                | 1.05E-10                           | 1.11E-10                           | 2.15E-10                              |
| SSE            | 20000                | Na-24   | 5.45E-01                | 9.81E-08                           | 1.04E-07                           | 2.02E-07                              |
| SSE            | 30000                | Na-22   | 3.36E-04                | 6.05E-11                           | 7.03E-11                           | 1.31E-10                              |
| SSE            | 30000                | Na-24   | 3.05E-01                | 5.50E-08                           | 6.38E-08                           | 1.19E-07                              |
| SSE            | 40000                | Na-22   | 2.33E-04                | 4.19E-11                           | 5.10E-11                           | 9.28E-11                              |
| SSE            | 40000                | Na-24   | 2.05E-01                | 3.68E-08                           | 4.48E-08                           | 8.16E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSE            | 50000                | Na-22   | 1.72E-04                | 3.09E-11                           | 3.93E-11                           | 7.02E-11                              |
| SSE            | 50000                | Na-24   | 1.46E-01                | 2.63E-08                           | 3.34E-08                           | 5.97E-08                              |
| SSE            | 80000                | Na-22   | 7.94E-05                | 1.43E-11                           | 2.14E-11                           | 3.57E-11                              |
| SSE            | 80000                | Na-24   | 6.14E-02                | 1.10E-08                           | 1.65E-08                           | 2.76E-08                              |
| SE             | 200                  | Na-22   | 5.65E-01                | 1.02E-07                           | 1.14E-08                           | 1.13E-07                              |
| SE             | 200                  | Na-24   | 5.65E+02                | 1.02E-04                           | 1.14E-05                           | 1.13E-04                              |
| SE             | 300                  | Na-22   | 3.20E-01                | 5.76E-08                           | 7.61E-09                           | 6.52E-08                              |
| SE             | 300                  | Na-24   | 3.20E+02                | 5.76E-05                           | 7.61E-06                           | 6.52E-05                              |
| SE             | 400                  | Na-22   | 2.09E-01                | 3.76E-08                           | 5.70E-09                           | 4.33E-08                              |
| SE             | 400                  | Na-24   | 2.09E+02                | 3.75E-05                           | 5.69E-06                           | 4.32E-05                              |
| SE             | 500                  | Na-22   | 1.48E-01                | 2.67E-08                           | 4.55E-09                           | 3.12E-08                              |
| SE             | 500                  | Na-24   | 1.48E+02                | 2.66E-05                           | 4.55E-06                           | 3.12E-05                              |
| SE             | 700                  | Na-22   | 8.61E-02                | 1.55E-08                           | 3.24E-09                           | 1.87E-08                              |
| SE             | 700                  | Na-24   | 8.59E+01                | 1.55E-05                           | 3.24E-06                           | 1.87E-05                              |
| SE             | 1000                 | Na-22   | 4.68E-02                | 8.42E-09                           | 2.26E-09                           | 1.07E-08                              |
| SE             | 1000                 | Na-24   | 4.66E+01                | 8.40E-06                           | 2.25E-06                           | 1.07E-05                              |
| SE             | 1500                 | Na-22   | 2.43E-02                | 4.37E-09                           | 1.50E-09                           | 5.87E-09                              |
| SE             | 1500                 | Na-24   | 2.42E+01                | 4.35E-06                           | 1.49E-06                           | 5.84E-06                              |
| SE             | 2000                 | Na-22   | 1.51E-02                | 2.72E-09                           | 1.12E-09                           | 3.84E-09                              |
| SE             | 2000                 | Na-24   | 1.50E+01                | 2.70E-06                           | 1.11E-06                           | 3.82E-06                              |
| SE             | 3000                 | Na-22   | 7.70E-03                | 1.39E-09                           | 7.42E-10                           | 2.13E-09                              |
| SE             | 3000                 | Na-24   | 7.63E+00                | 1.37E-06                           | 7.36E-07                           | 2.11E-06                              |
| SE             | 4000                 | Na-22   | 5.02E-03                | 9.04E-10                           | 5.53E-10                           | 1.46E-09                              |
| SE             | 4000                 | Na-24   | 4.96E+00                | 8.93E-07                           | 5.46E-07                           | 1.44E-06                              |
| SE             | 5000                 | Na-22   | 3.62E-03                | 6.52E-10                           | 4.40E-10                           | 1.09E-09                              |
| SE             | 5000                 | Na-24   | 3.57E+00                | 6.42E-07                           | 4.33E-07                           | 1.08E-06                              |
| SE             | 7000                 | Na-22   | 2.20E-03                | 3.96E-10                           | 3.11E-10                           | 7.06E-10                              |
| SE             | 7000                 | Na-24   | 2.15E+00                | 3.88E-07                           | 3.04E-07                           | 6.92E-07                              |
| SE             | 10000                | Na-22   | 1.31E-03                | 2.35E-10                           | 2.14E-10                           | 4.49E-10                              |
| SE             | 10000                | Na-24   | 1.27E+00                | 2.28E-07                           | 2.08E-07                           | 4.36E-07                              |
| SE             | 15000                | Na-22   | 7.89E-04                | 1.42E-10                           | 1.40E-10                           | 2.82E-10                              |
| SE             | 15000                | Na-24   | 7.55E-01                | 1.36E-07                           | 1.34E-07                           | 2.70E-07                              |
| SE             | 20000                | Na-22   | 5.44E-04                | 9.79E-11                           | 1.03E-10                           | 2.01E-10                              |
| SE             | 20000                | Na-24   | 5.13E-01                | 9.23E-08                           | 9.71E-08                           | 1.89E-07                              |
| SE             | 30000                | Na-22   | 3.17E-04                | 5.70E-11                           | 6.57E-11                           | 1.23E-10                              |
| SE             | 30000                | Na-24   | 2.90E-01                | 5.21E-08                           | 6.01E-08                           | 1.12E-07                              |
| SE             | 40000                | Na-22   | 2.20E-04                | 3.95E-11                           | 4.77E-11                           | 8.73E-11                              |
| SE             | 40000                | Na-24   | 1.95E-01                | 3.51E-08                           | 4.24E-08                           | 7.75E-08                              |
| SE             | 50000                | Na-22   | 1.63E-04                | 2.93E-11                           | 3.69E-11                           | 6.62E-11                              |
| SE             | 50000                | Na-24   | 1.40E-01                | 2.52E-08                           | 3.18E-08                           | 5.70E-08                              |
| SE             | 80000                | Na-22   | 7.65E-05                | 1.38E-11                           | 2.03E-11                           | 3.41E-11                              |
| SE             | 80000                | Na-24   | 6.04E-02                | 1.09E-08                           | 1.60E-08                           | 2.69E-08                              |
| ESE            | 200                  | Na-22   | 5.50E-01                | 9.90E-08                           | 1.06E-08                           | 1.10E-07                              |
| ESE            | 200                  | Na-24   | 5.50E+02                | 9.90E-05                           | 1.06E-05                           | 1.10E-04                              |
| ESE            | 300                  | Na-22   | 3.08E-01                | 5.55E-08                           | 7.07E-09                           | 6.26E-08                              |
| ESE            | 300                  | Na-24   | 3.08E+02                | 5.54E-05                           | 7.06E-06                           | 6.25E-05                              |
| ESE            | 400                  | Na-22   | 2.00E-01                | 3.60E-08                           | 5.29E-09                           | 4.13E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 400                  | Na-24   | 2.00E+02                | 3.60E-05                           | 5.29E-06                           | 4.13E-05                              |
| ESE            | 500                  | Na-22   | 1.41E-01                | 2.54E-08                           | 4.23E-09                           | 2.97E-08                              |
| ESE            | 500                  | Na-24   | 1.41E+02                | 2.54E-05                           | 4.22E-06                           | 2.96E-05                              |
| ESE            | 700                  | Na-22   | 8.15E-02                | 1.47E-08                           | 3.01E-09                           | 1.77E-08                              |
| ESE            | 700                  | Na-24   | 8.13E+01                | 1.46E-05                           | 3.01E-06                           | 1.76E-05                              |
| ESE            | 1000                 | Na-22   | 4.40E-02                | 7.91E-09                           | 2.10E-09                           | 1.00E-08                              |
| ESE            | 1000                 | Na-24   | 4.38E+01                | 7.89E-06                           | 2.10E-06                           | 9.99E-06                              |
| ESE            | 1500                 | Na-22   | 2.27E-02                | 4.09E-09                           | 1.39E-09                           | 5.48E-09                              |
| ESE            | 1500                 | Na-24   | 2.26E+01                | 4.07E-06                           | 1.39E-06                           | 5.46E-06                              |
| ESE            | 2000                 | Na-22   | 1.41E-02                | 2.54E-09                           | 1.04E-09                           | 3.58E-09                              |
| ESE            | 2000                 | Na-24   | 1.40E+01                | 2.53E-06                           | 1.04E-06                           | 3.56E-06                              |
| ESE            | 3000                 | Na-22   | 7.19E-03                | 1.29E-09                           | 6.90E-10                           | 1.98E-09                              |
| ESE            | 3000                 | Na-24   | 7.13E+00                | 1.28E-06                           | 6.85E-07                           | 1.97E-06                              |
| ESE            | 4000                 | Na-22   | 4.69E-03                | 8.44E-10                           | 5.14E-10                           | 1.36E-09                              |
| ESE            | 4000                 | Na-24   | 4.64E+00                | 8.35E-07                           | 5.09E-07                           | 1.34E-06                              |
| ESE            | 5000                 | Na-22   | 3.38E-03                | 6.09E-10                           | 4.09E-10                           | 1.02E-09                              |
| ESE            | 5000                 | Na-24   | 3.34E+00                | 6.01E-07                           | 4.04E-07                           | 1.00E-06                              |
| ESE            | 7000                 | Na-22   | 2.06E-03                | 3.70E-10                           | 2.89E-10                           | 6.59E-10                              |
| ESE            | 7000                 | Na-24   | 2.02E+00                | 3.63E-07                           | 2.84E-07                           | 6.47E-07                              |
| ESE            | 10000                | Na-22   | 1.22E-03                | 2.20E-10                           | 2.00E-10                           | 4.20E-10                              |
| ESE            | 10000                | Na-24   | 1.19E+00                | 2.14E-07                           | 1.94E-07                           | 4.08E-07                              |
| ESE            | 15000                | Na-22   | 7.40E-04                | 1.33E-10                           | 1.31E-10                           | 2.64E-10                              |
| ESE            | 15000                | Na-24   | 7.10E-01                | 1.28E-07                           | 1.26E-07                           | 2.53E-07                              |
| ESE            | 20000                | Na-22   | 5.11E-04                | 9.20E-11                           | 9.63E-11                           | 1.88E-10                              |
| ESE            | 20000                | Na-24   | 4.84E-01                | 8.71E-08                           | 9.12E-08                           | 1.78E-07                              |
| ESE            | 30000                | Na-22   | 2.99E-04                | 5.38E-11                           | 6.16E-11                           | 1.15E-10                              |
| ESE            | 30000                | Na-24   | 2.75E-01                | 4.96E-08                           | 5.67E-08                           | 1.06E-07                              |
| ESE            | 40000                | Na-22   | 2.08E-04                | 3.74E-11                           | 4.49E-11                           | 8.23E-11                              |
| ESE            | 40000                | Na-24   | 1.86E-01                | 3.35E-08                           | 4.02E-08                           | 7.37E-08                              |
| ESE            | 50000                | Na-22   | 1.55E-04                | 2.78E-11                           | 3.47E-11                           | 6.26E-11                              |
| ESE            | 50000                | Na-24   | 1.35E-01                | 2.42E-08                           | 3.03E-08                           | 5.45E-08                              |
| ESE            | 80000                | Na-22   | 7.38E-05                | 1.33E-11                           | 1.93E-11                           | 3.26E-11                              |
| ESE            | 80000                | Na-24   | 5.92E-02                | 1.07E-08                           | 1.55E-08                           | 2.61E-08                              |
| E              | 200                  | Na-22   | 5.35E-01                | 9.63E-08                           | 9.92E-09                           | 1.06E-07                              |
| E              | 200                  | Na-24   | 5.35E+02                | 9.62E-05                           | 9.91E-06                           | 1.06E-04                              |
| E              | 300                  | Na-22   | 2.97E-01                | 5.35E-08                           | 6.60E-09                           | 6.01E-08                              |
| E              | 300                  | Na-24   | 2.97E+02                | 5.35E-05                           | 6.60E-06                           | 6.01E-05                              |
| E              | 400                  | Na-22   | 1.92E-01                | 3.46E-08                           | 4.94E-09                           | 3.95E-08                              |
| E              | 400                  | Na-24   | 1.92E+02                | 3.46E-05                           | 4.94E-06                           | 3.95E-05                              |
| E              | 500                  | Na-22   | 1.35E-01                | 2.43E-08                           | 3.95E-09                           | 2.83E-08                              |
| E              | 500                  | Na-24   | 1.35E+02                | 2.43E-05                           | 3.94E-06                           | 2.82E-05                              |
| E              | 700                  | Na-22   | 7.73E-02                | 1.39E-08                           | 2.81E-09                           | 1.67E-08                              |
| E              | 700                  | Na-24   | 7.71E+01                | 1.39E-05                           | 2.81E-06                           | 1.67E-05                              |
| E              | 1000                 | Na-22   | 4.15E-02                | 7.46E-09                           | 1.96E-09                           | 9.42E-09                              |
| E              | 1000                 | Na-24   | 4.13E+01                | 7.44E-06                           | 1.96E-06                           | 9.40E-06                              |
| E              | 1500                 | Na-22   | 2.14E-02                | 3.84E-09                           | 1.30E-09                           | 5.15E-09                              |
| E              | 1500                 | Na-24   | 2.13E+01                | 3.83E-06                           | 1.30E-06                           | 5.13E-06                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| E              | 2000                 | Na-22   | 1.33E-02                | 2.39E-09                           | 9.73E-10                           | 3.36E-09                              |
| E              | 2000                 | Na-24   | 1.32E+01                | 2.37E-06                           | 9.68E-07                           | 3.34E-06                              |
| E              | 3000                 | Na-22   | 6.74E-03                | 1.21E-09                           | 6.45E-10                           | 1.86E-09                              |
| E              | 3000                 | Na-24   | 6.69E+00                | 1.20E-06                           | 6.40E-07                           | 1.84E-06                              |
| E              | 4000                 | Na-22   | 4.40E-03                | 7.92E-10                           | 4.81E-10                           | 1.27E-09                              |
| E              | 4000                 | Na-24   | 4.35E+00                | 7.84E-07                           | 4.76E-07                           | 1.26E-06                              |
| E              | 5000                 | Na-22   | 3.17E-03                | 5.71E-10                           | 3.83E-10                           | 9.54E-10                              |
| E              | 5000                 | Na-24   | 3.13E+00                | 5.64E-07                           | 3.78E-07                           | 9.42E-07                              |
| E              | 7000                 | Na-22   | 1.93E-03                | 3.47E-10                           | 2.71E-10                           | 6.18E-10                              |
| E              | 7000                 | Na-24   | 1.90E+00                | 3.41E-07                           | 2.66E-07                           | 6.07E-07                              |
| E              | 10000                | Na-22   | 1.15E-03                | 2.07E-10                           | 1.87E-10                           | 3.94E-10                              |
| E              | 10000                | Na-24   | 1.12E+00                | 2.01E-07                           | 1.82E-07                           | 3.84E-07                              |
| E              | 15000                | Na-22   | 6.96E-04                | 1.25E-10                           | 1.23E-10                           | 2.48E-10                              |
| E              | 15000                | Na-24   | 6.70E-01                | 1.21E-07                           | 1.18E-07                           | 2.39E-07                              |
| E              | 20000                | Na-22   | 4.82E-04                | 8.68E-11                           | 9.05E-11                           | 1.77E-10                              |
| E              | 20000                | Na-24   | 4.58E-01                | 8.24E-08                           | 8.59E-08                           | 1.68E-07                              |
| E              | 30000                | Na-22   | 2.83E-04                | 5.10E-11                           | 5.80E-11                           | 1.09E-10                              |
| E              | 30000                | Na-24   | 2.62E-01                | 4.72E-08                           | 5.37E-08                           | 1.01E-07                              |
| E              | 40000                | Na-22   | 1.97E-04                | 3.55E-11                           | 4.23E-11                           | 7.79E-11                              |
| E              | 40000                | Na-24   | 1.78E-01                | 3.21E-08                           | 3.82E-08                           | 7.02E-08                              |
| E              | 50000                | Na-22   | 1.47E-04                | 2.65E-11                           | 3.28E-11                           | 5.93E-11                              |
| E              | 50000                | Na-24   | 1.29E-01                | 2.33E-08                           | 2.89E-08                           | 5.22E-08                              |
| E              | 80000                | Na-22   | 7.12E-05                | 1.28E-11                           | 1.84E-11                           | 3.12E-11                              |
| E              | 80000                | Na-24   | 5.79E-02                | 1.04E-08                           | 1.49E-08                           | 2.54E-08                              |
| ENE            | 200                  | Na-22   | 5.20E-01                | 9.36E-08                           | 9.30E-09                           | 1.03E-07                              |
| ENE            | 200                  | Na-24   | 5.20E+02                | 9.35E-05                           | 9.30E-06                           | 1.03E-04                              |
| ENE            | 300                  | Na-22   | 2.87E-01                | 5.17E-08                           | 6.19E-09                           | 5.79E-08                              |
| ENE            | 300                  | Na-24   | 2.87E+02                | 5.16E-05                           | 6.18E-06                           | 5.78E-05                              |
| ENE            | 400                  | Na-22   | 1.85E-01                | 3.32E-08                           | 4.63E-09                           | 3.79E-08                              |
| ENE            | 400                  | Na-24   | 1.84E+02                | 3.32E-05                           | 4.63E-06                           | 3.78E-05                              |
| ENE            | 500                  | Na-22   | 1.29E-01                | 2.33E-08                           | 3.70E-09                           | 2.70E-08                              |
| ENE            | 500                  | Na-24   | 1.29E+02                | 2.32E-05                           | 3.70E-06                           | 2.69E-05                              |
| ENE            | 700                  | Na-22   | 7.34E-02                | 1.32E-08                           | 2.64E-09                           | 1.59E-08                              |
| ENE            | 700                  | Na-24   | 7.33E+01                | 1.32E-05                           | 2.63E-06                           | 1.58E-05                              |
| ENE            | 1000                 | Na-22   | 3.92E-02                | 7.06E-09                           | 1.84E-09                           | 8.90E-09                              |
| ENE            | 1000                 | Na-24   | 3.91E+01                | 7.04E-06                           | 1.84E-06                           | 8.87E-06                              |
| ENE            | 1500                 | Na-22   | 2.01E-02                | 3.62E-09                           | 1.22E-09                           | 4.85E-09                              |
| ENE            | 1500                 | Na-24   | 2.01E+01                | 3.61E-06                           | 1.22E-06                           | 4.83E-06                              |
| ENE            | 2000                 | Na-22   | 1.25E-02                | 2.25E-09                           | 9.13E-10                           | 3.16E-09                              |
| ENE            | 2000                 | Na-24   | 1.24E+01                | 2.24E-06                           | 9.09E-07                           | 3.15E-06                              |
| ENE            | 3000                 | Na-22   | 6.35E-03                | 1.14E-09                           | 6.06E-10                           | 1.75E-09                              |
| ENE            | 3000                 | Na-24   | 6.30E+00                | 1.13E-06                           | 6.01E-07                           | 1.74E-06                              |
| ENE            | 4000                 | Na-22   | 4.14E-03                | 7.46E-10                           | 4.52E-10                           | 1.20E-09                              |
| ENE            | 4000                 | Na-24   | 4.10E+00                | 7.38E-07                           | 4.47E-07                           | 1.19E-06                              |
| ENE            | 5000                 | Na-22   | 2.99E-03                | 5.38E-10                           | 3.60E-10                           | 8.98E-10                              |
| ENE            | 5000                 | Na-24   | 2.95E+00                | 5.32E-07                           | 3.56E-07                           | 8.87E-07                              |
| ENE            | 7000                 | Na-22   | 1.82E-03                | 3.27E-10                           | 2.55E-10                           | 5.82E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m <sup>3</sup> ) | Dry<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Wet<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Ground<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) |
|----------------|----------------------|---------|--------------------------------------|---|---|--|
| ENE            | 7000                 | Na-24   | 1.79E+00                             | 3.22E-07  | 2.50E-07  | 5.72E-07   |
| ENE            | 10000                | Na-22   | 1.08E-03                             | 1.95E-10  | 1.76E-10  | 3.71E-10   |
| ENE            | 10000                | Na-24   | 1.06E+00                             | 1.90E-07  | 1.72E-07  | 3.62E-07   |
| ENE            | 15000                | Na-22   | 6.58E-04                             | 1.18E-10  | 1.16E-10  | 2.34E-10   |
| ENE            | 15000                | Na-24   | 6.34E-01                             | 1.14E-07  | 1.12E-07  | 2.26E-07   |
| ENE            | 20000                | Na-22   | 4.56E-04                             | 8.21E-11  | 8.53E-11  | 1.67E-10   |
| ENE            | 20000                | Na-24   | 4.34E-01                             | 7.82E-08  | 8.13E-08  | 1.59E-07   |
| ENE            | 30000                | Na-22   | 2.69E-04                             | 4.84E-11  | 5.48E-11  | 1.03E-10   |
| ENE            | 30000                | Na-24   | 2.50E-01                             | 4.50E-08  | 5.10E-08  | 9.60E-08   |
| ENE            | 40000                | Na-22   | 1.88E-04                             | 3.38E-11  | 4.01E-11  | 7.39E-11   |
| ENE            | 40000                | Na-24   | 1.71E-01                             | 3.07E-08  | 3.64E-08  | 6.71E-08   |
| ENE            | 50000                | Na-22   | 1.40E-04                             | 2.53E-11  | 3.11E-11  | 5.64E-11   |
| ENE            | 50000                | Na-24   | 1.24E-01                             | 2.24E-08  | 2.76E-08  | 5.00E-08   |
| ENE            | 80000                | Na-22   | 6.87E-05                             | 1.24E-11  | 1.75E-11  | 2.99E-11   |
| ENE            | 80000                | Na-24   | 5.66E-02                             | 1.02E-08  | 1.44E-08  | 2.46E-08   |
| NE             | 200                  | Na-22   | 5.05E-01                             | 9.10E-08  | 8.75E-09  | 9.97E-08   |
| NE             | 200                  | Na-24   | 5.05E+02                             | 9.09E-05  | 8.75E-06  | 9.97E-05   |
| NE             | 300                  | Na-22   | 2.78E-01                             | 5.00E-08  | 5.82E-09  | 5.58E-08   |
| NE             | 300                  | Na-24   | 2.77E+02                             | 4.99E-05  | 5.82E-06  | 5.57E-05   |
| NE             | 400                  | Na-22   | 1.78E-01                             | 3.20E-08  | 4.36E-09  | 3.63E-08   |
| NE             | 400                  | Na-24   | 1.77E+02                             | 3.19E-05  | 4.36E-06  | 3.63E-05   |
| NE             | 500                  | Na-22   | 1.24E-01                             | 2.23E-08  | 3.48E-09  | 2.58E-08   |
| NE             | 500                  | Na-24   | 1.24E+02                             | 2.22E-05  | 3.48E-06  | 2.57E-05   |
| NE             | 700                  | Na-22   | 6.99E-02                             | 1.26E-08  | 2.48E-09  | 1.51E-08   |
| NE             | 700                  | Na-24   | 6.98E+01                             | 1.26E-05  | 2.48E-06  | 1.50E-05   |
| NE             | 1000                 | Na-22   | 3.71E-02                             | 6.69E-09  | 1.73E-09  | 8.42E-09   |
| NE             | 1000                 | Na-24   | 3.71E+01                             | 6.67E-06  | 1.73E-06  | 8.40E-06   |
| NE             | 1500                 | Na-22   | 1.90E-02                             | 3.43E-09  | 1.15E-09  | 4.58E-09   |
| NE             | 1500                 | Na-24   | 1.90E+01                             | 3.42E-06  | 1.15E-06  | 4.56E-06   |
| NE             | 2000                 | Na-22   | 1.18E-02                             | 2.12E-09  | 8.60E-10  | 2.99E-09   |
| NE             | 2000                 | Na-24   | 1.18E+01                             | 2.12E-06  | 8.56E-07  | 2.97E-06   |
| NE             | 3000                 | Na-22   | 5.99E-03                             | 1.08E-09  | 5.71E-10  | 1.65E-09   |
| NE             | 3000                 | Na-24   | 5.95E+00                             | 1.07E-06  | 5.67E-07  | 1.64E-06   |
| NE             | 4000                 | Na-22   | 3.91E-03                             | 7.04E-10  | 4.26E-10  | 1.13E-09   |
| NE             | 4000                 | Na-24   | 3.88E+00                             | 6.98E-07  | 4.22E-07  | 1.12E-06   |
| NE             | 5000                 | Na-22   | 2.82E-03                             | 5.08E-10  | 3.39E-10  | 8.48E-10   |
| NE             | 5000                 | Na-24   | 2.79E+00                             | 5.03E-07  | 3.35E-07  | 8.38E-07   |
| NE             | 7000                 | Na-22   | 1.72E-03                             | 3.09E-10  | 2.40E-10  | 5.50E-10   |
| NE             | 7000                 | Na-24   | 1.69E+00                             | 3.05E-07  | 2.36E-07  | 5.41E-07   |
| NE             | 10000                | Na-22   | 1.03E-03                             | 1.85E-10  | 1.66E-10  | 3.51E-10   |
| NE             | 10000                | Na-24   | 1.00E+00                             | 1.80E-07  | 1.62E-07  | 3.43E-07   |
| NE             | 15000                | Na-22   | 6.23E-04                             | 1.12E-10  | 1.09E-10  | 2.21E-10   |
| NE             | 15000                | Na-24   | 6.02E-01                             | 1.08E-07  | 1.06E-07  | 2.14E-07   |
| NE             | 20000                | Na-22   | 4.33E-04                             | 7.79E-11  | 8.06E-11  | 1.59E-10   |
| NE             | 20000                | Na-24   | 4.13E-01                             | 7.44E-08  | 7.71E-08  | 1.51E-07   |
| NE             | 30000                | Na-22   | 2.56E-04                             | 4.61E-11  | 5.19E-11  | 9.80E-11   |
| NE             | 30000                | Na-24   | 2.39E-01                             | 4.31E-08  | 4.85E-08  | 9.16E-08   |

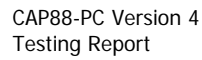


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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 40000                | Na-22   | 1.79E-04                | 3.23E-11                           | 3.80E-11                           | 7.03E-11                              |
| NE             | 40000                | Na-24   | 1.64E-01                | 2.95E-08                           | 3.47E-08                           | 6.42E-08                              |
| NE             | 50000                | Na-22   | 1.34E-04                | 2.42E-11                           | 2.96E-11                           | 5.38E-11                              |
| NE             | 50000                | Na-24   | 1.20E-01                | 2.16E-08                           | 2.64E-08                           | 4.80E-08                              |
| NE             | 80000                | Na-22   | 6.63E-05                | 1.19E-11                           | 1.68E-11                           | 2.87E-11                              |
| NE             | 80000                | Na-24   | 5.53E-02                | 9.95E-09                           | 1.40E-08                           | 2.39E-08                              |
| NNE            | 200                  | Na-22   | 4.92E-01                | 8.85E-08                           | 8.27E-09                           | 9.68E-08                              |
| NNE            | 200                  | Na-24   | 4.91E+02                | 8.85E-05                           | 8.26E-06                           | 9.67E-05                              |
| NNE            | 300                  | Na-22   | 2.69E-01                | 4.83E-08                           | 5.50E-09                           | 5.38E-08                              |
| NNE            | 300                  | Na-24   | 2.68E+02                | 4.83E-05                           | 5.50E-06                           | 5.38E-05                              |
| NNE            | 400                  | Na-22   | 1.71E-01                | 3.08E-08                           | 4.12E-09                           | 3.49E-08                              |
| NNE            | 400                  | Na-24   | 1.71E+02                | 3.08E-05                           | 4.12E-06                           | 3.49E-05                              |
| NNE            | 500                  | Na-22   | 1.19E-01                | 2.14E-08                           | 3.29E-09                           | 2.46E-08                              |
| NNE            | 500                  | Na-24   | 1.19E+02                | 2.13E-05                           | 3.29E-06                           | 2.46E-05                              |
| NNE            | 700                  | Na-22   | 6.67E-02                | 1.20E-08                           | 2.35E-09                           | 1.44E-08                              |
| NNE            | 700                  | Na-24   | 6.66E+01                | 1.20E-05                           | 2.34E-06                           | 1.43E-05                              |
| NNE            | 1000                 | Na-22   | 3.53E-02                | 6.35E-09                           | 1.64E-09                           | 7.99E-09                              |
| NNE            | 1000                 | Na-24   | 3.52E+01                | 6.34E-06                           | 1.63E-06                           | 7.97E-06                              |
| NNE            | 1500                 | Na-22   | 1.81E-02                | 3.25E-09                           | 1.09E-09                           | 4.34E-09                              |
| NNE            | 1500                 | Na-24   | 1.80E+01                | 3.24E-06                           | 1.08E-06                           | 4.33E-06                              |
| NNE            | 2000                 | Na-22   | 1.12E-02                | 2.01E-09                           | 8.13E-10                           | 2.83E-09                              |
| NNE            | 2000                 | Na-24   | 1.11E+01                | 2.01E-06                           | 8.10E-07                           | 2.82E-06                              |
| NNE            | 3000                 | Na-22   | 5.68E-03                | 1.02E-09                           | 5.40E-10                           | 1.56E-09                              |
| NNE            | 3000                 | Na-24   | 5.64E+00                | 1.02E-06                           | 5.36E-07                           | 1.55E-06                              |
| NNE            | 4000                 | Na-22   | 3.71E-03                | 6.67E-10                           | 4.03E-10                           | 1.07E-09                              |
| NNE            | 4000                 | Na-24   | 3.68E+00                | 6.62E-07                           | 3.99E-07                           | 1.06E-06                              |
| NNE            | 5000                 | Na-22   | 2.68E-03                | 4.82E-10                           | 3.21E-10                           | 8.03E-10                              |
| NNE            | 5000                 | Na-24   | 2.65E+00                | 4.77E-07                           | 3.18E-07                           | 7.94E-07                              |
| NNE            | 7000                 | Na-22   | 1.63E-03                | 2.93E-10                           | 2.27E-10                           | 5.21E-10                              |
| NNE            | 7000                 | Na-24   | 1.61E+00                | 2.89E-07                           | 2.24E-07                           | 5.13E-07                              |
| NNE            | 10000                | Na-22   | 9.73E-04                | 1.75E-10                           | 1.57E-10                           | 3.33E-10                              |
| NNE            | 10000                | Na-24   | 9.52E-01                | 1.71E-07                           | 1.54E-07                           | 3.25E-07                              |
| NNE            | 15000                | Na-22   | 5.92E-04                | 1.07E-10                           | 1.04E-10                           | 2.10E-10                              |
| NNE            | 15000                | Na-24   | 5.73E-01                | 1.03E-07                           | 1.00E-07                           | 2.03E-07                              |
| NNE            | 20000                | Na-22   | 4.11E-04                | 7.41E-11                           | 7.65E-11                           | 1.51E-10                              |
| NNE            | 20000                | Na-24   | 3.94E-01                | 7.10E-08                           | 7.33E-08                           | 1.44E-07                              |
| NNE            | 30000                | Na-22   | 2.44E-04                | 4.40E-11                           | 4.94E-11                           | 9.34E-11                              |
| NNE            | 30000                | Na-24   | 2.29E-01                | 4.13E-08                           | 4.63E-08                           | 8.75E-08                              |
| NNE            | 40000                | Na-22   | 1.71E-04                | 3.08E-11                           | 3.62E-11                           | 6.70E-11                              |
| NNE            | 40000                | Na-24   | 1.57E-01                | 2.83E-08                           | 3.32E-08                           | 6.15E-08                              |
| NNE            | 50000                | Na-22   | 1.28E-04                | 2.31E-11                           | 2.82E-11                           | 5.14E-11                              |
| NNE            | 50000                | Na-24   | 1.15E-01                | 2.08E-08                           | 2.54E-08                           | 4.61E-08                              |
| NNE            | 80000                | Na-22   | 6.41E-05                | 1.15E-11                           | 1.61E-11                           | 2.76E-11                              |
| NNE            | 80000                | Na-24   | 5.40E-02                | 9.72E-09                           | 1.35E-08                           | 2.32E-08                              |



Version 4.0

Clean Air Act Assessment Package - 1988

Non-Radon Individual Assessment  
Fri Jun 07 18:27:16 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: KY Zip: 40069

```
Source Category:
    Source Type:  Area
Emission Year:  1990
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_002.
Dataset Date:  Jun 7, 2013 06:27 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG1990.wnd

```



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CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR Na-22  
SOLUBILITY: F  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 200       | 300       | 400       | 500       | 700       | 1000      | 1500      |
| N                 | 8.353E-06 | 6.108E-06 | 4.658E-06 | 3.726E-06 | 2.610E-06 | 1.699E-06 | 9.871E-07 |
| NNW               | 9.198E-06 | 6.311E-06 | 4.722E-06 | 3.722E-06 | 2.495E-06 | 1.536E-06 | 8.691E-07 |
| NW                | 9.525E-06 | 6.374E-06 | 4.690E-06 | 3.608E-06 | 2.317E-06 | 1.386E-06 | 7.735E-07 |
| WNW               | 9.654E-06 | 6.358E-06 | 4.564E-06 | 3.428E-06 | 2.141E-06 | 1.260E-06 | 6.940E-07 |
| W                 | 9.711E-06 | 6.261E-06 | 4.380E-06 | 3.231E-06 | 1.985E-06 | 1.153E-06 | 6.267E-07 |
| WSW               | 9.709E-06 | 6.098E-06 | 4.173E-06 | 3.042E-06 | 1.849E-06 | 1.060E-06 | 5.692E-07 |
| SW                | 9.644E-06 | 5.897E-06 | 3.969E-06 | 2.871E-06 | 1.729E-06 | 9.785E-07 | 5.202E-07 |
| SSW               | 9.520E-06 | 5.677E-06 | 3.777E-06 | 2.718E-06 | 1.622E-06 | 9.067E-07 | 4.781E-07 |
| S                 | 9.348E-06 | 5.457E-06 | 3.601E-06 | 2.579E-06 | 1.525E-06 | 8.433E-07 | 4.417E-07 |
| SSE               | 9.141E-06 | 5.246E-06 | 3.440E-06 | 2.452E-06 | 1.437E-06 | 7.874E-07 | 4.101E-07 |
| SE                | 8.913E-06 | 5.047E-06 | 3.293E-06 | 2.336E-06 | 1.357E-06 | 7.377E-07 | 3.825E-07 |
| ESE               | 8.674E-06 | 4.861E-06 | 3.156E-06 | 2.229E-06 | 1.285E-06 | 6.933E-07 | 3.582E-07 |
| E                 | 8.435E-06 | 4.689E-06 | 3.030E-06 | 2.129E-06 | 1.218E-06 | 6.537E-07 | 3.367E-07 |
| ENE               | 8.199E-06 | 4.527E-06 | 2.912E-06 | 2.037E-06 | 1.158E-06 | 6.180E-07 | 3.175E-07 |
| NE                | 7.970E-06 | 4.376E-06 | 2.801E-06 | 1.951E-06 | 1.102E-06 | 5.858E-07 | 3.003E-07 |
| NNE               | 7.753E-06 | 4.234E-06 | 2.697E-06 | 1.871E-06 | 1.052E-06 | 5.566E-07 | 2.849E-07 |

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 2000      | 3000      | 4000      | 5000      | 7000      | 10000     | 15000     |
| N                 | 6.577E-07 | 3.652E-07 | 2.406E-07 | 1.752E-07 | 1.059E-07 | 6.164E-08 | 3.494E-08 |
| NNW               | 5.727E-07 | 3.123E-07 | 2.051E-07 | 1.488E-07 | 8.970E-08 | 5.223E-08 | 3.015E-08 |
| NW                | 5.039E-07 | 2.698E-07 | 1.765E-07 | 1.277E-07 | 7.690E-08 | 4.487E-08 | 2.622E-08 |
| WNW               | 4.472E-07 | 2.360E-07 | 1.541E-07 | 1.112E-07 | 6.702E-08 | 3.922E-08 | 2.311E-08 |
| W                 | 4.001E-07 | 2.089E-07 | 1.362E-07 | 9.827E-08 | 5.926E-08 | 3.477E-08 | 2.062E-08 |
| WSW               | 3.608E-07 | 1.870E-07 | 1.218E-07 | 8.785E-08 | 5.304E-08 | 3.120E-08 | 1.860E-08 |
| SW                | 3.279E-07 | 1.690E-07 | 1.101E-07 | 7.939E-08 | 4.798E-08 | 2.830E-08 | 1.693E-08 |
| SSW               | 3.001E-07 | 1.540E-07 | 1.004E-07 | 7.237E-08 | 4.379E-08 | 2.588E-08 | 1.553E-08 |
| S                 | 2.763E-07 | 1.414E-07 | 9.218E-08 | 6.645E-08 | 4.026E-08 | 2.383E-08 | 1.434E-08 |
| SSE               | 2.559E-07 | 1.307E-07 | 8.520E-08 | 6.143E-08 | 3.726E-08 | 2.209E-08 | 1.333E-08 |
| SE                | 2.382E-07 | 1.214E-07 | 7.919E-08 | 5.711E-08 | 3.467E-08 | 2.058E-08 | 1.244E-08 |
| ESE               | 2.227E-07 | 1.134E-07 | 7.396E-08 | 5.334E-08 | 3.241E-08 | 1.927E-08 | 1.166E-08 |
| E                 | 2.091E-07 | 1.063E-07 | 6.937E-08 | 5.004E-08 | 3.043E-08 | 1.811E-08 | 1.098E-08 |
| ENE               | 1.970E-07 | 1.001E-07 | 6.532E-08 | 4.713E-08 | 2.868E-08 | 1.708E-08 | 1.037E-08 |
| NE                | 1.861E-07 | 9.451E-08 | 6.170E-08 | 4.452E-08 | 2.711E-08 | 1.617E-08 | 9.823E-09 |
| NNE               | 1.764E-07 | 8.953E-08 | 5.847E-08 | 4.220E-08 | 2.571E-08 | 1.534E-08 | 9.333E-09 |





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CHIQ  
Page 2

GROUND-LEVEL CHI/Q VALUES FOR Na-22  
SOLUBILITY: F  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

---

| Distance (meters) |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 20000     | 30000     | 40000     | 50000     | 80000     |
| N                 | 2.218E-08 | 1.086E-08 | 6.731E-09 | 4.348E-09 | 1.250E-09 |
| NNW               | 1.959E-08 | 1.001E-08 | 6.421E-09 | 4.323E-09 | 1.398E-09 |
| NW                | 1.730E-08 | 9.128E-09 | 5.984E-09 | 4.137E-09 | 1.466E-09 |
| WNW               | 1.542E-08 | 8.331E-09 | 5.543E-09 | 3.902E-09 | 1.480E-09 |
| W                 | 1.388E-08 | 7.632E-09 | 5.134E-09 | 3.662E-09 | 1.463E-09 |
| WSW               | 1.259E-08 | 7.029E-09 | 4.767E-09 | 3.435E-09 | 1.431E-09 |
| SW                | 1.152E-08 | 6.507E-09 | 4.441E-09 | 3.226E-09 | 1.390E-09 |
| SSW               | 1.062E-08 | 6.053E-09 | 4.153E-09 | 3.036E-09 | 1.345E-09 |
| S                 | 9.837E-09 | 5.654E-09 | 3.896E-09 | 2.863E-09 | 1.298E-09 |
| SSE               | 9.165E-09 | 5.304E-09 | 3.668E-09 | 2.707E-09 | 1.252E-09 |
| SE                | 8.577E-09 | 4.993E-09 | 3.463E-09 | 2.566E-09 | 1.207E-09 |
| ESE               | 8.058E-09 | 4.715E-09 | 3.279E-09 | 2.437E-09 | 1.164E-09 |
| E                 | 7.599E-09 | 4.466E-09 | 3.113E-09 | 2.320E-09 | 1.122E-09 |
| ENE               | 7.190E-09 | 4.242E-09 | 2.963E-09 | 2.214E-09 | 1.083E-09 |
| NE                | 6.820E-09 | 4.039E-09 | 2.826E-09 | 2.116E-09 | 1.046E-09 |
| NNE               | 6.488E-09 | 3.854E-09 | 2.701E-09 | 2.026E-09 | 1.011E-09 |

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CHIQ  
Page 3

GROUND-LEVEL CHI/Q VALUES FOR Na-24  
SOLUBILITY: F  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 200       | 300       | 400       | 500       | 700       | 1000      | 1500      |
| N                 | 8.332E-06 | 6.084E-06 | 4.634E-06 | 3.702E-06 | 2.587E-06 | 1.678E-06 | 9.682E-07 |
| NNW               | 9.180E-06 | 6.293E-06 | 4.704E-06 | 3.704E-06 | 2.478E-06 | 1.521E-06 | 8.566E-07 |
| NW                | 9.510E-06 | 6.360E-06 | 4.675E-06 | 3.594E-06 | 2.305E-06 | 1.375E-06 | 7.646E-07 |
| WNW               | 9.641E-06 | 6.346E-06 | 4.552E-06 | 3.417E-06 | 2.131E-06 | 1.252E-06 | 6.873E-07 |
| W                 | 9.701E-06 | 6.250E-06 | 4.370E-06 | 3.222E-06 | 1.978E-06 | 1.147E-06 | 6.215E-07 |
| WSW               | 9.700E-06 | 6.090E-06 | 4.165E-06 | 3.035E-06 | 1.843E-06 | 1.055E-06 | 5.651E-07 |
| SW                | 9.636E-06 | 5.889E-06 | 3.962E-06 | 2.865E-06 | 1.724E-06 | 9.743E-07 | 5.168E-07 |
| SSW               | 9.513E-06 | 5.671E-06 | 3.771E-06 | 2.713E-06 | 1.618E-06 | 9.032E-07 | 4.753E-07 |
| S                 | 9.341E-06 | 5.451E-06 | 3.596E-06 | 2.574E-06 | 1.521E-06 | 8.404E-07 | 4.394E-07 |
| SSE               | 9.135E-06 | 5.240E-06 | 3.436E-06 | 2.448E-06 | 1.434E-06 | 7.848E-07 | 4.082E-07 |
| SE                | 8.908E-06 | 5.042E-06 | 3.289E-06 | 2.333E-06 | 1.355E-06 | 7.355E-07 | 3.808E-07 |
| ESE               | 8.669E-06 | 4.857E-06 | 3.153E-06 | 2.226E-06 | 1.282E-06 | 6.914E-07 | 3.567E-07 |
| E                 | 8.431E-06 | 4.685E-06 | 3.027E-06 | 2.127E-06 | 1.216E-06 | 6.520E-07 | 3.354E-07 |
| ENE               | 8.195E-06 | 4.524E-06 | 2.909E-06 | 2.035E-06 | 1.156E-06 | 6.165E-07 | 3.164E-07 |
| NE                | 7.967E-06 | 4.373E-06 | 2.798E-06 | 1.949E-06 | 1.101E-06 | 5.844E-07 | 2.993E-07 |
| NNE               | 7.749E-06 | 4.231E-06 | 2.695E-06 | 1.869E-06 | 1.050E-06 | 5.554E-07 | 2.840E-07 |

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 2000      | 3000      | 4000      | 5000      | 7000      | 10000     | 15000     |
| N                 | 6.410E-07 | 3.513E-07 | 2.285E-07 | 1.643E-07 | 9.679E-08 | 5.420E-08 | 2.881E-08 |
| NNW               | 5.617E-07 | 3.034E-07 | 1.973E-07 | 1.417E-07 | 8.384E-08 | 4.742E-08 | 2.609E-08 |
| NW                | 4.962E-07 | 2.636E-07 | 1.712E-07 | 1.228E-07 | 7.285E-08 | 4.154E-08 | 2.336E-08 |
| WNW               | 4.415E-07 | 2.315E-07 | 1.502E-07 | 1.077E-07 | 6.407E-08 | 3.677E-08 | 2.099E-08 |
| W                 | 3.958E-07 | 2.055E-07 | 1.333E-07 | 9.560E-08 | 5.701E-08 | 3.291E-08 | 1.899E-08 |
| WSW               | 3.573E-07 | 1.843E-07 | 1.195E-07 | 8.576E-08 | 5.127E-08 | 2.973E-08 | 1.730E-08 |
| SW                | 3.251E-07 | 1.668E-07 | 1.082E-07 | 7.770E-08 | 4.656E-08 | 2.711E-08 | 1.588E-08 |
| SSW               | 2.978E-07 | 1.523E-07 | 9.885E-08 | 7.098E-08 | 4.263E-08 | 2.490E-08 | 1.466E-08 |
| S                 | 2.744E-07 | 1.399E-07 | 9.089E-08 | 6.530E-08 | 3.928E-08 | 2.301E-08 | 1.361E-08 |
| SSE               | 2.543E-07 | 1.294E-07 | 8.411E-08 | 6.045E-08 | 3.643E-08 | 2.139E-08 | 1.270E-08 |
| SE                | 2.368E-07 | 1.204E-07 | 7.826E-08 | 5.627E-08 | 3.396E-08 | 1.998E-08 | 1.190E-08 |
| ESE               | 2.215E-07 | 1.124E-07 | 7.314E-08 | 5.261E-08 | 3.179E-08 | 1.874E-08 | 1.119E-08 |
| E                 | 2.080E-07 | 1.055E-07 | 6.866E-08 | 4.940E-08 | 2.989E-08 | 1.765E-08 | 1.056E-08 |
| ENE               | 1.960E-07 | 9.936E-08 | 6.469E-08 | 4.656E-08 | 2.820E-08 | 1.668E-08 | 1.000E-08 |
| NE                | 1.853E-07 | 9.386E-08 | 6.114E-08 | 4.402E-08 | 2.668E-08 | 1.580E-08 | 9.494E-09 |
| NNE               | 1.757E-07 | 8.896E-08 | 5.797E-08 | 4.175E-08 | 2.533E-08 | 1.502E-08 | 9.037E-09 |



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CHIQ  
Page 4

GROUND-LEVEL CHI/Q VALUES FOR Na-24  
SOLUBILITY: F  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

---

| Distance (meters) |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 20000     | 30000     | 40000     | 50000     | 80000     |
| N                 | 1.715E-08 | 7.386E-09 | 4.024E-09 | 2.285E-09 | 4.466E-10 |
| NNW               | 1.615E-08 | 7.494E-09 | 4.365E-09 | 2.668E-09 | 6.462E-10 |
| NW                | 1.483E-08 | 7.241E-09 | 4.395E-09 | 2.812E-09 | 7.906E-10 |
| WNW               | 1.356E-08 | 6.868E-09 | 4.286E-09 | 2.829E-09 | 8.846E-10 |
| W                 | 1.243E-08 | 6.468E-09 | 4.117E-09 | 2.779E-09 | 9.411E-10 |
| WSW               | 1.144E-08 | 6.081E-09 | 3.930E-09 | 2.699E-09 | 9.726E-10 |
| SW                | 1.058E-08 | 5.721E-09 | 3.741E-09 | 2.603E-09 | 9.860E-10 |
| SSW               | 9.828E-09 | 5.391E-09 | 3.559E-09 | 2.503E-09 | 9.875E-10 |
| S                 | 9.170E-09 | 5.089E-09 | 3.386E-09 | 2.402E-09 | 9.804E-10 |
| SSE               | 8.594E-09 | 4.816E-09 | 3.225E-09 | 2.305E-09 | 9.680E-10 |
| SE                | 8.082E-09 | 4.568E-09 | 3.075E-09 | 2.212E-09 | 9.518E-10 |
| ESE               | 7.626E-09 | 4.341E-09 | 2.937E-09 | 2.123E-09 | 9.332E-10 |
| E                 | 7.218E-09 | 4.135E-09 | 2.809E-09 | 2.040E-09 | 9.134E-10 |
| ENE               | 6.851E-09 | 3.946E-09 | 2.690E-09 | 1.962E-09 | 8.929E-10 |
| NE                | 6.518E-09 | 3.773E-09 | 2.580E-09 | 1.889E-09 | 8.720E-10 |
| NNE               | 6.216E-09 | 3.614E-09 | 2.479E-09 | 1.820E-09 | 8.512E-10 |

---



## ***Appendix C: Test Case 3 Inputs and Reports***

### **C.1 Inputs**

#### ***C.1.1 Dataset***

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Changes Last Saved 6/7/2013 6:33:00 PM  
Reports Last Generated 6/7/2013 6:33:00 PM

ERRORS

CHANGES



### C.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

|          |   |  |      |
|----------|---|--|------|
| Name     | Springfield Nuclear Power Plant             | Emission Year                                  | 2013 |
| Address  | 100 Industrial Way                          | Source Category                                |      |
|          |   |  |      |
| City     | Springfield                                 |  |      |
| Zip      | 49037                                       | (Note: State is found on the Agricultural tab) |      |
| Comments | Intended for Software Testing Purposes Only |  |      |
|          | Version 4.0, Release Candidate 3            |  |      |

|        |         |
|--------|---------|
| ERRORS | CHANGES |
|        |         |



### C.1.3 Population

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Population Population Age: Ten Build up time: 100 years

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Documents and Settings\XPMUser\Documents\CAP88\Population Files\sprg200

File: sprg2000 Springfield

Midpoints: 13

|       |          |          |          |          |          |
|-------|----------|----------|----------|----------|----------|
| 1 - 5 | 250.00   | 750.00   | 1500.00  | 2500.00  | 3500.00  |
| 6-10  | 4500.00  | 7500.00  | 15000.00 | 25000.00 | 35000.00 |
| 11-15 | 45000.00 | 55000.00 | 70000.00 | 0.00     | 0.00     |
| 16-20 | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     |

Maximum Exposed Individual

Direction: auto Midpoint index: 0 Auto-determine

ERRORS

CHANGES



### C.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG2010.

File SPRG2010 Springfield

|                            |         |                |
|----------------------------|---------|----------------|
| Annual Precipitation       | 400.00  | cm/year        |
| Annual Ambient Temperature | 10.00   | Celsius        |
| Lid Height                 | 1000.00 | meters         |
| Absolute Humidity          | 8.00    | grams/cu meter |

ERRORS

CHANGES



### C.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population Meteorological **Sources** Agricultural Nuclides Reports

Source Type Stack

Sources 3

|             | 1     | 2     | 3     |
|-------------|-------|-------|-------|
| ▶ Height(m) | 10.00 | 15.00 | 20.00 |
| Diameter(m) | 2.00  | 1.50  | 1.00  |

Plume Type Fixed

Enter the plume rise for each Pasquill category

|          | A    | B    | C    | D    | E    | F    | G    |
|----------|------|------|------|------|------|------|------|
| ▶ meters | 0.00 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 |

ERRORS

CHANGES





### C.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source: Regional

|                               | Vegetable | Milk | Meat |
|-------------------------------|-----------|------|------|
| Fraction home produced        | 0.0       | 0.0  | 0.0  |
| Fraction from assessment area | 1.0       | 1.0  | 1.0  |
| Fraction imported             | 0.0       | 0.0  | 0.0  |

Agriculture State: Michigan

|   |           |       |
|---|-----------|-------|
| Beef cattle density                     | 7.900e-02 | #/ha2 |
| Milk cattle density                     | 3.510e-02 | #/ha2 |
| Land fraction cultivated for vegetables | 1.700e-02 |       |

ERRORS

CHANGES



### C.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_003.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length max ☐ Radon Only Ac-223 Add

Released Nuclide Count 1 Total Nuclide Count 3 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form   | Type | Size  | RR1       | RR2       | RR3       |
|-----|---------|-------------|------|-------|-----------|-----------|-----------|
| 1   | Fe-60   | Particulate | M    | 1.... | 1.000e-01 | 2.000e-01 | 5.000e-01 |

ERRORS

CHANGES



## C.2 Reports

### C.2.1 Synopsis Report

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: MI                      Zip: 49037

Source Category:  
Source Type: Stack  
Emission Year: 2013  
DOSE Age Group: Ten

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Effective Dose Equivalent  
(mrem/year)

---

5.70E+00

---

At This Location: 2500 Meters West

Dataset Name: Test\_003.  
Dataset Date: Jun 7, 2013 06:33 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind  
p File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population F



Fri Jun 07 18:33:17 2013

SYNOPSIS  
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2500 Meters West  
Lifetime Fatal Cancer Risk: 3.13E-06

ORGAN DOSE EQUIVALENT SUMMARY  
(RN-222 Working Level Calculations Excluded)

| Organ    | Selected<br>Individual<br>(mrem/y) | Collective<br>Population<br>(person-rem/y) |
|----------|------------------------------------|--|
| Adrenal  | 5.05E+00                           | 9.69E+02                                   |
| UB_Wall  | 5.48E+00                           | 1.01E+03                                   |
| Bone_Sur | 7.69E+00                           | 1.49E+03                                   |
| Brain    | 5.33E+00                           | 9.80E+02                                   |
| Breasts  | 5.78E+00                           | 1.06E+03                                   |
| St_Wall  | 5.39E+00                           | 1.01E+03                                   |
| SI_Wall  | 5.36E+00                           | 1.00E+03                                   |
| ULI_Wall | 5.39E+00                           | 1.01E+03                                   |
| LLI_Wall | 5.56E+00                           | 1.04E+03                                   |
| Kidneys  | 5.47E+00                           | 1.04E+03                                   |
| Liver    | 5.44E+00                           | 1.12E+03                                   |
| Muscle   | 6.05E+00                           | 1.12E+03                                   |
| Ovaries  | 5.04E+00                           | 9.46E+02                                   |
| Pancreas | 5.08E+00                           | 9.78E+02                                   |
| R_Marrow | 5.80E+00                           | 1.23E+03                                   |
| Skin     | 6.89E+00                           | 1.25E+03                                   |
| Spleen   | 5.54E+00                           | 1.49E+03                                   |
| Testes   | 6.05E+00                           | 1.11E+03                                   |
| Thymus   | 5.19E+00                           | 9.62E+02                                   |
| Thyroid  | 5.56E+00                           | 1.02E+03                                   |
| GB_Wall  | 5.07E+00                           | 9.69E+02                                   |
| Ht_Wall  | 5.32E+00                           | 9.95E+02                                   |
| Uterus   | 5.26E+00                           | 9.81E+02                                   |
| ET_Reg   | 5.07E+00                           | 9.37E+02                                   |
| Lung_66  | 5.61E+00                           | 1.04E+03                                   |
| Effectiv | 5.70E+00                           | 1.09E+03                                   |



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SYNOPSIS  
Page 2

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

| Risk Range         | # of People | # of People in This Risk Range or Higher | Deaths/Year in This Risk Range | Deaths/Year in This Risk Range or Higher |
|--------------------|-------------|--|--------------------------------|--|
| 1.0E+00 TO 1.0E-01 | 0           | 0  | 0.00E+00                       | 0.00E+00                                 |
| 1.0E-01 TO 1.0E-02 | 0           | 0  | 0.00E+00                       | 0.00E+00                                 |
| 1.0E-02 TO 1.0E-03 | 0           | 0  | 0.00E+00                       | 0.00E+00                                 |
| 1.0E-03 TO 1.0E-04 | 0           | 0  | 0.00E+00                       | 0.00E+00                                 |
| 1.0E-04 TO 1.0E-05 | 0           | 0  | 0.00E+00                       | 0.00E+00                                 |
| 1.0E-05 TO 1.0E-06 | 30667       | 30667                                    | 1.37E-01                       | 1.37E-01                                 |
| LESS THAN 1.0E-06  | 7690426     | 7721093                                  | 1.25E+01                       | 1.26E+01                                 |

RADIONUCLIDE EMISSIONS DURING THE YEAR 2013

| Nuclide | Type | Size  | Source #1 | Source #2 | Source #3 | TOTAL   |
|---------|------|-------|-----------|-----------|-----------|---------|
|         |      |       | Ci/y      | Ci/y      | Ci/y      | Ci/y    |
| Fe-60   | M    | 1.000 | 1.0E-01   | 2.0E-01   | 5.0E-01   | 8.0E-01 |

SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 400.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m



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SYNOPSIS  
Page 3

SOURCE INFORMATION

| Source Number:    | 1     | 2     | 3     |      |      |      |      |
|-------------------|-------|-------|-------|------|------|------|------|
| Stack Height (m): | 10.00 | 15.00 | 20.00 |      |      |      |      |
| Diameter (m):     | 2.00  | 1.50  | 1.00  |      |      |      |      |
| Plume Rise        |       |       |       |      |      |      |      |
| Pasquill Cat:     | A     | B     | C     | D    | E    | F    | G    |
| Fixed (m):        | 0.00  | 1.00  | 2.00  | 3.00 | 4.00 | 5.00 | 6.00 |
| (Fixed Rise)      |       |       |       |      |      |      |      |

AGRICULTURAL DATA

|  | Vegetable | Milk  | Meat  |
|--|-----------|-------|-------|
| Fraction Home Produced:                          | 0.000     | 0.000 | 0.000 |
| Fraction From Assessment Area:                   | 0.621     | 0.325 | 0.089 |
| Fraction Imported:                               | 0.379     | 0.675 | 0.911 |
| Beef Cattle Density:                             | 7.90E-02  |       |       |
| Milk Cattle Density:                             | 3.51E-02  |       |       |
| Land Fraction Cultivated<br>for Vegetable Crops: | 1.70E-02  |       |       |



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SYNOPSIS  
Page 4

POPULATION DATA

| Direction | Distance (m) |     |      |      |      |      |       |
|-----------|--------------|-----|------|------|------|------|-------|
|           | 250          | 750 | 1500 | 2500 | 3500 | 4500 | 7500  |
| N         | 0            | 0   | 0    | 0    | 0    | 0    | 0     |
| NNW       | 0            | 0   | 0    | 0    | 0    | 136  | 6332  |
| NW        | 0            | 0   | 0    | 0    | 1135 | 913  | 13272 |
| WNW       | 0            | 0   | 0    | 0    | 822  | 527  | 4075  |
| W         | 0            | 0   | 0    | 3563 | 687  | 1096 | 4663  |
| WSW       | 0            | 0   | 0    | 0    | 0    | 0    | 2704  |
| SW        | 0            | 0   | 0    | 1236 | 0    | 0    | 7985  |
| SSW       | 0            | 0   | 0    | 0    | 0    | 0    | 15546 |
| S         | 0            | 0   | 0    | 0    | 0    | 0    | 769   |
| SSE       | 0            | 0   | 0    | 0    | 0    | 0    | 2285  |
| SE        | 0            | 0   | 0    | 0    | 0    | 0    | 2071  |
| ESE       | 0            | 0   | 0    | 0    | 0    | 1939 | 6362  |
| E         | 0            | 0   | 948  | 0    | 0    | 0    | 6009  |
| ENE       | 0            | 0   | 0    | 0    | 0    | 1652 | 7339  |
| NE        | 0            | 0   | 0    | 0    | 0    | 3196 | 4873  |
| NNE       | 0            | 0   | 0    | 0    | 0    | 517  | 669   |

| Direction | Distance (m) |        |        |         |        |        |
|-----------|--------------|--------|--------|---------|--------|--------|
|           | 15000        | 25000  | 35000  | 45000   | 55000  | 70000  |
| N         | 17837        | 60195  | 40003  | 46648   | 33974  | 54127  |
| NNW       | 16073        | 15361  | 4313   | 9394    | 18610  | 14131  |
| NW        | 6677         | 2066   | 4683   | 4813    | 5017   | 63578  |
| WNW       | 1767         | 1889   | 11049  | 33685   | 2423   | 24752  |
| W         | 1880         | 1259   | 620    | 5238    | 3579   | 14272  |
| WSW       | 2653         | 1924   | 2502   | 3494    | 2400   | 12507  |
| SW        | 28563        | 4705   | 7373   | 3053    | 4163   | 26410  |
| SSW       | 69828        | 4816   | 0      | 0       | 9238   | 12626  |
| S         | 6570         | 6817   | 8114   | 8514    | 3776   | 21889  |
| SSE       | 4014         | 17320  | 110829 | 29452   | 5970   | 12689  |
| SE        | 43355        | 52598  | 26065  | 67669   | 72448  | 132870 |
| ESE       | 42813        | 111828 | 85315  | 331972  | 571426 | 464790 |
| E         | 74162        | 108275 | 355572 | 1038696 | 643542 | 537    |
| ENE       | 65261        | 110998 | 253330 | 640015  | 331028 | 0      |
| NE        | 39650        | 82149  | 211583 | 138292  | 71533  | 113    |
| NNE       | 37844        | 79888  | 79555  | 43526   | 67118  | 189834 |



## *C.2.2 General Data*

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

G E N E R A L   D A T A

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: MI Zip: 49037

Source Category:  
Source Type: Stack  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_003.  
Dataset Date: Jun 7, 2013 06:33 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind  
Files\SPRG2010.wnd  
Population File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population  
Files\sprg2000.pop





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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| Fe-60   | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| Fe-60   | 1.27E-09                 | 5.48E-05 | 0.00E+00 | 3.00E-04             | 3.00E-02 |

FOOTNOTES:

- (1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)
- (2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)



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GENERAL  
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

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| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| Fe-60   | 1.00E-01                       | 1.00E-03   | 1.00E-01           | 1.00E-01  |

---

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)

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GENERAL  
Page 4

NUMBER OF BEEF CATTLE

| Direction | Distance (meters) |     |      |      |      |      |      |
|-----------|-------------------|-----|------|------|------|------|------|
|           | 250               | 750 | 1500 | 2500 | 3500 | 4500 | 7500 |
| N         | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| NNW       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| NW        | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| WNW       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| W         | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| WSW       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| SW        | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| SSW       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| S         | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| SSE       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| SE        | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| ESE       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| E         | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| ENE       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| NE        | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |
| NNE       | 0                 | 1   | 5    | 8    | 11   | 14   | 116  |

| Direction | Distance (meters) |       |       |       |       |       |
|-----------|-------------------|-------|-------|-------|-------|-------|
|           | 15000             | 25000 | 35000 | 45000 | 55000 | 70000 |
| N         | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| NNW       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| NW        | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| WNW       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| W         | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| WSW       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| SW        | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| SSW       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| S         | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| SSE       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| SE        | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| ESE       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| E         | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| ENE       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| NE        | 465               | 776   | 1086  | 1396  | 1706  | 4343  |
| NNE       | 465               | 776   | 1086  | 1396  | 1706  | 4343  |



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GENERAL  
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NUMBER OF MILK CATTLE

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| Distance (meters) |     |     |      |      |      |      |      |
|-------------------|-----|-----|------|------|------|------|------|
| Direction         | 250 | 750 | 1500 | 2500 | 3500 | 4500 | 7500 |
| N                 | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| NNW               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| NW                | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| WNW               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| W                 | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| WSW               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| SW                | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| SSW               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| S                 | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| SSE               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| SE                | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| ESE               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| E                 | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| ENE               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| NE                | 0   | 1   | 2    | 3    | 5    | 6    | 52   |
| NNE               | 0   | 1   | 2    | 3    | 5    | 6    | 52   |

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| Distance (meters) |       |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|-------|
| Direction         | 15000 | 25000 | 35000 | 45000 | 55000 | 70000 |
| N                 | 207   | 345   | 482   | 620   | 758   | 1930  |
| NNW               | 207   | 345   | 482   | 620   | 758   | 1930  |
| NW                | 207   | 345   | 482   | 620   | 758   | 1930  |
| WNW               | 207   | 345   | 482   | 620   | 758   | 1930  |
| W                 | 207   | 345   | 482   | 620   | 758   | 1930  |
| WSW               | 207   | 345   | 482   | 620   | 758   | 1930  |
| SW                | 207   | 345   | 482   | 620   | 758   | 1930  |
| SSW               | 207   | 345   | 482   | 620   | 758   | 1930  |
| S                 | 207   | 345   | 482   | 620   | 758   | 1930  |
| SSE               | 207   | 345   | 482   | 620   | 758   | 1930  |
| SE                | 207   | 345   | 482   | 620   | 758   | 1930  |
| ESE               | 207   | 345   | 482   | 620   | 758   | 1930  |
| E                 | 207   | 345   | 482   | 620   | 758   | 1930  |
| ENE               | 207   | 345   | 482   | 620   | 758   | 1930  |
| NE                | 207   | 345   | 482   | 620   | 758   | 1930  |
| NNE               | 207   | 345   | 482   | 620   | 758   | 1930  |

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GENERAL  
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AREA OF VEGETABLE CROP PRODUCTION (M\*\*2)

| Direction | Distance (meters) |         |         |         |         |         |         |
|-----------|-------------------|---------|---------|---------|---------|---------|---------|
|           | 250               | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N         | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| NNW       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| NW        | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| WNW       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| W         | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| WSW       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| SW        | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| SSW       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| S         | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| SSE       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| SE        | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| ESE       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| E         | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| ENE       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| NE        | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |
| NNE       | 0.0E+00           | 2.5E+03 | 1.0E+04 | 1.7E+04 | 2.3E+04 | 3.0E+04 | 2.5E+05 |

| Direction | Distance (meters) |         |         |         |         |         |
|-----------|-------------------|---------|---------|---------|---------|---------|
|           | 15000             | 25000   | 35000   | 45000   | 55000   | 70000   |
| N         | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| NNW       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| NW        | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| WNW       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| W         | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| WSW       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| SW        | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| SSW       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| S         | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| SSE       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| SE        | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| ESE       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| E         | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| ENE       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| NE        | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |
| NNE       | 1.0E+06           | 1.7E+06 | 2.3E+06 | 3.0E+06 | 3.7E+06 | 9.3E+06 |



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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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HUMAN INHALATION RATE  
Cubic meters/yr 3.73E+03

SOIL PARAMETERS  
Effective surface density (kg/sq m, dry weight)  
(Assumes 15 cm plow layer) 2.15E+02

BUILDUP TIMES  
For activity in soil (years) 1.00E+02  
For radionuclides deposited on ground/water (days) 3.65E+04

DELAY TIMES  
Ingestion of pasture grass by animals (hr) 0.00E+00  
Ingestion of stored feed by animals (hr) 2.16E+03  
Ingestion of leafy vegetables by man (hr) 3.36E+02  
Ingestion of produce by man (hr) 3.36E+02  
Transport time from animal feed-milk-man (day) 2.00E+00  
Time from slaughter to consumption (day) 2.00E+01

WEATHERING  
Removal rate constant for physical loss (per hr) 2.90E-03

CROP EXPOSURE DURATION  
Pasture grass (hr) 7.20E+02  
Crops/leafy vegetables (hr) 1.44E+03

AGRICULTURAL PRODUCTIVITY  
Grass-cow-milk-man pathway (kg/sq m) 2.80E-01  
Produce/leafy veg for human consumption (kg/sq m) 7.16E-01

FALLOUT INTERCEPTION FRACTIONS  
Vegetables 2.00E-01  
Pasture 5.70E-01

GRAZING PARAMETERS  
Fraction of year animals graze on pasture 4.00E-01  
Fraction of daily feed that is pasture grass  
when animal grazes on pasture 4.30E-01

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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Actual fractions of food types from outside area can  
be greater than the minimum fractions listed below.)

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 4.63E+01

Milk ingestion (L/y) 1.13E+02

Meat ingestion (kg/y) 6.40E+01

Leafy vegetable ingestion (kg/y) 4.73E+00

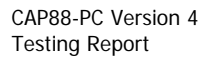
SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

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Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: MI                               Zip: 49037
```

```
Source Category:
Source Type: Stack
Emission Year: 2013
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name: Test_003.
Dataset Date: Jun 7, 2013 06:33 PM
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG2010.wnd
Population File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population
Files\sprg2000.pop

```



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WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |



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WEATHER  
Page 2

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

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| Pasquill Stability Class |   |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|---|
| Dir                      | A | B | C | D | E | F | G |

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|       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| N     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

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ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 400.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *C.2.4 Dose and Risk Equivalent Summaries*

### D O S E   A N D   R I S K   E Q U I V A L E N T   S U M M A R I E S

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: MI                      Zip: 49037

Source Category:  
Source Type: Stack  
Emission Year: 2013  
DOSE Age Group: Ten

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_003.  
Dataset Date: Jun 7, 2013 06:33 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG2010.wnd  
Pop File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population Files\sprg2000.pop



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SUMMARY  
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem/y) | Collective<br>Population<br>(person-rem/y) |
|----------|------------------------------------|--|
| Adrenal  | 5.05E+00                           | 9.69E+02                                   |
| UB_Wall  | 5.48E+00                           | 1.01E+03                                   |
| Bone_Sur | 7.69E+00                           | 1.49E+03                                   |
| Brain    | 5.33E+00                           | 9.80E+02                                   |
| Breasts  | 5.78E+00                           | 1.06E+03                                   |
| St_Wall  | 5.39E+00                           | 1.01E+03                                   |
| SI_Wall  | 5.36E+00                           | 1.00E+03                                   |
| ULI_Wall | 5.39E+00                           | 1.01E+03                                   |
| LLI_Wall | 5.56E+00                           | 1.04E+03                                   |
| Kidneys  | 5.47E+00                           | 1.04E+03                                   |
| Liver    | 5.44E+00                           | 1.12E+03                                   |
| Muscle   | 6.05E+00                           | 1.12E+03                                   |
| Ovaries  | 5.04E+00                           | 9.46E+02                                   |
| Pancreas | 5.08E+00                           | 9.78E+02                                   |
| R_Marrow | 5.80E+00                           | 1.23E+03                                   |
| Skin     | 6.89E+00                           | 1.25E+03                                   |
| Spleen   | 5.54E+00                           | 1.49E+03                                   |
| Testes   | 6.05E+00                           | 1.11E+03                                   |
| Thymus   | 5.19E+00                           | 9.62E+02                                   |
| Thyroid  | 5.56E+00                           | 1.02E+03                                   |
| GB_Wall  | 5.07E+00                           | 9.69E+02                                   |
| Ht_Wall  | 5.32E+00                           | 9.95E+02                                   |
| Uterus   | 5.26E+00                           | 9.81E+02                                   |
| ET_Reg   | 5.07E+00                           | 9.37E+02                                   |
| Lung_66  | 5.61E+00                           | 1.04E+03                                   |
| Effectiv | 5.70E+00                           | 1.09E+03                                   |

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem/y) | Collective<br>Population<br>(person-rem/y) |
|----------------|------------------------------------|--|
| INGESTION      | 1.08E-02                           | 8.34E+01                                   |
| INHALATION     | 1.19E-02                           | 1.28E+00                                   |
| AIR IMMERSION  | 1.01E-07                           | 1.51E-05                                   |
| GROUND SURFACE | 5.67E+00                           | 1.01E+03                                   |
| INTERNAL       | 2.27E-02                           | 8.47E+01                                   |
| EXTERNAL       | 5.67E+00                           | 1.01E+03                                   |
| TOTAL          | 5.70E+00                           | 1.09E+03                                   |



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SUMMARY  
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclides | Selected<br>Individual<br>(mrem/y) | Collective<br>Population<br>(person-rem/y) |
|----------|------------------------------------|--|
| Fe-60    | 2.27E-02                           | 8.47E+01                                   |
| Co-60m   | 1.23E-02                           | 2.20E+00                                   |
| Co-60    | 5.66E+00                           | 1.01E+03                                   |
| TOTAL    | 5.70E+00                           | 1.09E+03                                   |



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SUMMARY  
Page 3

CANCER RISK SUMMARY

| Cancer   | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths/y) |
|----------|--|---|
| Esophagu | 5.62E-08   | 1.30E-04  |
| Stomach  | 2.17E-07   | 5.00E-04  |
| Colon    | 5.62E-07   | 1.30E-03  |
| Liver    | 8.19E-08   | 1.89E-04  |
| LUNG     | 5.48E-07   | 1.26E-03  |
| Bone     | 7.26E-09   | 1.67E-05  |
| Skin     | 6.85E-09   | 1.58E-05  |
| Breast   | 2.79E-07   | 6.42E-04  |
| Ovary    | 7.15E-08   | 1.65E-04  |
| Bladder  | 1.32E-07   | 3.05E-04  |
| Kidneys  | 2.84E-08   | 6.54E-05  |
| Thyroid  | 1.77E-08   | 4.07E-05  |
| Leukemia | 3.23E-07   | 7.45E-04  |
| Residual | 7.99E-07   | 1.84E-03  |
| Total    | 3.13E-06   | 7.22E-03  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths/y) |
|----------------|--|---|
| INGESTION      | 4.51E-11   | 4.51E-06  |
| INHALATION     | 7.78E-10   | 1.09E-06  |
| AIR IMMERSION  | 5.21E-14   | 1.02E-10  |
| GROUND SURFACE | 3.13E-06   | 7.22E-03  |
| INTERNAL       | 8.23E-10   | 5.60E-06  |
| EXTERNAL       | 3.13E-06   | 7.22E-03  |
| TOTAL          | 3.13E-06   | 7.22E-03  |



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SUMMARY  
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NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths/y) |
|---------|--|---|
| Fe-60   | 8.52E-10   | 5.66E-06  |
| Co-60m  | 6.46E-09   | 1.49E-05  |
| Co-60   | 3.13E-06   | 7.20E-03  |
| TOTAL   | 3.13E-06   | 7.22E-03  |





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SUMMARY  
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 250          | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.5E+00 | 2.3E+00 |
| NW        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.2E+00 | 3.8E+00 | 2.0E+00 |
| WNW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.4E+00 | 3.2E+00 | 1.7E+00 |
| W         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 5.7E+00 | 3.8E+00 | 2.8E+00 | 1.5E+00 |
| WSW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.4E+00 |
| SW        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 4.5E+00 | 0.0E+00 | 0.0E+00 | 1.2E+00 |
| SSW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.1E+00 |
| S         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.0E+00 |
| SSE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 9.6E-01 |
| SSE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 9.0E-01 |
| ESE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.5E+00 | 8.4E-01 |
| E         | 0.0E+00      | 0.0E+00 | 4.9E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.9E-01 |
| ENE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.3E+00 | 7.5E-01 |
| NE        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.3E+00 | 7.1E-01 |
| NNE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.2E+00 | 6.7E-01 |

| Direction | Distance (m) |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|
|           | 15000        | 25000   | 35000   | 45000   | 55000   | 70000   |
| N         | 9.4E-01      | 3.4E-01 | 1.6E-01 | 8.6E-02 | 4.9E-02 | 2.5E-02 |
| NNW       | 8.6E-01      | 3.5E-01 | 1.8E-01 | 1.1E-01 | 6.6E-02 | 3.6E-02 |
| NW        | 7.7E-01      | 3.4E-01 | 1.9E-01 | 1.2E-01 | 7.6E-02 | 4.3E-02 |
| WNW       | 7.0E-01      | 3.2E-01 | 1.9E-01 | 1.2E-01 | 8.2E-02 | 4.9E-02 |
| W         | 6.4E-01      | 3.1E-01 | 1.8E-01 | 1.2E-01 | 8.4E-02 | 5.2E-02 |
| WSW       | 5.8E-01      | 2.9E-01 | 1.8E-01 | 1.2E-01 | 8.5E-02 | 5.4E-02 |
| SW        | 5.4E-01      | 2.7E-01 | 1.7E-01 | 1.2E-01 | 8.4E-02 | 5.5E-02 |
| SSW       | 5.0E-01      | 2.5E-01 | 0.0E+00 | 0.0E+00 | 8.3E-02 | 5.6E-02 |
| S         | 4.6E-01      | 2.4E-01 | 1.6E-01 | 1.1E-01 | 8.2E-02 | 5.5E-02 |
| SSE       | 4.3E-01      | 2.3E-01 | 1.5E-01 | 1.1E-01 | 8.0E-02 | 5.5E-02 |
| SSE       | 4.0E-01      | 2.2E-01 | 1.4E-01 | 1.0E-01 | 7.8E-02 | 5.4E-02 |
| ESE       | 3.8E-01      | 2.1E-01 | 1.4E-01 | 9.9E-02 | 7.6E-02 | 5.4E-02 |
| E         | 3.6E-01      | 2.0E-01 | 1.3E-01 | 9.6E-02 | 7.4E-02 | 5.3E-02 |
| ENE       | 3.4E-01      | 1.9E-01 | 1.3E-01 | 9.3E-02 | 7.2E-02 | 0.0E+00 |
| NE        | 3.3E-01      | 1.8E-01 | 1.2E-01 | 9.0E-02 | 7.0E-02 | 5.1E-02 |
| NNE       | 3.1E-01      | 1.7E-01 | 1.2E-01 | 8.7E-02 | 6.8E-02 | 5.0E-02 |



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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 6.2E-01 | 1.5E+01 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.8E+00 | 3.5E+00 | 2.6E+01 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.6E+00 | 1.7E+00 | 7.0E+00 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.0E+01 | 2.6E+00 | 3.1E+00 | 7.1E+00 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.7E+00 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.6E+00 | 0.0E+00 | 0.0E+00 | 9.9E+00 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.8E+01 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 8.0E-01 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.2E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.9E+00 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.9E+00 | 5.3E+00 |
| E            | 0.0E+00 | 0.0E+00 | 4.7E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.7E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.2E+00 | 5.5E+00 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.0E+00 | 3.4E+00 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 6.1E-01 | 4.5E-01 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 1.7E+01 | 2.0E+01 | 6.5E+00 | 4.0E+00 | 1.7E+00 | 1.4E+00 |
| NNW          | 1.4E+01 | 5.4E+00 | 8.0E-01 | 1.0E+00 | 1.2E+00 | 5.0E-01 |
| NW           | 5.2E+00 | 7.0E-01 | 8.9E-01 | 5.7E-01 | 3.8E-01 | 2.8E+00 |
| WNW          | 1.2E+00 | 6.1E-01 | 2.1E+00 | 4.1E+00 | 2.0E-01 | 1.2E+00 |
| W            | 1.2E+00 | 3.8E-01 | 1.1E-01 | 6.4E-01 | 3.0E-01 | 7.4E-01 |
| WSW          | 1.5E+00 | 5.5E-01 | 4.4E-01 | 4.2E-01 | 2.0E-01 | 6.8E-01 |
| SW           | 1.5E+01 | 1.3E+00 | 1.3E+00 | 3.6E-01 | 3.5E-01 | 1.5E+00 |
| SSW          | 3.5E+01 | 1.2E+00 | 0.0E+00 | 0.0E+00 | 7.7E-01 | 7.0E-01 |
| S            | 3.0E+00 | 1.6E+00 | 1.3E+00 | 9.4E-01 | 3.1E-01 | 1.2E+00 |
| SSE          | 1.7E+00 | 4.0E+00 | 1.7E+01 | 3.1E+00 | 4.8E-01 | 7.0E-01 |
| SSE          | 1.8E+01 | 1.1E+01 | 3.7E+00 | 7.0E+00 | 5.6E+00 | 7.2E+00 |
| ESE          | 1.6E+01 | 2.3E+01 | 1.2E+01 | 3.3E+01 | 4.3E+01 | 2.5E+01 |
| E            | 2.7E+01 | 2.1E+01 | 4.7E+01 | 1.0E+02 | 4.8E+01 | 2.8E-02 |
| ENE          | 2.2E+01 | 2.1E+01 | 3.2E+01 | 6.0E+01 | 2.4E+01 | 0.0E+00 |
| NE           | 1.3E+01 | 1.5E+01 | 2.6E+01 | 1.2E+01 | 5.0E+00 | 5.8E-03 |
| NNE          | 1.2E+01 | 1.4E+01 | 9.3E+00 | 3.8E+00 | 4.6E+00 | 9.5E+00 |



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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.5E-06 | 1.3E-06 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.8E-06 | 2.1E-06 | 1.1E-06 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.4E-06 | 1.8E-06 | 9.4E-07 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.1E-06 | 2.1E-06 | 1.6E-06 | 8.3E-07 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.5E-07 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.5E-06 | 0.0E+00 | 0.0E+00 | 6.8E-07 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 6.2E-07 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.7E-07 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.3E-07 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.9E-07 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 8.2E-07 | 4.6E-07 |
| E            | 0.0E+00 | 0.0E+00 | 2.7E-06 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.3E-07 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.3E-07 | 4.1E-07 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 6.9E-07 | 3.8E-07 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 6.5E-07 | 3.6E-07 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 5.1E-07 | 1.8E-07 | 8.3E-08 | 4.2E-08 | 2.1E-08 | 8.1E-09 |
| NNW          | 4.7E-07 | 1.9E-07 | 9.6E-08 | 5.3E-08 | 3.0E-08 | 1.4E-08 |
| NW           | 4.2E-07 | 1.8E-07 | 9.9E-08 | 5.9E-08 | 3.6E-08 | 1.8E-08 |
| WNW          | 3.8E-07 | 1.7E-07 | 9.8E-08 | 6.1E-08 | 3.9E-08 | 2.1E-08 |
| W            | 3.4E-07 | 1.6E-07 | 9.6E-08 | 6.1E-08 | 4.1E-08 | 2.3E-08 |
| WSW          | 3.1E-07 | 1.5E-07 | 9.2E-08 | 6.0E-08 | 4.1E-08 | 2.4E-08 |
| SW           | 2.9E-07 | 1.4E-07 | 8.8E-08 | 5.9E-08 | 4.1E-08 | 2.5E-08 |
| SSW          | 2.7E-07 | 1.3E-07 | 0.0E+00 | 0.0E+00 | 4.0E-08 | 2.5E-08 |
| S            | 2.5E-07 | 1.3E-07 | 8.0E-08 | 5.5E-08 | 3.9E-08 | 2.5E-08 |
| SSE          | 2.3E-07 | 1.2E-07 | 7.6E-08 | 5.3E-08 | 3.8E-08 | 2.4E-08 |
| SSE          | 2.2E-07 | 1.1E-07 | 7.3E-08 | 5.1E-08 | 3.7E-08 | 2.4E-08 |
| ESE          | 2.0E-07 | 1.1E-07 | 7.0E-08 | 4.9E-08 | 3.6E-08 | 2.4E-08 |
| E            | 1.9E-07 | 1.0E-07 | 6.7E-08 | 4.7E-08 | 3.5E-08 | 2.3E-08 |
| ENE          | 1.8E-07 | 9.8E-08 | 6.4E-08 | 4.5E-08 | 3.4E-08 | 0.0E+00 |
| NE           | 1.7E-07 | 9.3E-08 | 6.1E-08 | 4.4E-08 | 3.3E-08 | 2.2E-08 |
| NNE          | 1.7E-07 | 8.9E-08 | 5.9E-08 | 4.2E-08 | 3.2E-08 | 2.2E-08 |



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SUMMARY  
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COLLECTIVE FATAL CANCER RATE (deaths/y)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 250          | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.4E-06 | 1.0E-04 |
| NW        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.2E-05 | 2.5E-05 | 1.9E-04 |
| WNW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.6E-05 | 1.2E-05 | 5.0E-05 |
| W         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 1.4E-04 | 1.9E-05 | 2.2E-05 | 5.0E-05 |
| WSW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.6E-05 |
| SW        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 4.0E-05 | 0.0E+00 | 0.0E+00 | 7.0E-05 |
| SSW       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.2E-04 |
| S         | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.7E-06 |
| SSE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.6E-05 |
| SSE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.3E-05 |
| ESE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.1E-05 | 3.8E-05 |
| E         | 0.0E+00      | 0.0E+00 | 3.3E-05 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.3E-05 |
| ENE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.6E-05 | 3.9E-05 |
| NE        | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 2.8E-05 | 2.4E-05 |
| NNE       | 0.0E+00      | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.3E-06 | 3.1E-06 |

| Direction | Distance (m) |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|
|           | 15000        | 25000   | 35000   | 45000   | 55000   | 70000   |
| N         | 1.2E-04      | 1.4E-04 | 4.3E-05 | 2.5E-05 | 9.4E-06 | 5.7E-06 |
| NNW       | 9.7E-05      | 3.7E-05 | 5.4E-06 | 6.5E-06 | 7.4E-06 | 2.5E-06 |
| NW        | 3.6E-05      | 4.9E-06 | 6.0E-06 | 3.7E-06 | 2.3E-06 | 1.5E-05 |
| WNW       | 8.7E-06      | 4.2E-06 | 1.4E-05 | 2.7E-05 | 1.2E-06 | 6.7E-06 |
| W         | 8.4E-06      | 2.6E-06 | 7.7E-07 | 4.1E-06 | 1.9E-06 | 4.2E-06 |
| WSW       | 1.1E-05      | 3.8E-06 | 3.0E-06 | 2.7E-06 | 1.3E-06 | 3.9E-06 |
| SW        | 1.1E-04      | 8.7E-06 | 8.4E-06 | 2.3E-06 | 2.2E-06 | 8.4E-06 |
| SSW       | 2.4E-04      | 8.4E-06 | 0.0E+00 | 0.0E+00 | 4.8E-06 | 4.0E-06 |
| S         | 2.1E-05      | 1.1E-05 | 8.4E-06 | 6.0E-06 | 1.9E-06 | 7.0E-06 |
| SSE       | 1.2E-05      | 2.7E-05 | 1.1E-04 | 2.0E-05 | 2.9E-06 | 4.0E-06 |
| SSE       | 1.2E-04      | 7.7E-05 | 2.5E-05 | 4.5E-05 | 3.5E-05 | 4.2E-05 |
| ESE       | 1.1E-04      | 1.6E-04 | 7.7E-05 | 2.1E-04 | 2.7E-04 | 1.4E-04 |
| E         | 1.9E-04      | 1.4E-04 | 3.1E-04 | 6.3E-04 | 2.9E-04 | 1.6E-07 |
| ENE       | 1.5E-04      | 1.4E-04 | 2.1E-04 | 3.8E-04 | 1.4E-04 | 0.0E+00 |
| NE        | 8.9E-05      | 9.9E-05 | 1.7E-04 | 7.8E-05 | 3.0E-05 | 3.3E-08 |
| NNE       | 8.1E-05      | 9.2E-05 | 6.1E-05 | 2.4E-05 | 2.8E-05 | 5.3E-05 |



### *C.2.5 Dose and Risk Conversion Factors*

#### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: MI                      Zip: 49037

Source Category:  
Source Type: Stack  
Emission Year: 2013  
DOSE Age Group: Ten

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_003.  
Dataset Date: Jun 7, 2013 06:33 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG2010.wnd  
Pop File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population Files\sprg2000.pop



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FACTOR  
Page 1

#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie/year intake rate, where the average lifetime is 70.7565 years.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units   |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries                |
| Inhalation | lifetime risk/100,000 picoCuries                |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie-years  |
| Surface    | lifetime risk-square cm/100,000 picoCurie-years |



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FACTOR  
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\*\*\*\*\*  
\* NUCLIDE Fe-60 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Ten

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 8.029E-04 | 4.447E-04  | 2.435E+04        | 1.293E+01         |
| UB_Wall  | 4.033E-04 | 2.215E-04  | 2.901E+04        | 1.713E+01         |
| Bone_Sur | 1.417E-03 | 7.711E-04  | 1.678E+05        | 9.879E+01         |
| Brain    | 3.500E-04 | 1.926E-04  | 3.332E+04        | 1.247E+01         |
| Breasts  | 3.578E-04 | 1.986E-04  | 7.864E+04        | 4.963E+01         |
| St_Wall  | 5.846E-04 | 3.235E-04  | 3.087E+04        | 1.701E+01         |
| SI_Wall  | 5.661E-04 | 3.122E-04  | 2.109E+04        | 1.164E+01         |
| ULI_Wall | 5.624E-04 | 3.067E-04  | 2.388E+04        | 1.316E+01         |
| LLI_Wall | 5.624E-04 | 2.997E-04  | 2.120E+04        | 1.212E+01         |
| Kidneys  | 7.215E-04 | 3.985E-04  | 3.577E+04        | 2.074E+01         |
| Liver    | 1.746E-03 | 9.616E-04  | 3.122E+04        | 1.689E+01         |
| Muscle   | 4.403E-04 | 2.424E-04  | 4.800E+04        | 3.565E+01         |
| Ovaries  | 5.513E-04 | 3.041E-04  | 1.852E+04        | 1.114E+01         |
| Pancreas | 8.547E-04 | 4.732E-04  | 1.911E+04        | 1.011E+01         |
| R_Marrow | 2.224E-03 | 1.211E-03  | 3.006E+04        | 1.608E+01         |
| Skin     | 3.108E-04 | 1.713E-04  | 7.654E+07        | 1.351E+02         |
| Spleen   | 5.735E-03 | 3.141E-03  | 3.052E+04        | 1.654E+01         |
| Testes   | 3.467E-04 | 1.907E-04  | 5.930E+04        | 4.439E+01         |
| Thymus   | 4.403E-04 | 2.441E-04  | 3.844E+04        | 1.992E+01         |
| Thyroid  | 4.033E-04 | 2.223E-04  | 5.126E+04        | 2.645E+01         |
| GB_Wall  | 7.474E-04 | 4.137E-04  | 2.307E+04        | 1.200E+01         |
| Ht_Wall  | 5.624E-04 | 3.116E-04  | 2.784E+04        | 1.480E+01         |
| Uterus   | 5.069E-04 | 2.802E-04  | 1.957E+04        | 1.104E+01         |
| ET_Reg   | 4.033E-04 | 2.610E-04  | 1.911E+04        | 1.011E+01         |
| Lung_66  | 5.069E-04 | 4.273E-04  | 3.786E+04        | 1.934E+01         |
| Effectiv | 9.139E-04 | 5.195E-04  | 8.073E+05        | 2.668E+01         |

RISK CONVERSION FACTORS FOR: Ten

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 1.891E-10 | 3.370E-08  | 2.144E-05        | 9.646E-09         |
| Stomach  | 1.761E-08 | 2.236E-07  | 1.247E-04        | 6.862E-08         |
| Colon    | 3.349E-07 | 4.562E-07  | 2.342E-04        | 1.316E-07         |
| Liver    | 1.043E-09 | 1.739E-07  | 4.730E-05        | 2.563E-08         |
| LUNG     | 2.816E-09 | 6.619E-07  | 3.705E-04        | 1.887E-07         |
| Bone     | 3.774E-11 | 8.466E-09  | 1.596E-05        | 9.378E-09         |
| Skin     | 2.893E-11 | 2.318E-09  | 7.642E-03        | 1.351E-08         |
| Breast   | 1.084E-09 | 1.453E-07  | 3.798E-04        | 2.400E-07         |
| Ovary    | 4.403E-09 | 5.291E-08  | 2.633E-05        | 1.584E-08         |
| Bladder  | 3.652E-09 | 5.942E-08  | 7.013E-05        | 4.136E-08         |
| Kidneys  | 3.848E-10 | 2.486E-08  | 1.864E-05        | 1.079E-08         |
| Thyroid  | 6.697E-11 | 9.583E-09  | 1.631E-05        | 8.423E-09         |
| Leukemia | 4.033E-09 | 6.364E-07  | 1.689E-04        | 9.029E-08         |
| Residual | 1.025E-08 | 9.180E-07  | 4.532E-04        | 2.912E-07         |
| Total    | 3.811E-07 | 3.407E-06  | 9.588E-03        | 1.145E-06         |



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\* NUCLIDE Co-60m :Particulate \*  
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DOSE RATE CONVERSION FACTORS FOR: Ten

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 2.061E-10 | 1.771E-10  | 1.887E+07        | 4.019E+03         |
| UB_Wall  | 1.465E-10 | 7.644E-11  | 1.934E+07        | 4.509E+03         |
| Bone_Sur | 1.498E-10 | 1.099E-10  | 4.520E+07        | 1.026E+04         |
| Brain    | 9.916E-11 | 6.031E-11  | 2.446E+07        | 4.276E+03         |
| Breasts  | 1.054E-10 | 1.709E-10  | 2.773E+07        | 5.021E+03         |
| St_Wall  | 9.768E-08 | 1.033E-08  | 2.062E+07        | 4.450E+03         |
| SI_Wall  | 1.695E-08 | 1.872E-09  | 1.841E+07        | 4.241E+03         |
| ULI_Wall | 2.239E-09 | 3.204E-10  | 1.911E+07        | 4.334E+03         |
| LLI_Wall | 4.366E-10 | 1.391E-10  | 1.876E+07        | 4.404E+03         |
| Kidneys  | 1.939E-10 | 1.069E-10  | 2.109E+07        | 4.544E+03         |
| Liver    | 3.260E-10 | 1.999E-10  | 2.097E+07        | 4.474E+03         |
| Muscle   | 1.384E-10 | 1.053E-10  | 2.307E+07        | 5.079E+03         |
| Ovaries  | 2.364E-10 | 8.850E-11  | 1.876E+07        | 4.031E+03         |
| Pancreas | 3.700E-10 | 1.710E-10  | 1.806E+07        | 4.008E+03         |
| R_Marrow | 1.410E-10 | 1.035E-10  | 2.214E+07        | 4.555E+03         |
| Skin     | 8.991E-11 | 6.767E-11  | 3.891E+07        | 2.481E+04         |
| Spleen   | 2.468E-10 | 1.465E-10  | 2.097E+07        | 4.485E+03         |
| Testes   | 1.151E-10 | 5.321E-11  | 2.412E+07        | 5.196E+03         |
| Thymus   | 1.258E-10 | 1.899E-10  | 2.225E+07        | 4.427E+03         |
| Thyroid  | 1.251E-10 | 1.074E-10  | 2.435E+07        | 4.672E+03         |
| GB_Wall  | 2.893E-10 | 1.208E-10  | 1.899E+07        | 4.054E+03         |
| Ht_Wall  | 1.746E-10 | 2.510E-10  | 2.039E+07        | 4.334E+03         |
| Uterus   | 2.098E-10 | 7.933E-11  | 1.794E+07        | 4.159E+03         |
| ET_Reg   | 1.251E-10 | 7.948E-09  | 1.806E+07        | 4.008E+03         |
| Lung_66  | 1.436E-10 | 3.092E-08  | 2.330E+07        | 4.718E+03         |
| Effectiv | 1.206E-08 | 5.054E-09  | 2.260E+07        | 4.940E+03         |

RISK CONVERSION FACTORS FOR: Ten

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 3.552E-12 | 2.630E-14  | 2.167E-02        | 4.345E-06         |
| Stomach  | 8.362E-09 | 7.677E-12  | 8.330E-02        | 1.794E-05         |
| Colon    | 1.376E-08 | 6.723E-13  | 1.957E-01        | 4.509E-05         |
| Liver    | 1.188E-11 | 3.633E-14  | 3.180E-02        | 6.780E-06         |
| LUNG     | 5.735E-11 | 7.111E-11  | 2.283E-01        | 4.613E-05         |
| Bone     | 7.178E-13 | 1.238E-15  | 4.287E-03        | 9.751E-07         |
| Skin     | 4.625E-13 | 1.189E-15  | 3.879E-03        | 2.481E-06         |
| Breast   | 2.427E-11 | 1.967E-13  | 1.340E-01        | 2.423E-05         |
| Ovary    | 2.923E-11 | 1.534E-14  | 2.668E-02        | 5.732E-06         |
| Bladder  | 5.069E-11 | 1.999E-14  | 4.672E-02        | 1.090E-05         |
| Kidneys  | 4.736E-12 | 6.701E-15  | 1.097E-02        | 2.365E-06         |
| Thyroid  | 1.454E-12 | 7.874E-15  | 7.747E-03        | 1.491E-06         |
| Leukemia | 3.496E-11 | 5.728E-14  | 1.247E-01        | 2.551E-05         |
| Residual | 1.802E-10 | 4.817E-13  | 2.982E-01        | 6.501E-05         |
| Total    | 2.250E-08 | 8.033E-11  | 1.212E+00        | 2.586E-04         |





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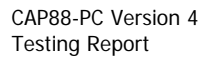
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\* NUCLIDE Co-60 :Particulate \*  
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DOSE RATE CONVERSION FACTORS FOR: Ten

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 4.107E-05 | 4.022E-05  | 1.212E+10        | 2.377E+06         |
| UB_Wall  | 3.171E-05 | 1.206E-05  | 1.212E+10        | 2.586E+06         |
| Bone_Sur | 3.274E-05 | 2.157E-05  | 2.062E+10        | 3.612E+06         |
| Brain    | 2.490E-05 | 1.095E-05  | 1.561E+10        | 2.516E+06         |
| Breasts  | 2.250E-05 | 3.866E-05  | 1.619E+10        | 2.726E+06         |
| St_Wall  | 3.452E-05 | 2.479E-05  | 1.293E+10        | 2.540E+06         |
| SI_Wall  | 4.810E-05 | 1.982E-05  | 1.200E+10        | 2.528E+06         |
| ULI_Wall | 6.068E-05 | 2.396E-05  | 1.223E+10        | 2.540E+06         |
| LLI_Wall | 8.732E-05 | 3.035E-05  | 1.223E+10        | 2.621E+06         |
| Kidneys  | 3.774E-05 | 2.278E-05  | 1.305E+10        | 2.575E+06         |
| Liver    | 7.400E-05 | 4.662E-05  | 1.316E+10        | 2.551E+06         |
| Muscle   | 2.960E-05 | 2.100E-05  | 1.410E+10        | 2.854E+06         |
| Ovaries  | 4.736E-05 | 1.824E-05  | 1.247E+10        | 2.377E+06         |
| Pancreas | 4.292E-05 | 3.461E-05  | 1.177E+10        | 2.388E+06         |
| R_Marrow | 3.163E-05 | 2.190E-05  | 1.433E+10        | 2.714E+06         |
| Skin     | 2.017E-05 | 1.315E-05  | 1.689E+10        | 3.227E+06         |
| Spleen   | 3.419E-05 | 3.070E-05  | 1.316E+10        | 2.551E+06         |
| Testes   | 2.812E-05 | 1.035E-05  | 1.433E+10        | 2.854E+06         |
| Thymus   | 3.001E-05 | 3.985E-05  | 1.363E+10        | 2.447E+06         |
| Thyroid  | 3.127E-05 | 2.278E-05  | 1.480E+10        | 2.621E+06         |
| GB_Wall  | 4.440E-05 | 2.450E-05  | 1.223E+10        | 2.388E+06         |
| Ht_Wall  | 3.308E-05 | 5.787E-05  | 1.293E+10        | 2.505E+06         |
| Uterus   | 4.181E-05 | 1.599E-05  | 1.165E+10        | 2.481E+06         |
| ET_Reg   | 3.127E-05 | 1.127E-04  | 1.177E+10        | 2.388E+06         |
| Lung_66  | 3.064E-05 | 2.578E-04  | 1.445E+10        | 2.645E+06         |
| Effectiv | 4.144E-05 | 5.276E-05  | 1.386E+10        | 2.680E+06         |

RISK CONVERSION FACTORS FOR: Ten

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 6.179E-14 | 5.646E-09  | 1.433E+01        | 2.656E-03         |
| Stomach  | 3.045E-10 | 2.187E-08  | 5.219E+01        | 1.025E-02         |
| Colon    | 1.191E-11 | 7.800E-08  | 1.258E+02        | 2.656E-02         |
| Liver    | 2.205E-13 | 8.540E-09  | 1.992E+01        | 3.868E-03         |
| LUNG     | 8.325E-13 | 5.857E-07  | 1.410E+02        | 2.586E-02         |
| Bone     | 6.549E-15 | 2.478E-10  | 1.957E+00        | 3.425E-04         |
| Skin     | 4.995E-15 | 2.335E-10  | 1.689E+00        | 3.215E-04         |
| Breast   | 3.016E-13 | 4.462E-08  | 7.829E+01        | 1.316E-02         |
| Ovary    | 1.669E-13 | 3.204E-09  | 1.771E+01        | 3.378E-03         |
| Bladder  | 1.783E-13 | 3.244E-09  | 2.924E+01        | 6.256E-03         |
| Kidneys  | 5.180E-14 | 1.447E-09  | 6.792E+00        | 1.340E-03         |
| Thyroid  | 2.342E-14 | 1.690E-09  | 4.707E+00        | 8.341E-04         |
| Leukemia | 3.696E-13 | 1.201E-08  | 8.038E+01        | 1.526E-02         |
| Residual | 2.264E-12 | 1.039E-07  | 1.887E+02        | 3.775E-02         |
| Total    | 3.208E-10 | 8.706E-07  | 7.631E+02        | 1.480E-01         |



Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: MI                               Zip: 49037
```

```
Source Category:
Source Type: Stack
Emission Year: 2013
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name: Test_003.
Dataset Date: Jun 7, 2013 06:33 PM
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\SPRG2010.wnd
Population File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population
Files\sprg2000.pop

```



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 250                  | Fe-60   | 2.15E-01                | 3.87E-08                           | 6.29E-08                           | 1.02E-07                              |
| N              | 250                  | Co-60m  | 5.18E-02                | 9.33E-09                           | 1.52E-08                           | 2.45E-08                              |
| N              | 250                  | Co-60   | 2.82E-08                | 5.07E-15                           | 8.24E-15                           | 1.33E-14                              |
| N              | 750                  | Fe-60   | 6.69E-02                | 1.20E-08                           | 2.03E-08                           | 3.23E-08                              |
| N              | 750                  | Co-60m  | 3.77E-02                | 6.78E-09                           | 1.14E-08                           | 1.82E-08                              |
| N              | 750                  | Co-60   | 6.67E-08                | 1.20E-14                           | 2.02E-14                           | 3.22E-14                              |
| N              | 1500                 | Fe-60   | 2.77E-02                | 4.99E-09                           | 9.68E-09                           | 1.47E-08                              |
| N              | 1500                 | Co-60m  | 2.24E-02                | 4.04E-09                           | 7.83E-09                           | 1.19E-08                              |
| N              | 1500                 | Co-60   | 8.84E-08                | 1.59E-14                           | 3.09E-14                           | 4.68E-14                              |
| N              | 2500                 | Fe-60   | 1.30E-02                | 2.34E-09                           | 5.49E-09                           | 7.83E-09                              |
| N              | 2500                 | Co-60m  | 1.22E-02                | 2.20E-09                           | 5.14E-09                           | 7.34E-09                              |
| N              | 2500                 | Co-60   | 8.95E-08                | 1.61E-14                           | 3.77E-14                           | 5.38E-14                              |
| N              | 3500                 | Fe-60   | 7.62E-03                | 1.37E-09                           | 3.71E-09                           | 5.08E-09                              |
| N              | 3500                 | Co-60m  | 7.46E-03                | 1.34E-09                           | 3.63E-09                           | 4.97E-09                              |
| N              | 3500                 | Co-60   | 8.28E-08                | 1.49E-14                           | 4.03E-14                           | 5.52E-14                              |
| N              | 4500                 | Fe-60   | 5.07E-03                | 9.12E-10                           | 2.73E-09                           | 3.64E-09                              |
| N              | 4500                 | Co-60m  | 5.03E-03                | 9.06E-10                           | 2.71E-09                           | 3.62E-09                              |
| N              | 4500                 | Co-60   | 7.58E-08                | 1.37E-14                           | 4.09E-14                           | 5.45E-14                              |
| N              | 7500                 | Fe-60   | 2.10E-03                | 3.79E-10                           | 1.40E-09                           | 1.78E-09                              |
| N              | 7500                 | Co-60m  | 2.10E-03                | 3.79E-10                           | 1.40E-09                           | 1.78E-09                              |
| N              | 7500                 | Co-60   | 5.77E-08                | 1.04E-14                           | 3.84E-14                           | 4.88E-14                              |
| N              | 15000                | Fe-60   | 5.96E-04                | 1.07E-10                           | 4.92E-10                           | 6.00E-10                              |
| N              | 15000                | Co-60m  | 5.96E-04                | 1.07E-10                           | 4.92E-10                           | 6.00E-10                              |
| N              | 15000                | Co-60   | 3.49E-08                | 6.28E-15                           | 2.89E-14                           | 3.51E-14                              |
| N              | 25000                | Fe-60   | 1.75E-04                | 3.14E-11                           | 1.80E-10                           | 2.12E-10                              |
| N              | 25000                | Co-60m  | 1.75E-04                | 3.14E-11                           | 1.80E-10                           | 2.12E-10                              |
| N              | 25000                | Co-60   | 1.75E-08                | 3.15E-15                           | 1.81E-14                           | 2.12E-14                              |
| N              | 35000                | Fe-60   | 7.60E-05                | 1.37E-11                           | 8.38E-11                           | 9.74E-11                              |
| N              | 35000                | Co-60m  | 7.60E-05                | 1.37E-11                           | 8.38E-11                           | 9.74E-11                              |
| N              | 35000                | Co-60   | 1.08E-08                | 1.94E-15                           | 1.19E-14                           | 1.38E-14                              |
| N              | 45000                | Fe-60   | 3.57E-05                | 6.43E-12                           | 4.21E-11                           | 4.85E-11                              |
| N              | 45000                | Co-60m  | 3.57E-05                | 6.43E-12                           | 4.21E-11                           | 4.85E-11                              |
| N              | 45000                | Co-60   | 6.55E-09                | 1.18E-15                           | 7.71E-15                           | 8.89E-15                              |
| N              | 55000                | Fe-60   | 1.67E-05                | 3.01E-12                           | 2.18E-11                           | 2.48E-11                              |
| N              | 55000                | Co-60m  | 1.67E-05                | 3.01E-12                           | 2.18E-11                           | 2.48E-11                              |
| N              | 55000                | Co-60   | 3.77E-09                | 6.78E-16                           | 4.91E-15                           | 5.59E-15                              |
| N              | 70000                | Fe-60   | 5.09E-06                | 9.16E-13                           | 8.53E-12                           | 9.45E-12                              |
| N              | 70000                | Co-60m  | 5.09E-06                | 9.16E-13                           | 8.53E-12                           | 9.45E-12                              |
| N              | 70000                | Co-60   | 1.46E-09                | 2.63E-16                           | 2.45E-15                           | 2.71E-15                              |
| NNW            | 250                  | Fe-60   | 1.62E-01                | 2.91E-08                           | 4.73E-08                           | 7.65E-08                              |
| NNW            | 250                  | Co-60m  | 3.03E-02                | 5.45E-09                           | 8.85E-09                           | 1.43E-08                              |
| NNW            | 250                  | Co-60   | 1.22E-08                | 2.20E-15                           | 3.57E-15                           | 5.77E-15                              |
| NNW            | 750                  | Fe-60   | 5.08E-02                | 9.14E-09                           | 1.54E-08                           | 2.45E-08                              |
| NNW            | 750                  | Co-60m  | 2.35E-02                | 4.23E-09                           | 7.12E-09                           | 1.14E-08                              |
| NNW            | 750                  | Co-60   | 3.03E-08                | 5.45E-15                           | 9.19E-15                           | 1.46E-14                              |
| NNW            | 1500                 | Fe-60   | 2.13E-02                | 3.84E-09                           | 7.43E-09                           | 1.13E-08                              |
| NNW            | 1500                 | Co-60m  | 1.52E-02                | 2.73E-09                           | 5.29E-09                           | 8.02E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNW            | 1500                 | Co-60   | 4.26E-08                | 7.67E-15                           | 1.49E-14                           | 2.25E-14                              |
| NNW            | 2500                 | Fe-60   | 1.02E-02                | 1.83E-09                           | 4.27E-09                           | 6.11E-09                              |
| NNW            | 2500                 | Co-60m  | 8.89E-03                | 1.60E-09                           | 3.73E-09                           | 5.33E-09                              |
| NNW            | 2500                 | Co-60   | 4.59E-08                | 8.25E-15                           | 1.93E-14                           | 2.75E-14                              |
| NNW            | 3500                 | Fe-60   | 6.05E-03                | 1.09E-09                           | 2.93E-09                           | 4.02E-09                              |
| NNW            | 3500                 | Co-60m  | 5.72E-03                | 1.03E-09                           | 2.77E-09                           | 3.79E-09                              |
| NNW            | 3500                 | Co-60   | 4.45E-08                | 8.01E-15                           | 2.15E-14                           | 2.96E-14                              |
| NNW            | 4500                 | Fe-60   | 4.09E-03                | 7.36E-10                           | 2.19E-09                           | 2.92E-09                              |
| NNW            | 4500                 | Co-60m  | 3.99E-03                | 7.19E-10                           | 2.13E-09                           | 2.85E-09                              |
| NNW            | 4500                 | Co-60   | 4.24E-08                | 7.63E-15                           | 2.26E-14                           | 3.03E-14                              |
| NNW            | 7500                 | Fe-60   | 1.78E-03                | 3.21E-10                           | 1.17E-09                           | 1.49E-09                              |
| NNW            | 7500                 | Co-60m  | 1.78E-03                | 3.20E-10                           | 1.16E-09                           | 1.48E-09                              |
| NNW            | 7500                 | Co-60   | 3.50E-08                | 6.30E-15                           | 2.29E-14                           | 2.92E-14                              |
| NNW            | 15000                | Fe-60   | 5.58E-04                | 1.00E-10                           | 4.47E-10                           | 5.47E-10                              |
| NNW            | 15000                | Co-60m  | 5.58E-04                | 1.00E-10                           | 4.47E-10                           | 5.47E-10                              |
| NNW            | 15000                | Co-60   | 2.40E-08                | 4.32E-15                           | 1.92E-14                           | 2.36E-14                              |
| NNW            | 25000                | Fe-60   | 1.91E-04                | 3.44E-11                           | 1.84E-10                           | 2.19E-10                              |
| NNW            | 25000                | Co-60m  | 1.91E-04                | 3.44E-11                           | 1.84E-10                           | 2.19E-10                              |
| NNW            | 25000                | Co-60   | 1.42E-08                | 2.55E-15                           | 1.37E-14                           | 1.62E-14                              |
| NNW            | 35000                | Fe-60   | 9.30E-05                | 1.67E-11                           | 9.54E-11                           | 1.12E-10                              |
| NNW            | 35000                | Co-60m  | 9.30E-05                | 1.67E-11                           | 9.54E-11                           | 1.12E-10                              |
| NNW            | 35000                | Co-60   | 9.80E-09                | 1.76E-15                           | 1.01E-14                           | 1.18E-14                              |
| NNW            | 45000                | Fe-60   | 4.91E-05                | 8.84E-12                           | 5.34E-11                           | 6.22E-11                              |
| NNW            | 45000                | Co-60m  | 4.91E-05                | 8.84E-12                           | 5.34E-11                           | 6.22E-11                              |
| NNW            | 45000                | Co-60   | 6.71E-09                | 1.21E-15                           | 7.29E-15                           | 8.50E-15                              |
| NNW            | 55000                | Fe-60   | 2.62E-05                | 4.71E-12                           | 3.09E-11                           | 3.56E-11                              |
| NNW            | 55000                | Co-60m  | 2.62E-05                | 4.71E-12                           | 3.09E-11                           | 3.56E-11                              |
| NNW            | 55000                | Co-60   | 4.39E-09                | 7.90E-16                           | 5.19E-15                           | 5.98E-15                              |
| NNW            | 70000                | Fe-60   | 9.77E-06                | 1.76E-12                           | 1.42E-11                           | 1.60E-11                              |
| NNW            | 70000                | Co-60m  | 9.77E-06                | 1.76E-12                           | 1.42E-11                           | 1.60E-11                              |
| NNW            | 70000                | Co-60   | 2.10E-09                | 3.77E-16                           | 3.05E-15                           | 3.43E-15                              |
| NW             | 250                  | Fe-60   | 1.30E-01                | 2.34E-08                           | 3.79E-08                           | 6.13E-08                              |
| NW             | 250                  | Co-60m  | 1.98E-02                | 3.56E-09                           | 5.79E-09                           | 9.35E-09                              |
| NW             | 250                  | Co-60   | 6.34E-09                | 1.14E-15                           | 1.85E-15                           | 3.00E-15                              |
| NW             | 750                  | Fe-60   | 4.09E-02                | 7.36E-09                           | 1.24E-08                           | 1.98E-08                              |
| NW             | 750                  | Co-60m  | 1.60E-02                | 2.88E-09                           | 4.85E-09                           | 7.73E-09                              |
| NW             | 750                  | Co-60   | 1.62E-08                | 2.92E-15                           | 4.91E-15                           | 7.83E-15                              |
| NW             | 1500                 | Fe-60   | 1.73E-02                | 3.11E-09                           | 6.03E-09                           | 9.14E-09                              |
| NW             | 1500                 | Co-60m  | 1.09E-02                | 1.96E-09                           | 3.80E-09                           | 5.76E-09                              |
| NW             | 1500                 | Co-60   | 2.37E-08                | 4.26E-15                           | 8.26E-15                           | 1.25E-14                              |
| NW             | 2500                 | Fe-60   | 8.34E-03                | 1.50E-09                           | 3.50E-09                           | 5.00E-09                              |
| NW             | 2500                 | Co-60m  | 6.74E-03                | 1.21E-09                           | 2.83E-09                           | 4.04E-09                              |
| NW             | 2500                 | Co-60   | 2.66E-08                | 4.78E-15                           | 1.11E-14                           | 1.59E-14                              |
| NW             | 3500                 | Fe-60   | 5.01E-03                | 9.01E-10                           | 2.41E-09                           | 3.32E-09                              |
| NW             | 3500                 | Co-60m  | 4.51E-03                | 8.12E-10                           | 2.18E-09                           | 2.99E-09                              |
| NW             | 3500                 | Co-60   | 2.67E-08                | 4.81E-15                           | 1.29E-14                           | 1.77E-14                              |
| NW             | 4500                 | Fe-60   | 3.42E-03                | 6.16E-10                           | 1.82E-09                           | 2.43E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 4500                 | Co-60m  | 3.25E-03                | 5.84E-10                           | 1.73E-09                           | 2.31E-09                              |
| NW             | 4500                 | Co-60   | 2.62E-08                | 4.71E-15                           | 1.39E-14                           | 1.86E-14                              |
| NW             | 7500                 | Fe-60   | 1.53E-03                | 2.76E-10                           | 9.93E-10                           | 1.27E-09                              |
| NW             | 7500                 | Co-60m  | 1.52E-03                | 2.74E-10                           | 9.86E-10                           | 1.26E-09                              |
| NW             | 7500                 | Co-60   | 2.29E-08                | 4.13E-15                           | 1.49E-14                           | 1.90E-14                              |
| NW             | 15000                | Fe-60   | 5.10E-04                | 9.19E-11                           | 4.01E-10                           | 4.93E-10                              |
| NW             | 15000                | Co-60m  | 5.10E-04                | 9.19E-11                           | 4.01E-10                           | 4.93E-10                              |
| NW             | 15000                | Co-60   | 1.72E-08                | 3.09E-15                           | 1.35E-14                           | 1.66E-14                              |
| NW             | 25000                | Fe-60   | 1.92E-04                | 3.46E-11                           | 1.78E-10                           | 2.13E-10                              |
| NW             | 25000                | Co-60m  | 1.92E-04                | 3.46E-11                           | 1.78E-10                           | 2.13E-10                              |
| NW             | 25000                | Co-60   | 1.12E-08                | 2.02E-15                           | 1.04E-14                           | 1.25E-14                              |
| NW             | 35000                | Fe-60   | 1.00E-04                | 1.80E-11                           | 9.82E-11                           | 1.16E-10                              |
| NW             | 35000                | Co-60m  | 1.00E-04                | 1.80E-11                           | 9.82E-11                           | 1.16E-10                              |
| NW             | 35000                | Co-60   | 8.35E-09                | 1.50E-15                           | 8.20E-15                           | 9.71E-15                              |
| NW             | 45000                | Fe-60   | 5.67E-05                | 1.02E-11                           | 5.87E-11                           | 6.89E-11                              |
| NW             | 45000                | Co-60m  | 5.67E-05                | 1.02E-11                           | 5.87E-11                           | 6.89E-11                              |
| NW             | 45000                | Co-60   | 6.15E-09                | 1.11E-15                           | 6.36E-15                           | 7.47E-15                              |
| NW             | 55000                | Fe-60   | 3.27E-05                | 5.88E-12                           | 3.64E-11                           | 4.22E-11                              |
| NW             | 55000                | Co-60m  | 3.27E-05                | 5.88E-12                           | 3.64E-11                           | 4.22E-11                              |
| NW             | 55000                | Co-60   | 4.36E-09                | 7.85E-16                           | 4.85E-15                           | 5.64E-15                              |
| NW             | 70000                | Fe-60   | 1.39E-05                | 2.50E-12                           | 1.85E-11                           | 2.10E-11                              |
| NW             | 70000                | Co-60m  | 1.39E-05                | 2.50E-12                           | 1.85E-11                           | 2.10E-11                              |
| NW             | 70000                | Co-60   | 2.38E-09                | 4.28E-16                           | 3.16E-15                           | 3.59E-15                              |
| WNW            | 250                  | Fe-60   | 1.08E-01                | 1.95E-08                           | 3.17E-08                           | 5.12E-08                              |
| WNW            | 250                  | Co-60m  | 1.40E-02                | 2.51E-09                           | 4.08E-09                           | 6.59E-09                              |
| WNW            | 250                  | Co-60   | 3.71E-09                | 6.68E-16                           | 1.08E-15                           | 1.75E-15                              |
| WNW            | 750                  | Fe-60   | 3.43E-02                | 6.17E-09                           | 1.04E-08                           | 1.65E-08                              |
| WNW            | 750                  | Co-60m  | 1.16E-02                | 2.09E-09                           | 3.52E-09                           | 5.61E-09                              |
| WNW            | 750                  | Co-60   | 9.68E-09                | 1.74E-15                           | 2.93E-15                           | 4.67E-15                              |
| WNW            | 1500                 | Fe-60   | 1.46E-02                | 2.62E-09                           | 5.07E-09                           | 7.69E-09                              |
| WNW            | 1500                 | Co-60m  | 8.19E-03                | 1.47E-09                           | 2.86E-09                           | 4.33E-09                              |
| WNW            | 1500                 | Co-60   | 1.45E-08                | 2.61E-15                           | 5.06E-15                           | 7.67E-15                              |
| WNW            | 2500                 | Fe-60   | 7.06E-03                | 1.27E-09                           | 2.96E-09                           | 4.23E-09                              |
| WNW            | 2500                 | Co-60m  | 5.29E-03                | 9.51E-10                           | 2.21E-09                           | 3.16E-09                              |
| WNW            | 2500                 | Co-60   | 1.68E-08                | 3.02E-15                           | 7.03E-15                           | 1.01E-14                              |
| WNW            | 3500                 | Fe-60   | 4.27E-03                | 7.68E-10                           | 2.05E-09                           | 2.82E-09                              |
| WNW            | 3500                 | Co-60m  | 3.65E-03                | 6.57E-10                           | 1.76E-09                           | 2.41E-09                              |
| WNW            | 3500                 | Co-60   | 1.73E-08                | 3.12E-15                           | 8.33E-15                           | 1.14E-14                              |
| WNW            | 4500                 | Fe-60   | 2.94E-03                | 5.28E-10                           | 1.55E-09                           | 2.08E-09                              |
| WNW            | 4500                 | Co-60m  | 2.69E-03                | 4.84E-10                           | 1.43E-09                           | 1.91E-09                              |
| WNW            | 4500                 | Co-60   | 1.73E-08                | 3.12E-15                           | 9.18E-15                           | 1.23E-14                              |
| WNW            | 7500                 | Fe-60   | 1.34E-03                | 2.41E-10                           | 8.62E-10                           | 1.10E-09                              |
| WNW            | 7500                 | Co-60m  | 1.32E-03                | 2.38E-10                           | 8.49E-10                           | 1.09E-09                              |
| WNW            | 7500                 | Co-60   | 1.59E-08                | 2.87E-15                           | 1.02E-14                           | 1.31E-14                              |
| WNW            | 15000                | Fe-60   | 4.65E-04                | 8.37E-11                           | 3.61E-10                           | 4.45E-10                              |
| WNW            | 15000                | Co-60m  | 4.65E-04                | 8.37E-11                           | 3.61E-10                           | 4.45E-10                              |
| WNW            | 15000                | Co-60   | 1.28E-08                | 2.30E-15                           | 9.90E-15                           | 1.22E-14                              |



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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WNW            | 25000                | Fe-60   | 1.86E-04                | 3.35E-11                           | 1.68E-10                           | 2.02E-10                              |
| WNW            | 25000                | Co-60m  | 1.86E-04                | 3.35E-11                           | 1.68E-10                           | 2.02E-10                              |
| WNW            | 25000                | Co-60   | 8.98E-09                | 1.62E-15                           | 8.11E-15                           | 9.73E-15                              |
| WNW            | 35000                | Fe-60   | 1.02E-04                | 1.83E-11                           | 9.69E-11                           | 1.15E-10                              |
| WNW            | 35000                | Co-60m  | 1.02E-04                | 1.83E-11                           | 9.69E-11                           | 1.15E-10                              |
| WNW            | 35000                | Co-60   | 7.01E-09                | 1.26E-15                           | 6.68E-15                           | 7.95E-15                              |
| WNW            | 45000                | Fe-60   | 6.03E-05                | 1.09E-11                           | 6.05E-11                           | 7.13E-11                              |
| WNW            | 45000                | Co-60m  | 6.03E-05                | 1.09E-11                           | 6.05E-11                           | 7.13E-11                              |
| WNW            | 45000                | Co-60   | 5.42E-09                | 9.75E-16                           | 5.43E-15                           | 6.40E-15                              |
| WNW            | 55000                | Fe-60   | 3.67E-05                | 6.61E-12                           | 3.92E-11                           | 4.58E-11                              |
| WNW            | 55000                | Co-60m  | 3.67E-05                | 6.61E-12                           | 3.92E-11                           | 4.58E-11                              |
| WNW            | 55000                | Co-60   | 4.06E-09                | 7.30E-16                           | 4.34E-15                           | 5.07E-15                              |
| WNW            | 70000                | Fe-60   | 1.71E-05                | 3.08E-12                           | 2.14E-11                           | 2.44E-11                              |
| WNW            | 70000                | Co-60m  | 1.71E-05                | 3.08E-12                           | 2.14E-11                           | 2.44E-11                              |
| WNW            | 70000                | Co-60   | 2.42E-09                | 4.36E-16                           | 3.03E-15                           | 3.46E-15                              |
| W              | 250                  | Fe-60   | 9.30E-02                | 1.67E-08                           | 2.72E-08                           | 4.39E-08                              |
| W              | 250                  | Co-60m  | 1.04E-02                | 1.87E-09                           | 3.03E-09                           | 4.90E-09                              |
| W              | 250                  | Co-60   | 2.36E-09                | 4.24E-16                           | 6.88E-16                           | 1.11E-15                              |
| W              | 750                  | Fe-60   | 2.95E-02                | 5.30E-09                           | 8.93E-09                           | 1.42E-08                              |
| W              | 750                  | Co-60m  | 8.80E-03                | 1.58E-09                           | 2.67E-09                           | 4.25E-09                              |
| W              | 750                  | Co-60   | 6.23E-09                | 1.12E-15                           | 1.89E-15                           | 3.01E-15                              |
| W              | 1500                 | Fe-60   | 1.26E-02                | 2.26E-09                           | 4.38E-09                           | 6.64E-09                              |
| W              | 1500                 | Co-60m  | 6.38E-03                | 1.15E-09                           | 2.22E-09                           | 3.37E-09                              |
| W              | 1500                 | Co-60   | 9.53E-09                | 1.72E-15                           | 3.32E-15                           | 5.04E-15                              |
| W              | 2500                 | Fe-60   | 6.12E-03                | 1.10E-09                           | 2.56E-09                           | 3.67E-09                              |
| W              | 2500                 | Co-60m  | 4.25E-03                | 7.65E-10                           | 1.78E-09                           | 2.54E-09                              |
| W              | 2500                 | Co-60   | 1.13E-08                | 2.03E-15                           | 4.72E-15                           | 6.75E-15                              |
| W              | 3500                 | Fe-60   | 3.72E-03                | 6.70E-10                           | 1.79E-09                           | 2.46E-09                              |
| W              | 3500                 | Co-60m  | 3.01E-03                | 5.42E-10                           | 1.45E-09                           | 1.99E-09                              |
| W              | 3500                 | Co-60   | 1.19E-08                | 2.14E-15                           | 5.70E-15                           | 7.84E-15                              |
| W              | 4500                 | Fe-60   | 2.57E-03                | 4.63E-10                           | 1.36E-09                           | 1.82E-09                              |
| W              | 4500                 | Co-60m  | 2.26E-03                | 4.08E-10                           | 1.20E-09                           | 1.60E-09                              |
| W              | 4500                 | Co-60   | 1.21E-08                | 2.17E-15                           | 6.38E-15                           | 8.56E-15                              |
| W              | 7500                 | Fe-60   | 1.19E-03                | 2.14E-10                           | 7.62E-10                           | 9.76E-10                              |
| W              | 7500                 | Co-60m  | 1.16E-03                | 2.08E-10                           | 7.40E-10                           | 9.48E-10                              |
| W              | 7500                 | Co-60   | 1.16E-08                | 2.08E-15                           | 7.39E-15                           | 9.47E-15                              |
| W              | 15000                | Fe-60   | 4.25E-04                | 7.65E-11                           | 3.27E-10                           | 4.03E-10                              |
| W              | 15000                | Co-60m  | 4.25E-04                | 7.64E-11                           | 3.27E-10                           | 4.03E-10                              |
| W              | 15000                | Co-60   | 9.76E-09                | 1.76E-15                           | 7.51E-15                           | 9.27E-15                              |
| W              | 25000                | Fe-60   | 1.78E-04                | 3.21E-11                           | 1.58E-10                           | 1.90E-10                              |
| W              | 25000                | Co-60m  | 1.78E-04                | 3.21E-11                           | 1.58E-10                           | 1.90E-10                              |
| W              | 25000                | Co-60   | 7.27E-09                | 1.31E-15                           | 6.44E-15                           | 7.75E-15                              |
| W              | 35000                | Fe-60   | 1.00E-04                | 1.81E-11                           | 9.37E-11                           | 1.12E-10                              |
| W              | 35000                | Co-60m  | 1.00E-04                | 1.81E-11                           | 9.37E-11                           | 1.12E-10                              |
| W              | 35000                | Co-60   | 5.88E-09                | 1.06E-15                           | 5.49E-15                           | 6.55E-15                              |
| W              | 45000                | Fe-60   | 6.17E-05                | 1.11E-11                           | 6.03E-11                           | 7.14E-11                              |
| W              | 45000                | Co-60m  | 6.17E-05                | 1.11E-11                           | 6.03E-11                           | 7.14E-11                              |



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AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 45000                | Co-60   | 4.71E-09                | 8.48E-16                           | 4.61E-15                           | 5.46E-15                              |
| W              | 55000                | Fe-60   | 3.90E-05                | 7.01E-12                           | 4.04E-11                           | 4.74E-11                              |
| W              | 55000                | Co-60m  | 3.90E-05                | 7.01E-12                           | 4.04E-11                           | 4.74E-11                              |
| W              | 55000                | Co-60   | 3.67E-09                | 6.61E-16                           | 3.81E-15                           | 4.47E-15                              |
| W              | 70000                | Fe-60   | 1.94E-05                | 3.49E-12                           | 2.31E-11                           | 2.66E-11                              |
| W              | 70000                | Co-60m  | 1.94E-05                | 3.49E-12                           | 2.31E-11                           | 2.66E-11                              |
| W              | 70000                | Co-60   | 2.35E-09                | 4.22E-16                           | 2.80E-15                           | 3.22E-15                              |
| WSW            | 250                  | Fe-60   | 8.14E-02                | 1.47E-08                           | 2.38E-08                           | 3.84E-08                              |
| WSW            | 250                  | Co-60m  | 8.00E-03                | 1.44E-09                           | 2.34E-09                           | 3.78E-09                              |
| WSW            | 250                  | Co-60   | 1.59E-09                | 2.86E-16                           | 4.63E-16                           | 7.49E-16                              |
| WSW            | 750                  | Fe-60   | 2.58E-02                | 4.65E-09                           | 7.83E-09                           | 1.25E-08                              |
| WSW            | 750                  | Co-60m  | 6.90E-03                | 1.24E-09                           | 2.09E-09                           | 3.33E-09                              |
| WSW            | 750                  | Co-60   | 4.24E-09                | 7.63E-16                           | 1.28E-15                           | 2.05E-15                              |
| WSW            | 1500                 | Fe-60   | 1.10E-02                | 1.99E-09                           | 3.85E-09                           | 5.84E-09                              |
| WSW            | 1500                 | Co-60m  | 5.11E-03                | 9.20E-10                           | 1.78E-09                           | 2.70E-09                              |
| WSW            | 1500                 | Co-60   | 6.59E-09                | 1.19E-15                           | 2.29E-15                           | 3.48E-15                              |
| WSW            | 2500                 | Fe-60   | 5.40E-03                | 9.73E-10                           | 2.26E-09                           | 3.23E-09                              |
| WSW            | 2500                 | Co-60m  | 3.48E-03                | 6.27E-10                           | 1.46E-09                           | 2.08E-09                              |
| WSW            | 2500                 | Co-60   | 7.94E-09                | 1.43E-15                           | 3.32E-15                           | 4.75E-15                              |
| WSW            | 3500                 | Fe-60   | 3.29E-03                | 5.93E-10                           | 1.58E-09                           | 2.17E-09                              |
| WSW            | 3500                 | Co-60m  | 2.52E-03                | 4.54E-10                           | 1.21E-09                           | 1.66E-09                              |
| WSW            | 3500                 | Co-60   | 8.48E-09                | 1.53E-15                           | 4.07E-15                           | 5.60E-15                              |
| WSW            | 4500                 | Fe-60   | 2.28E-03                | 4.11E-10                           | 1.20E-09                           | 1.62E-09                              |
| WSW            | 4500                 | Co-60m  | 1.93E-03                | 3.47E-10                           | 1.02E-09                           | 1.36E-09                              |
| WSW            | 4500                 | Co-60   | 8.76E-09                | 1.58E-15                           | 4.62E-15                           | 6.19E-15                              |
| WSW            | 7500                 | Fe-60   | 1.07E-03                | 1.92E-10                           | 6.81E-10                           | 8.74E-10                              |
| WSW            | 7500                 | Co-60m  | 1.02E-03                | 1.84E-10                           | 6.51E-10                           | 8.35E-10                              |
| WSW            | 7500                 | Co-60   | 8.66E-09                | 1.56E-15                           | 5.52E-15                           | 7.07E-15                              |
| WSW            | 15000                | Fe-60   | 3.90E-04                | 7.02E-11                           | 2.98E-10                           | 3.68E-10                              |
| WSW            | 15000                | Co-60m  | 3.89E-04                | 7.01E-11                           | 2.97E-10                           | 3.68E-10                              |
| WSW            | 15000                | Co-60   | 7.66E-09                | 1.38E-15                           | 5.85E-15                           | 7.23E-15                              |
| WSW            | 25000                | Fe-60   | 1.69E-04                | 3.05E-11                           | 1.48E-10                           | 1.78E-10                              |
| WSW            | 25000                | Co-60m  | 1.69E-04                | 3.05E-11                           | 1.48E-10                           | 1.78E-10                              |
| WSW            | 25000                | Co-60   | 5.96E-09                | 1.07E-15                           | 5.21E-15                           | 6.28E-15                              |
| WSW            | 35000                | Fe-60   | 9.76E-05                | 1.76E-11                           | 8.98E-11                           | 1.07E-10                              |
| WSW            | 35000                | Co-60m  | 9.76E-05                | 1.76E-11                           | 8.98E-11                           | 1.07E-10                              |
| WSW            | 35000                | Co-60   | 4.96E-09                | 8.93E-16                           | 4.56E-15                           | 5.46E-15                              |
| WSW            | 45000                | Fe-60   | 6.16E-05                | 1.11E-11                           | 5.92E-11                           | 7.03E-11                              |
| WSW            | 45000                | Co-60m  | 6.15E-05                | 1.11E-11                           | 5.92E-11                           | 7.03E-11                              |
| WSW            | 45000                | Co-60   | 4.09E-09                | 7.36E-16                           | 3.93E-15                           | 4.67E-15                              |
| WSW            | 55000                | Fe-60   | 4.00E-05                | 7.21E-12                           | 4.07E-11                           | 4.79E-11                              |
| WSW            | 55000                | Co-60m  | 4.00E-05                | 7.21E-12                           | 4.07E-11                           | 4.79E-11                              |
| WSW            | 55000                | Co-60   | 3.28E-09                | 5.91E-16                           | 3.33E-15                           | 3.92E-15                              |
| WSW            | 70000                | Fe-60   | 2.10E-05                | 3.78E-12                           | 2.42E-11                           | 2.79E-11                              |
| WSW            | 70000                | Co-60m  | 2.10E-05                | 3.78E-12                           | 2.42E-11                           | 2.79E-11                              |
| WSW            | 70000                | Co-60   | 2.21E-09                | 3.98E-16                           | 2.55E-15                           | 2.94E-15                              |
| SW             | 250                  | Fe-60   | 7.24E-02                | 1.30E-08                           | 2.12E-08                           | 3.42E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SW             | 250                  | Co-60m  | 6.37E-03                | 1.15E-09                           | 1.86E-09                           | 3.00E-09                              |
| SW             | 250                  | Co-60   | 1.12E-09                | 2.02E-16                           | 3.27E-16                           | 5.29E-16                              |
| SW             | 750                  | Fe-60   | 2.30E-02                | 4.14E-09                           | 6.98E-09                           | 1.11E-08                              |
| SW             | 750                  | Co-60m  | 5.55E-03                | 9.99E-10                           | 1.68E-09                           | 2.68E-09                              |
| SW             | 750                  | Co-60   | 3.02E-09                | 5.43E-16                           | 9.14E-16                           | 1.46E-15                              |
| SW             | 1500                 | Fe-60   | 9.86E-03                | 1.77E-09                           | 3.43E-09                           | 5.21E-09                              |
| SW             | 1500                 | Co-60m  | 4.18E-03                | 7.53E-10                           | 1.46E-09                           | 2.21E-09                              |
| SW             | 1500                 | Co-60   | 4.74E-09                | 8.54E-16                           | 1.65E-15                           | 2.51E-15                              |
| SW             | 2500                 | Fe-60   | 4.84E-03                | 8.71E-10                           | 2.02E-09                           | 2.89E-09                              |
| SW             | 2500                 | Co-60m  | 2.91E-03                | 5.24E-10                           | 1.22E-09                           | 1.74E-09                              |
| SW             | 2500                 | Co-60   | 5.80E-09                | 1.04E-15                           | 2.42E-15                           | 3.47E-15                              |
| SW             | 3500                 | Fe-60   | 2.96E-03                | 5.32E-10                           | 1.42E-09                           | 1.95E-09                              |
| SW             | 3500                 | Co-60m  | 2.14E-03                | 3.85E-10                           | 1.03E-09                           | 1.41E-09                              |
| SW             | 3500                 | Co-60   | 6.28E-09                | 1.13E-15                           | 3.01E-15                           | 4.14E-15                              |
| SW             | 4500                 | Fe-60   | 2.06E-03                | 3.70E-10                           | 1.08E-09                           | 1.45E-09                              |
| SW             | 4500                 | Co-60m  | 1.66E-03                | 2.99E-10                           | 8.76E-10                           | 1.18E-09                              |
| SW             | 4500                 | Co-60   | 6.56E-09                | 1.18E-15                           | 3.45E-15                           | 4.63E-15                              |
| SW             | 7500                 | Fe-60   | 9.70E-04                | 1.75E-10                           | 6.16E-10                           | 7.91E-10                              |
| SW             | 7500                 | Co-60m  | 9.09E-04                | 1.64E-10                           | 5.77E-10                           | 7.41E-10                              |
| SW             | 7500                 | Co-60   | 6.66E-09                | 1.20E-15                           | 4.23E-15                           | 5.43E-15                              |
| SW             | 15000                | Fe-60   | 3.60E-04                | 6.48E-11                           | 2.74E-10                           | 3.38E-10                              |
| SW             | 15000                | Co-60m  | 3.59E-04                | 6.45E-11                           | 2.73E-10                           | 3.37E-10                              |
| SW             | 15000                | Co-60   | 6.13E-09                | 1.10E-15                           | 4.66E-15                           | 5.77E-15                              |
| SW             | 25000                | Fe-60   | 1.60E-04                | 2.89E-11                           | 1.39E-10                           | 1.68E-10                              |
| SW             | 25000                | Co-60m  | 1.60E-04                | 2.89E-11                           | 1.39E-10                           | 1.67E-10                              |
| SW             | 25000                | Co-60   | 4.96E-09                | 8.92E-16                           | 4.28E-15                           | 5.17E-15                              |
| SW             | 35000                | Fe-60   | 9.43E-05                | 1.70E-11                           | 8.57E-11                           | 1.03E-10                              |
| SW             | 35000                | Co-60m  | 9.43E-05                | 1.70E-11                           | 8.57E-11                           | 1.03E-10                              |
| SW             | 35000                | Co-60   | 4.22E-09                | 7.59E-16                           | 3.84E-15                           | 4.59E-15                              |
| SW             | 45000                | Fe-60   | 6.06E-05                | 1.09E-11                           | 5.75E-11                           | 6.85E-11                              |
| SW             | 45000                | Co-60m  | 6.06E-05                | 1.09E-11                           | 5.75E-11                           | 6.85E-11                              |
| SW             | 45000                | Co-60   | 3.55E-09                | 6.40E-16                           | 3.37E-15                           | 4.01E-15                              |
| SW             | 55000                | Fe-60   | 4.03E-05                | 7.26E-12                           | 4.03E-11                           | 4.75E-11                              |
| SW             | 55000                | Co-60m  | 4.03E-05                | 7.26E-12                           | 4.03E-11                           | 4.75E-11                              |
| SW             | 55000                | Co-60   | 2.92E-09                | 5.26E-16                           | 2.92E-15                           | 3.44E-15                              |
| SW             | 70000                | Fe-60   | 2.20E-05                | 3.96E-12                           | 2.47E-11                           | 2.86E-11                              |
| SW             | 70000                | Co-60m  | 2.20E-05                | 3.96E-12                           | 2.47E-11                           | 2.86E-11                              |
| SW             | 70000                | Co-60   | 2.05E-09                | 3.69E-16                           | 2.30E-15                           | 2.67E-15                              |
| SSW            | 250                  | Fe-60   | 6.52E-02                | 1.17E-08                           | 1.91E-08                           | 3.08E-08                              |
| SSW            | 250                  | Co-60m  | 5.18E-03                | 9.33E-10                           | 1.51E-09                           | 2.45E-09                              |
| SSW            | 250                  | Co-60   | 8.19E-10                | 1.48E-16                           | 2.39E-16                           | 3.87E-16                              |
| SSW            | 750                  | Fe-60   | 2.08E-02                | 3.74E-09                           | 6.29E-09                           | 1.00E-08                              |
| SSW            | 750                  | Co-60m  | 4.57E-03                | 8.22E-10                           | 1.38E-09                           | 2.20E-09                              |
| SSW            | 750                  | Co-60   | 2.22E-09                | 4.00E-16                           | 6.74E-16                           | 1.07E-15                              |
| SSW            | 1500                 | Fe-60   | 8.90E-03                | 1.60E-09                           | 3.10E-09                           | 4.70E-09                              |
| SSW            | 1500                 | Co-60m  | 3.49E-03                | 6.27E-10                           | 1.21E-09                           | 1.84E-09                              |
| SSW            | 1500                 | Co-60   | 3.53E-09                | 6.35E-16                           | 1.23E-15                           | 1.86E-15                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 2500                 | Fe-60   | 4.38E-03                | 7.88E-10                           | 1.83E-09                           | 2.62E-09                              |
| SSW            | 2500                 | Co-60m  | 2.46E-03                | 4.44E-10                           | 1.03E-09                           | 1.47E-09                              |
| SSW            | 2500                 | Co-60   | 4.37E-09                | 7.86E-16                           | 1.82E-15                           | 2.61E-15                              |
| SSW            | 3500                 | Fe-60   | 2.68E-03                | 4.83E-10                           | 1.28E-09                           | 1.77E-09                              |
| SSW            | 3500                 | Co-60m  | 1.84E-03                | 3.31E-10                           | 8.81E-10                           | 1.21E-09                              |
| SSW            | 3500                 | Co-60   | 4.78E-09                | 8.60E-16                           | 2.29E-15                           | 3.15E-15                              |
| SSW            | 4500                 | Fe-60   | 1.87E-03                | 3.36E-10                           | 9.83E-10                           | 1.32E-09                              |
| SSW            | 4500                 | Co-60m  | 1.45E-03                | 2.61E-10                           | 7.61E-10                           | 1.02E-09                              |
| SSW            | 4500                 | Co-60   | 5.04E-09                | 9.07E-16                           | 2.65E-15                           | 3.56E-15                              |
| SSW            | 7500                 | Fe-60   | 8.87E-04                | 1.60E-10                           | 5.62E-10                           | 7.22E-10                              |
| SSW            | 7500                 | Co-60m  | 8.13E-04                | 1.46E-10                           | 5.16E-10                           | 6.62E-10                              |
| SSW            | 7500                 | Co-60   | 5.24E-09                | 9.43E-16                           | 3.32E-15                           | 4.26E-15                              |
| SSW            | 15000                | Fe-60   | 3.34E-04                | 6.01E-11                           | 2.53E-10                           | 3.13E-10                              |
| SSW            | 15000                | Co-60m  | 3.31E-04                | 5.97E-11                           | 2.51E-10                           | 3.11E-10                              |
| SSW            | 15000                | Co-60   | 5.00E-09                | 9.00E-16                           | 3.78E-15                           | 4.68E-15                              |
| SSW            | 25000                | Fe-60   | 1.52E-04                | 2.74E-11                           | 1.30E-10                           | 1.58E-10                              |
| SSW            | 25000                | Co-60m  | 1.52E-04                | 2.74E-11                           | 1.30E-10                           | 1.57E-10                              |
| SSW            | 25000                | Co-60   | 4.17E-09                | 7.51E-16                           | 3.57E-15                           | 4.32E-15                              |
| SSW            | 35000                | Fe-60   | 9.07E-05                | 1.63E-11                           | 8.17E-11                           | 9.80E-11                              |
| SSW            | 35000                | Co-60m  | 9.07E-05                | 1.63E-11                           | 8.17E-11                           | 9.80E-11                              |
| SSW            | 35000                | Co-60   | 3.62E-09                | 6.51E-16                           | 3.26E-15                           | 3.91E-15                              |
| SSW            | 45000                | Fe-60   | 5.93E-05                | 1.07E-11                           | 5.56E-11                           | 6.63E-11                              |
| SSW            | 45000                | Co-60m  | 5.93E-05                | 1.07E-11                           | 5.56E-11                           | 6.63E-11                              |
| SSW            | 45000                | Co-60   | 3.10E-09                | 5.59E-16                           | 2.91E-15                           | 3.47E-15                              |
| SSW            | 55000                | Fe-60   | 4.01E-05                | 7.22E-12                           | 3.95E-11                           | 4.68E-11                              |
| SSW            | 55000                | Co-60m  | 4.01E-05                | 7.22E-12                           | 3.95E-11                           | 4.68E-11                              |
| SSW            | 55000                | Co-60   | 2.60E-09                | 4.68E-16                           | 2.56E-15                           | 3.03E-15                              |
| SSW            | 70000                | Fe-60   | 2.26E-05                | 4.07E-12                           | 2.48E-11                           | 2.89E-11                              |
| SSW            | 70000                | Co-60m  | 2.26E-05                | 4.07E-12                           | 2.48E-11                           | 2.89E-11                              |
| SSW            | 70000                | Co-60   | 1.89E-09                | 3.40E-16                           | 2.07E-15                           | 2.41E-15                              |
| S              | 250                  | Fe-60   | 5.93E-02                | 1.07E-08                           | 1.73E-08                           | 2.80E-08                              |
| S              | 250                  | Co-60m  | 4.30E-03                | 7.74E-10                           | 1.26E-09                           | 2.03E-09                              |
| S              | 250                  | Co-60   | 6.17E-10                | 1.11E-16                           | 1.80E-16                           | 2.91E-16                              |
| S              | 750                  | Fe-60   | 1.89E-02                | 3.40E-09                           | 5.72E-09                           | 9.12E-09                              |
| S              | 750                  | Co-60m  | 3.82E-03                | 6.87E-10                           | 1.16E-09                           | 1.84E-09                              |
| S              | 750                  | Co-60   | 1.68E-09                | 3.03E-16                           | 5.10E-16                           | 8.13E-16                              |
| S              | 1500                 | Fe-60   | 8.11E-03                | 1.46E-09                           | 2.83E-09                           | 4.29E-09                              |
| S              | 1500                 | Co-60m  | 2.95E-03                | 5.31E-10                           | 1.03E-09                           | 1.56E-09                              |
| S              | 1500                 | Co-60   | 2.69E-09                | 4.85E-16                           | 9.38E-16                           | 1.42E-15                              |
| S              | 2500                 | Fe-60   | 4.00E-03                | 7.19E-10                           | 1.67E-09                           | 2.39E-09                              |
| S              | 2500                 | Co-60m  | 2.11E-03                | 3.80E-10                           | 8.83E-10                           | 1.26E-09                              |
| S              | 2500                 | Co-60   | 3.37E-09                | 6.06E-16                           | 1.41E-15                           | 2.01E-15                              |
| S              | 3500                 | Fe-60   | 2.45E-03                | 4.42E-10                           | 1.17E-09                           | 1.62E-09                              |
| S              | 3500                 | Co-60m  | 1.60E-03                | 2.88E-10                           | 7.65E-10                           | 1.05E-09                              |
| S              | 3500                 | Co-60   | 3.72E-09                | 6.69E-16                           | 1.78E-15                           | 2.45E-15                              |
| S              | 4500                 | Fe-60   | 1.71E-03                | 3.08E-10                           | 9.00E-10                           | 1.21E-09                              |
| S              | 4500                 | Co-60m  | 1.27E-03                | 2.29E-10                           | 6.68E-10                           | 8.96E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| S              | 4500                 | Co-60   | 3.95E-09                | 7.11E-16                           | 2.08E-15                           | 2.79E-15                              |
| S              | 7500                 | Fe-60   | 8.17E-04                | 1.47E-10                           | 5.17E-10                           | 6.64E-10                              |
| S              | 7500                 | Co-60m  | 7.32E-04                | 1.32E-10                           | 4.63E-10                           | 5.95E-10                              |
| S              | 7500                 | Co-60   | 4.19E-09                | 7.55E-16                           | 2.65E-15                           | 3.41E-15                              |
| S              | 15000                | Fe-60   | 3.11E-04                | 5.60E-11                           | 2.35E-10                           | 2.91E-10                              |
| S              | 15000                | Co-60m  | 3.08E-04                | 5.54E-11                           | 2.32E-10                           | 2.87E-10                              |
| S              | 15000                | Co-60   | 4.13E-09                | 7.43E-16                           | 3.12E-15                           | 3.86E-15                              |
| S              | 25000                | Fe-60   | 1.44E-04                | 2.59E-11                           | 1.23E-10                           | 1.48E-10                              |
| S              | 25000                | Co-60m  | 1.44E-04                | 2.59E-11                           | 1.22E-10                           | 1.48E-10                              |
| S              | 25000                | Co-60   | 3.54E-09                | 6.38E-16                           | 3.01E-15                           | 3.65E-15                              |
| S              | 35000                | Fe-60   | 8.71E-05                | 1.57E-11                           | 7.78E-11                           | 9.34E-11                              |
| S              | 35000                | Co-60m  | 8.71E-05                | 1.57E-11                           | 7.78E-11                           | 9.34E-11                              |
| S              | 35000                | Co-60   | 3.13E-09                | 5.63E-16                           | 2.79E-15                           | 3.36E-15                              |
| S              | 45000                | Fe-60   | 5.76E-05                | 1.04E-11                           | 5.36E-11                           | 6.40E-11                              |
| S              | 45000                | Co-60m  | 5.76E-05                | 1.04E-11                           | 5.36E-11                           | 6.40E-11                              |
| S              | 45000                | Co-60   | 2.72E-09                | 4.90E-16                           | 2.53E-15                           | 3.02E-15                              |
| S              | 55000                | Fe-60   | 3.96E-05                | 7.13E-12                           | 3.86E-11                           | 4.57E-11                              |
| S              | 55000                | Co-60m  | 3.96E-05                | 7.13E-12                           | 3.86E-11                           | 4.57E-11                              |
| S              | 55000                | Co-60   | 2.32E-09                | 4.18E-16                           | 2.26E-15                           | 2.68E-15                              |
| S              | 70000                | Fe-60   | 2.29E-05                | 4.12E-12                           | 2.47E-11                           | 2.88E-11                              |
| S              | 70000                | Co-60m  | 2.29E-05                | 4.12E-12                           | 2.47E-11                           | 2.88E-11                              |
| S              | 70000                | Co-60   | 1.73E-09                | 3.12E-16                           | 1.87E-15                           | 2.18E-15                              |
| SSE            | 250                  | Fe-60   | 5.44E-02                | 9.79E-09                           | 1.59E-08                           | 2.57E-08                              |
| SSE            | 250                  | Co-60m  | 3.63E-03                | 6.53E-10                           | 1.06E-09                           | 1.71E-09                              |
| SSE            | 250                  | Co-60   | 4.77E-10                | 8.58E-17                           | 1.39E-16                           | 2.25E-16                              |
| SSE            | 750                  | Fe-60   | 1.73E-02                | 3.12E-09                           | 5.25E-09                           | 8.37E-09                              |
| SSE            | 750                  | Co-60m  | 3.24E-03                | 5.83E-10                           | 9.82E-10                           | 1.57E-09                              |
| SSE            | 750                  | Co-60   | 1.31E-09                | 2.35E-16                           | 3.96E-16                           | 6.31E-16                              |
| SSE            | 1500                 | Fe-60   | 7.45E-03                | 1.34E-09                           | 2.60E-09                           | 3.94E-09                              |
| SSE            | 1500                 | Co-60m  | 2.53E-03                | 4.55E-10                           | 8.80E-10                           | 1.33E-09                              |
| SSE            | 1500                 | Co-60   | 2.11E-09                | 3.79E-16                           | 7.33E-16                           | 1.11E-15                              |
| SSE            | 2500                 | Fe-60   | 3.68E-03                | 6.62E-10                           | 1.54E-09                           | 2.20E-09                              |
| SSE            | 2500                 | Co-60m  | 1.83E-03                | 3.30E-10                           | 7.65E-10                           | 1.09E-09                              |
| SSE            | 2500                 | Co-60   | 2.65E-09                | 4.77E-16                           | 1.11E-15                           | 1.59E-15                              |
| SSE            | 3500                 | Fe-60   | 2.26E-03                | 4.07E-10                           | 1.08E-09                           | 1.49E-09                              |
| SSE            | 3500                 | Co-60m  | 1.40E-03                | 2.52E-10                           | 6.70E-10                           | 9.22E-10                              |
| SSE            | 3500                 | Co-60   | 2.95E-09                | 5.31E-16                           | 1.41E-15                           | 1.94E-15                              |
| SSE            | 4500                 | Fe-60   | 1.58E-03                | 2.84E-10                           | 8.30E-10                           | 1.11E-09                              |
| SSE            | 4500                 | Co-60m  | 1.12E-03                | 2.02E-10                           | 5.90E-10                           | 7.92E-10                              |
| SSE            | 4500                 | Co-60   | 3.16E-09                | 5.69E-16                           | 1.66E-15                           | 2.23E-15                              |
| SSE            | 7500                 | Fe-60   | 7.58E-04                | 1.36E-10                           | 4.79E-10                           | 6.15E-10                              |
| SSE            | 7500                 | Co-60m  | 6.62E-04                | 1.19E-10                           | 4.18E-10                           | 5.37E-10                              |
| SSE            | 7500                 | Co-60   | 3.41E-09                | 6.14E-16                           | 2.16E-15                           | 2.77E-15                              |
| SSE            | 15000                | Fe-60   | 2.91E-04                | 5.24E-11                           | 2.19E-10                           | 2.71E-10                              |
| SSE            | 15000                | Co-60m  | 2.86E-04                | 5.15E-11                           | 2.15E-10                           | 2.67E-10                              |
| SSE            | 15000                | Co-60   | 3.46E-09                | 6.22E-16                           | 2.60E-15                           | 3.22E-15                              |
| SSE            | 25000                | Fe-60   | 1.37E-04                | 2.46E-11                           | 1.16E-10                           | 1.40E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m <sup>3</sup> ) | Dry<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Wet<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Ground<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) |
|----------------|----------------------|---------|--------------------------------------|---|---|--|
| SSE            | 25000                | Co-60m  | 1.37E-04                             | 2.46E-11  | 1.15E-10  | 1.40E-10   |
| SSE            | 25000                | Co-60   | 3.04E-09                             | 5.48E-16  | 2.57E-15  | 3.12E-15   |
| SSE            | 35000                | Fe-60   | 8.35E-05                             | 1.50E-11  | 7.41E-11  | 8.91E-11   |
| SSE            | 35000                | Co-60m  | 8.35E-05                             | 1.50E-11  | 7.41E-11  | 8.91E-11   |
| SSE            | 35000                | Co-60   | 2.72E-09                             | 4.90E-16  | 2.42E-15  | 2.91E-15   |
| SSE            | 45000                | Fe-60   | 5.59E-05                             | 1.01E-11  | 5.16E-11  | 6.17E-11   |
| SSE            | 45000                | Co-60m  | 5.59E-05                             | 1.01E-11  | 5.16E-11  | 6.17E-11   |
| SSE            | 45000                | Co-60   | 2.40E-09                             | 4.33E-16  | 2.22E-15  | 2.65E-15   |
| SSE            | 55000                | Fe-60   | 3.89E-05                             | 7.00E-12  | 3.75E-11  | 4.45E-11   |
| SSE            | 55000                | Co-60m  | 3.89E-05                             | 7.00E-12  | 3.75E-11  | 4.45E-11   |
| SSE            | 55000                | Co-60   | 2.08E-09                             | 3.74E-16  | 2.00E-15  | 2.38E-15   |
| SSE            | 70000                | Fe-60   | 2.30E-05                             | 4.14E-12  | 2.44E-11  | 2.86E-11   |
| SSE            | 70000                | Co-60m  | 2.30E-05                             | 4.14E-12  | 2.44E-11  | 2.86E-11   |
| SSE            | 70000                | Co-60   | 1.59E-09                             | 2.86E-16  | 1.69E-15  | 1.97E-15   |
| SE             | 250                  | Fe-60   | 5.02E-02                             | 9.04E-09  | 1.47E-08  | 2.37E-08   |
| SE             | 250                  | Co-60m  | 3.10E-03                             | 5.58E-10  | 9.05E-10  | 1.46E-09   |
| SE             | 250                  | Co-60   | 3.76E-10                             | 6.76E-17  | 1.10E-16  | 1.77E-16   |
| SE             | 750                  | Fe-60   | 1.60E-02                             | 2.88E-09  | 4.85E-09  | 7.74E-09   |
| SE             | 750                  | Co-60m  | 2.79E-03                             | 5.01E-10  | 8.44E-10  | 1.35E-09   |
| SE             | 750                  | Co-60   | 1.03E-09                             | 1.86E-16  | 3.13E-16  | 5.00E-16   |
| SE             | 1500                 | Fe-60   | 6.89E-03                             | 1.24E-09  | 2.40E-09  | 3.64E-09   |
| SE             | 1500                 | Co-60m  | 2.19E-03                             | 3.94E-10  | 7.62E-10  | 1.16E-09   |
| SE             | 1500                 | Co-60   | 1.68E-09                             | 3.02E-16  | 5.84E-16  | 8.85E-16   |
| SE             | 2500                 | Fe-60   | 3.41E-03                             | 6.13E-10  | 1.42E-09  | 2.03E-09   |
| SE             | 2500                 | Co-60m  | 1.60E-03                             | 2.89E-10  | 6.70E-10  | 9.58E-10   |
| SE             | 2500                 | Co-60   | 2.13E-09                             | 3.83E-16  | 8.88E-16  | 1.27E-15   |
| SE             | 3500                 | Fe-60   | 2.10E-03                             | 3.77E-10  | 1.00E-09  | 1.38E-09   |
| SE             | 3500                 | Co-60m  | 1.24E-03                             | 2.23E-10  | 5.91E-10  | 8.14E-10   |
| SE             | 3500                 | Co-60   | 2.38E-09                             | 4.29E-16  | 1.14E-15  | 1.57E-15   |
| SE             | 4500                 | Fe-60   | 1.47E-03                             | 2.64E-10  | 7.70E-10  | 1.03E-09   |
| SE             | 4500                 | Co-60m  | 1.00E-03                             | 1.80E-10  | 5.25E-10  | 7.05E-10   |
| SE             | 4500                 | Co-60   | 2.56E-09                             | 4.62E-16  | 1.35E-15  | 1.81E-15   |
| SE             | 7500                 | Fe-60   | 7.06E-04                             | 1.27E-10  | 4.45E-10  | 5.72E-10   |
| SE             | 7500                 | Co-60m  | 6.02E-04                             | 1.08E-10  | 3.79E-10  | 4.88E-10   |
| SE             | 7500                 | Co-60   | 2.82E-09                             | 5.07E-16  | 1.78E-15  | 2.28E-15   |
| SE             | 15000                | Fe-60   | 2.73E-04                             | 4.92E-11  | 2.05E-10  | 2.54E-10   |
| SE             | 15000                | Co-60m  | 2.67E-04                             | 4.81E-11  | 2.01E-10  | 2.49E-10   |
| SE             | 15000                | Co-60   | 2.93E-09                             | 5.27E-16  | 2.20E-15  | 2.72E-15   |
| SE             | 25000                | Fe-60   | 1.30E-04                             | 2.34E-11  | 1.09E-10  | 1.33E-10   |
| SE             | 25000                | Co-60m  | 1.30E-04                             | 2.34E-11  | 1.09E-10  | 1.33E-10   |
| SE             | 25000                | Co-60   | 2.63E-09                             | 4.74E-16  | 2.21E-15  | 2.69E-15   |
| SE             | 35000                | Fe-60   | 8.01E-05                             | 1.44E-11  | 7.07E-11  | 8.51E-11   |
| SE             | 35000                | Co-60m  | 8.01E-05                             | 1.44E-11  | 7.07E-11  | 8.51E-11   |
| SE             | 35000                | Co-60   | 2.39E-09                             | 4.30E-16  | 2.11E-15  | 2.54E-15   |
| SE             | 45000                | Fe-60   | 5.41E-05                             | 9.74E-12  | 4.96E-11  | 5.94E-11   |
| SE             | 45000                | Co-60m  | 5.41E-05                             | 9.74E-12  | 4.96E-11  | 5.94E-11   |
| SE             | 45000                | Co-60   | 2.13E-09                             | 3.84E-16  | 1.96E-15  | 2.34E-15   |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SE             | 55000                | Fe-60   | 3.80E-05                | 6.85E-12                           | 3.64E-11                           | 4.33E-11                              |
| SE             | 55000                | Co-60m  | 3.80E-05                | 6.85E-12                           | 3.64E-11                           | 4.33E-11                              |
| SE             | 55000                | Co-60   | 1.86E-09                | 3.36E-16                           | 1.79E-15                           | 2.12E-15                              |
| SE             | 70000                | Fe-60   | 2.29E-05                | 4.13E-12                           | 2.40E-11                           | 2.82E-11                              |
| SE             | 70000                | Co-60m  | 2.29E-05                | 4.13E-12                           | 2.40E-11                           | 2.82E-11                              |
| SE             | 70000                | Co-60   | 1.45E-09                | 2.62E-16                           | 1.52E-15                           | 1.79E-15                              |
| ESE            | 250                  | Fe-60   | 4.67E-02                | 8.40E-09                           | 1.36E-08                           | 2.20E-08                              |
| ESE            | 250                  | Co-60m  | 2.68E-03                | 4.82E-10                           | 7.82E-10                           | 1.26E-09                              |
| ESE            | 250                  | Co-60   | 3.01E-10                | 5.42E-17                           | 8.80E-17                           | 1.42E-16                              |
| ESE            | 750                  | Fe-60   | 1.49E-02                | 2.68E-09                           | 4.51E-09                           | 7.19E-09                              |
| ESE            | 750                  | Co-60m  | 2.42E-03                | 4.35E-10                           | 7.33E-10                           | 1.17E-09                              |
| ESE            | 750                  | Co-60   | 8.32E-10                | 1.50E-16                           | 2.52E-16                           | 4.02E-16                              |
| ESE            | 1500                 | Fe-60   | 6.41E-03                | 1.15E-09                           | 2.23E-09                           | 3.39E-09                              |
| ESE            | 1500                 | Co-60m  | 1.91E-03                | 3.45E-10                           | 6.67E-10                           | 1.01E-09                              |
| ESE            | 1500                 | Co-60   | 1.35E-09                | 2.44E-16                           | 4.72E-16                           | 7.16E-16                              |
| ESE            | 2500                 | Fe-60   | 3.17E-03                | 5.71E-10                           | 1.32E-09                           | 1.89E-09                              |
| ESE            | 2500                 | Co-60m  | 1.41E-03                | 2.55E-10                           | 5.91E-10                           | 8.45E-10                              |
| ESE            | 2500                 | Co-60   | 1.73E-09                | 3.11E-16                           | 7.22E-16                           | 1.03E-15                              |
| ESE            | 3500                 | Fe-60   | 1.95E-03                | 3.52E-10                           | 9.34E-10                           | 1.29E-09                              |
| ESE            | 3500                 | Co-60m  | 1.10E-03                | 1.98E-10                           | 5.26E-10                           | 7.24E-10                              |
| ESE            | 3500                 | Co-60   | 1.95E-09                | 3.51E-16                           | 9.31E-16                           | 1.28E-15                              |
| ESE            | 4500                 | Fe-60   | 1.37E-03                | 2.46E-10                           | 7.18E-10                           | 9.64E-10                              |
| ESE            | 4500                 | Co-60m  | 8.96E-04                | 1.61E-10                           | 4.70E-10                           | 6.32E-10                              |
| ESE            | 4500                 | Co-60   | 2.11E-09                | 3.80E-16                           | 1.11E-15                           | 1.49E-15                              |
| ESE            | 7500                 | Fe-60   | 6.61E-04                | 1.19E-10                           | 4.16E-10                           | 5.35E-10                              |
| ESE            | 7500                 | Co-60m  | 5.49E-04                | 9.88E-11                           | 3.46E-10                           | 4.44E-10                              |
| ESE            | 7500                 | Co-60   | 2.35E-09                | 4.23E-16                           | 1.48E-15                           | 1.90E-15                              |
| ESE            | 15000                | Fe-60   | 2.57E-04                | 4.63E-11                           | 1.93E-10                           | 2.39E-10                              |
| ESE            | 15000                | Co-60m  | 2.50E-04                | 4.50E-11                           | 1.87E-10                           | 2.32E-10                              |
| ESE            | 15000                | Co-60   | 2.50E-09                | 4.50E-16                           | 1.87E-15                           | 2.32E-15                              |
| ESE            | 25000                | Fe-60   | 1.24E-04                | 2.23E-11                           | 1.04E-10                           | 1.26E-10                              |
| ESE            | 25000                | Co-60m  | 1.24E-04                | 2.23E-11                           | 1.03E-10                           | 1.26E-10                              |
| ESE            | 25000                | Co-60   | 2.30E-09                | 4.13E-16                           | 1.92E-15                           | 2.33E-15                              |
| ESE            | 35000                | Fe-60   | 7.69E-05                | 1.38E-11                           | 6.75E-11                           | 8.14E-11                              |
| ESE            | 35000                | Co-60m  | 7.69E-05                | 1.38E-11                           | 6.75E-11                           | 8.13E-11                              |
| ESE            | 35000                | Co-60   | 2.11E-09                | 3.79E-16                           | 1.85E-15                           | 2.23E-15                              |
| ESE            | 45000                | Fe-60   | 5.23E-05                | 9.42E-12                           | 4.78E-11                           | 5.72E-11                              |
| ESE            | 45000                | Co-60m  | 5.23E-05                | 9.42E-12                           | 4.78E-11                           | 5.72E-11                              |
| ESE            | 45000                | Co-60   | 1.90E-09                | 3.42E-16                           | 1.74E-15                           | 2.08E-15                              |
| ESE            | 55000                | Fe-60   | 3.71E-05                | 6.68E-12                           | 3.53E-11                           | 4.20E-11                              |
| ESE            | 55000                | Co-60m  | 3.71E-05                | 6.68E-12                           | 3.53E-11                           | 4.20E-11                              |
| ESE            | 55000                | Co-60   | 1.68E-09                | 3.02E-16                           | 1.60E-15                           | 1.90E-15                              |
| ESE            | 70000                | Fe-60   | 2.28E-05                | 4.10E-12                           | 2.36E-11                           | 2.77E-11                              |
| ESE            | 70000                | Co-60m  | 2.28E-05                | 4.10E-12                           | 2.36E-11                           | 2.77E-11                              |
| ESE            | 70000                | Co-60   | 1.33E-09                | 2.40E-16                           | 1.38E-15                           | 1.62E-15                              |
| E              | 250                  | Fe-60   | 4.36E-02                | 7.84E-09                           | 1.27E-08                           | 2.06E-08                              |
| E              | 250                  | Co-60m  | 2.34E-03                | 4.21E-10                           | 6.83E-10                           | 1.10E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| E              | 250                  | Co-60   | 2.45E-10                | 4.42E-17                           | 7.16E-17                           | 1.16E-16                              |
| E              | 750                  | Fe-60   | 1.39E-02                | 2.50E-09                           | 4.21E-09                           | 6.71E-09                              |
| E              | 750                  | Co-60m  | 2.12E-03                | 3.82E-10                           | 6.43E-10                           | 1.02E-09                              |
| E              | 750                  | Co-60   | 6.80E-10                | 1.22E-16                           | 2.06E-16                           | 3.28E-16                              |
| E              | 1500                 | Fe-60   | 5.99E-03                | 1.08E-09                           | 2.09E-09                           | 3.17E-09                              |
| E              | 1500                 | Co-60m  | 1.69E-03                | 3.04E-10                           | 5.88E-10                           | 8.92E-10                              |
| E              | 1500                 | Co-60   | 1.11E-09                | 2.00E-16                           | 3.87E-16                           | 5.87E-16                              |
| E              | 2500                 | Fe-60   | 2.97E-03                | 5.34E-10                           | 1.24E-09                           | 1.77E-09                              |
| E              | 2500                 | Co-60m  | 1.26E-03                | 2.26E-10                           | 5.25E-10                           | 7.51E-10                              |
| E              | 2500                 | Co-60   | 1.43E-09                | 2.57E-16                           | 5.96E-16                           | 8.52E-16                              |
| E              | 3500                 | Fe-60   | 1.83E-03                | 3.29E-10                           | 8.74E-10                           | 1.20E-09                              |
| E              | 3500                 | Co-60m  | 9.84E-04                | 1.77E-10                           | 4.70E-10                           | 6.48E-10                              |
| E              | 3500                 | Co-60   | 1.62E-09                | 2.91E-16                           | 7.72E-16                           | 1.06E-15                              |
| E              | 4500                 | Fe-60   | 1.28E-03                | 2.31E-10                           | 6.73E-10                           | 9.03E-10                              |
| E              | 4500                 | Co-60m  | 8.08E-04                | 1.45E-10                           | 4.23E-10                           | 5.69E-10                              |
| E              | 4500                 | Co-60   | 1.76E-09                | 3.16E-16                           | 9.21E-16                           | 1.24E-15                              |
| E              | 7500                 | Fe-60   | 6.21E-04                | 1.12E-10                           | 3.91E-10                           | 5.03E-10                              |
| E              | 7500                 | Co-60m  | 5.03E-04                | 9.05E-11                           | 3.16E-10                           | 4.07E-10                              |
| E              | 7500                 | Co-60   | 1.98E-09                | 3.57E-16                           | 1.25E-15                           | 1.60E-15                              |
| E              | 15000                | Fe-60   | 2.43E-04                | 4.38E-11                           | 1.82E-10                           | 2.26E-10                              |
| E              | 15000                | Co-60m  | 2.35E-04                | 4.22E-11                           | 1.75E-10                           | 2.18E-10                              |
| E              | 15000                | Co-60   | 2.15E-09                | 3.88E-16                           | 1.61E-15                           | 2.00E-15                              |
| E              | 25000                | Fe-60   | 1.18E-04                | 2.13E-11                           | 9.86E-11                           | 1.20E-10                              |
| E              | 25000                | Co-60m  | 1.18E-04                | 2.12E-11                           | 9.82E-11                           | 1.19E-10                              |
| E              | 25000                | Co-60   | 2.02E-09                | 3.63E-16                           | 1.68E-15                           | 2.04E-15                              |
| E              | 35000                | Fe-60   | 7.39E-05                | 1.33E-11                           | 6.46E-11                           | 7.79E-11                              |
| E              | 35000                | Co-60m  | 7.38E-05                | 1.33E-11                           | 6.46E-11                           | 7.78E-11                              |
| E              | 35000                | Co-60   | 1.87E-09                | 3.37E-16                           | 1.64E-15                           | 1.97E-15                              |
| E              | 45000                | Fe-60   | 5.06E-05                | 9.11E-12                           | 4.60E-11                           | 5.51E-11                              |
| E              | 45000                | Co-60m  | 5.06E-05                | 9.11E-12                           | 4.60E-11                           | 5.51E-11                              |
| E              | 45000                | Co-60   | 1.70E-09                | 3.06E-16                           | 1.55E-15                           | 1.85E-15                              |
| E              | 55000                | Fe-60   | 3.62E-05                | 6.51E-12                           | 3.42E-11                           | 4.07E-11                              |
| E              | 55000                | Co-60m  | 3.62E-05                | 6.51E-12                           | 3.42E-11                           | 4.07E-11                              |
| E              | 55000                | Co-60   | 1.52E-09                | 2.73E-16                           | 1.44E-15                           | 1.71E-15                              |
| E              | 70000                | Fe-60   | 2.25E-05                | 4.05E-12                           | 2.31E-11                           | 2.72E-11                              |
| E              | 70000                | Co-60m  | 2.25E-05                | 4.05E-12                           | 2.31E-11                           | 2.72E-11                              |
| E              | 70000                | Co-60   | 1.22E-09                | 2.20E-16                           | 1.26E-15                           | 1.48E-15                              |
| ENE            | 250                  | Fe-60   | 4.08E-02                | 7.35E-09                           | 1.19E-08                           | 1.93E-08                              |
| ENE            | 250                  | Co-60m  | 2.06E-03                | 3.71E-10                           | 6.01E-10                           | 9.72E-10                              |
| ENE            | 250                  | Co-60   | 2.02E-10                | 3.64E-17                           | 5.91E-17                           | 9.56E-17                              |
| ENE            | 750                  | Fe-60   | 1.30E-02                | 2.35E-09                           | 3.95E-09                           | 6.30E-09                              |
| ENE            | 750                  | Co-60m  | 1.88E-03                | 3.38E-10                           | 5.68E-10                           | 9.06E-10                              |
| ENE            | 750                  | Co-60   | 5.63E-10                | 1.01E-16                           | 1.70E-16                           | 2.72E-16                              |
| ENE            | 1500                 | Fe-60   | 5.63E-03                | 1.01E-09                           | 1.96E-09                           | 2.97E-09                              |
| ENE            | 1500                 | Co-60m  | 1.50E-03                | 2.70E-10                           | 5.23E-10                           | 7.93E-10                              |
| ENE            | 1500                 | Co-60   | 9.23E-10                | 1.66E-16                           | 3.21E-16                           | 4.88E-16                              |
| ENE            | 2500                 | Fe-60   | 2.79E-03                | 5.01E-10                           | 1.16E-09                           | 1.66E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ENE            | 2500                 | Co-60m  | 1.13E-03                | 2.03E-10                           | 4.70E-10                           | 6.72E-10                              |
| ENE            | 2500                 | Co-60   | 1.19E-09                | 2.14E-16                           | 4.97E-16                           | 7.11E-16                              |
| ENE            | 3500                 | Fe-60   | 1.72E-03                | 3.10E-10                           | 8.22E-10                           | 1.13E-09                              |
| ENE            | 3500                 | Co-60m  | 8.86E-04                | 1.60E-10                           | 4.23E-10                           | 5.83E-10                              |
| ENE            | 3500                 | Co-60   | 1.35E-09                | 2.44E-16                           | 6.47E-16                           | 8.91E-16                              |
| ENE            | 4500                 | Fe-60   | 1.21E-03                | 2.17E-10                           | 6.33E-10                           | 8.50E-10                              |
| ENE            | 4500                 | Co-60m  | 7.32E-04                | 1.32E-10                           | 3.83E-10                           | 5.15E-10                              |
| ENE            | 4500                 | Co-60   | 1.48E-09                | 2.66E-16                           | 7.75E-16                           | 1.04E-15                              |
| ENE            | 7500                 | Fe-60   | 5.86E-04                | 1.05E-10                           | 3.68E-10                           | 4.74E-10                              |
| ENE            | 7500                 | Co-60m  | 4.62E-04                | 8.31E-11                           | 2.90E-10                           | 3.74E-10                              |
| ENE            | 7500                 | Co-60   | 1.69E-09                | 3.04E-16                           | 1.06E-15                           | 1.36E-15                              |
| ENE            | 15000                | Fe-60   | 2.31E-04                | 4.15E-11                           | 1.72E-10                           | 2.14E-10                              |
| ENE            | 15000                | Co-60m  | 2.20E-04                | 3.97E-11                           | 1.65E-10                           | 2.04E-10                              |
| ENE            | 15000                | Co-60   | 1.87E-09                | 3.36E-16                           | 1.40E-15                           | 1.73E-15                              |
| ENE            | 25000                | Fe-60   | 1.13E-04                | 2.04E-11                           | 9.39E-11                           | 1.14E-10                              |
| ENE            | 25000                | Co-60m  | 1.12E-04                | 2.02E-11                           | 9.34E-11                           | 1.14E-10                              |
| ENE            | 25000                | Co-60   | 1.78E-09                | 3.21E-16                           | 1.48E-15                           | 1.80E-15                              |
| ENE            | 35000                | Fe-60   | 7.10E-05                | 1.28E-11                           | 6.19E-11                           | 7.46E-11                              |
| ENE            | 35000                | Co-60m  | 7.09E-05                | 1.28E-11                           | 6.18E-11                           | 7.46E-11                              |
| ENE            | 35000                | Co-60   | 1.67E-09                | 3.01E-16                           | 1.46E-15                           | 1.76E-15                              |
| ENE            | 45000                | Fe-60   | 4.89E-05                | 8.81E-12                           | 4.43E-11                           | 5.31E-11                              |
| ENE            | 45000                | Co-60m  | 4.89E-05                | 8.81E-12                           | 4.43E-11                           | 5.31E-11                              |
| ENE            | 45000                | Co-60   | 1.53E-09                | 2.76E-16                           | 1.39E-15                           | 1.66E-15                              |
| ENE            | 55000                | Fe-60   | 3.52E-05                | 6.34E-12                           | 3.32E-11                           | 3.95E-11                              |
| ENE            | 55000                | Co-60m  | 3.52E-05                | 6.34E-12                           | 3.32E-11                           | 3.95E-11                              |
| ENE            | 55000                | Co-60   | 1.38E-09                | 2.48E-16                           | 1.30E-15                           | 1.55E-15                              |
| ENE            | 70000                | Fe-60   | 2.22E-05                | 3.99E-12                           | 2.26E-11                           | 2.66E-11                              |
| ENE            | 70000                | Co-60m  | 2.22E-05                | 3.99E-12                           | 2.26E-11                           | 2.66E-11                              |
| ENE            | 70000                | Co-60   | 1.13E-09                | 2.03E-16                           | 1.15E-15                           | 1.35E-15                              |
| NE             | 250                  | Fe-60   | 3.84E-02                | 6.92E-09                           | 1.12E-08                           | 1.81E-08                              |
| NE             | 250                  | Co-60m  | 1.83E-03                | 3.29E-10                           | 5.33E-10                           | 8.62E-10                              |
| NE             | 250                  | Co-60   | 1.69E-10                | 3.04E-17                           | 4.93E-17                           | 7.97E-17                              |
| NE             | 750                  | Fe-60   | 1.23E-02                | 2.21E-09                           | 3.72E-09                           | 5.93E-09                              |
| NE             | 750                  | Co-60m  | 1.67E-03                | 3.00E-10                           | 5.06E-10                           | 8.06E-10                              |
| NE             | 750                  | Co-60   | 4.70E-10                | 8.47E-17                           | 1.42E-16                           | 2.27E-16                              |
| NE             | 1500                 | Fe-60   | 5.30E-03                | 9.54E-10                           | 1.84E-09                           | 2.80E-09                              |
| NE             | 1500                 | Co-60m  | 1.34E-03                | 2.42E-10                           | 4.67E-10                           | 7.09E-10                              |
| NE             | 1500                 | Co-60   | 7.75E-10                | 1.39E-16                           | 2.70E-16                           | 4.09E-16                              |
| NE             | 2500                 | Fe-60   | 2.63E-03                | 4.73E-10                           | 1.10E-09                           | 1.57E-09                              |
| NE             | 2500                 | Co-60m  | 1.01E-03                | 1.82E-10                           | 4.22E-10                           | 6.05E-10                              |
| NE             | 2500                 | Co-60   | 1.00E-09                | 1.81E-16                           | 4.19E-16                           | 5.99E-16                              |
| NE             | 3500                 | Fe-60   | 1.62E-03                | 2.92E-10                           | 7.75E-10                           | 1.07E-09                              |
| NE             | 3500                 | Co-60m  | 8.02E-04                | 1.44E-10                           | 3.83E-10                           | 5.27E-10                              |
| NE             | 3500                 | Co-60   | 1.15E-09                | 2.06E-16                           | 5.47E-16                           | 7.53E-16                              |
| NE             | 4500                 | Fe-60   | 1.14E-03                | 2.05E-10                           | 5.97E-10                           | 8.02E-10                              |
| NE             | 4500                 | Co-60m  | 6.65E-04                | 1.20E-10                           | 3.48E-10                           | 4.68E-10                              |
| NE             | 4500                 | Co-60   | 1.26E-09                | 2.26E-16                           | 6.58E-16                           | 8.85E-16                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 7500                 | Fe-60   | 5.54E-04                | 9.98E-11                           | 3.48E-10                           | 4.48E-10                              |
| NE             | 7500                 | Co-60m  | 4.26E-04                | 7.66E-11                           | 2.68E-10                           | 3.44E-10                              |
| NE             | 7500                 | Co-60   | 1.45E-09                | 2.60E-16                           | 9.09E-16                           | 1.17E-15                              |
| NE             | 15000                | Fe-60   | 2.19E-04                | 3.95E-11                           | 1.64E-10                           | 2.03E-10                              |
| NE             | 15000                | Co-60m  | 2.08E-04                | 3.74E-11                           | 1.55E-10                           | 1.92E-10                              |
| NE             | 15000                | Co-60   | 1.63E-09                | 2.94E-16                           | 1.22E-15                           | 1.51E-15                              |
| NE             | 25000                | Fe-60   | 1.08E-04                | 1.95E-11                           | 8.97E-11                           | 1.09E-10                              |
| NE             | 25000                | Co-60m  | 1.07E-04                | 1.93E-11                           | 8.90E-11                           | 1.08E-10                              |
| NE             | 25000                | Co-60   | 1.58E-09                | 2.85E-16                           | 1.31E-15                           | 1.59E-15                              |
| NE             | 35000                | Fe-60   | 6.83E-05                | 1.23E-11                           | 5.93E-11                           | 7.16E-11                              |
| NE             | 35000                | Co-60m  | 6.82E-05                | 1.23E-11                           | 5.93E-11                           | 7.15E-11                              |
| NE             | 35000                | Co-60   | 1.50E-09                | 2.69E-16                           | 1.30E-15                           | 1.57E-15                              |
| NE             | 45000                | Fe-60   | 4.73E-05                | 8.52E-12                           | 4.27E-11                           | 5.12E-11                              |
| NE             | 45000                | Co-60m  | 4.73E-05                | 8.52E-12                           | 4.27E-11                           | 5.12E-11                              |
| NE             | 45000                | Co-60   | 1.38E-09                | 2.49E-16                           | 1.25E-15                           | 1.50E-15                              |
| NE             | 55000                | Fe-60   | 3.43E-05                | 6.17E-12                           | 3.21E-11                           | 3.83E-11                              |
| NE             | 55000                | Co-60m  | 3.43E-05                | 6.17E-12                           | 3.21E-11                           | 3.83E-11                              |
| NE             | 55000                | Co-60   | 1.25E-09                | 2.26E-16                           | 1.18E-15                           | 1.40E-15                              |
| NE             | 70000                | Fe-60   | 2.18E-05                | 3.93E-12                           | 2.21E-11                           | 2.60E-11                              |
| NE             | 70000                | Co-60m  | 2.18E-05                | 3.93E-12                           | 2.21E-11                           | 2.60E-11                              |
| NE             | 70000                | Co-60   | 1.04E-09                | 1.87E-16                           | 1.05E-15                           | 1.24E-15                              |
| NNE            | 250                  | Fe-60   | 3.63E-02                | 6.54E-09                           | 1.06E-08                           | 1.71E-08                              |
| NNE            | 250                  | Co-60m  | 1.63E-03                | 2.94E-10                           | 4.77E-10                           | 7.70E-10                              |
| NNE            | 250                  | Co-60   | 1.43E-10                | 2.57E-17                           | 4.16E-17                           | 6.72E-17                              |
| NNE            | 750                  | Fe-60   | 1.16E-02                | 2.09E-09                           | 3.52E-09                           | 5.60E-09                              |
| NNE            | 750                  | Co-60m  | 1.50E-03                | 2.69E-10                           | 4.53E-10                           | 7.22E-10                              |
| NNE            | 750                  | Co-60   | 3.98E-10                | 7.16E-17                           | 1.20E-16                           | 1.92E-16                              |
| NNE            | 1500                 | Fe-60   | 5.01E-03                | 9.02E-10                           | 1.74E-09                           | 2.65E-09                              |
| NNE            | 1500                 | Co-60m  | 1.21E-03                | 2.17E-10                           | 4.21E-10                           | 6.38E-10                              |
| NNE            | 1500                 | Co-60   | 6.57E-10                | 1.18E-16                           | 2.29E-16                           | 3.47E-16                              |
| NNE            | 2500                 | Fe-60   | 2.48E-03                | 4.47E-10                           | 1.04E-09                           | 1.48E-09                              |
| NNE            | 2500                 | Co-60m  | 9.16E-04                | 1.65E-10                           | 3.82E-10                           | 5.47E-10                              |
| NNE            | 2500                 | Co-60   | 8.54E-10                | 1.54E-16                           | 3.56E-16                           | 5.10E-16                              |
| NNE            | 3500                 | Fe-60   | 1.54E-03                | 2.76E-10                           | 7.33E-10                           | 1.01E-09                              |
| NNE            | 3500                 | Co-60m  | 7.29E-04                | 1.31E-10                           | 3.48E-10                           | 4.79E-10                              |
| NNE            | 3500                 | Co-60   | 9.79E-10                | 1.76E-16                           | 4.67E-16                           | 6.43E-16                              |
| NNE            | 4500                 | Fe-60   | 1.08E-03                | 1.94E-10                           | 5.65E-10                           | 7.60E-10                              |
| NNE            | 4500                 | Co-60m  | 6.08E-04                | 1.09E-10                           | 3.18E-10                           | 4.28E-10                              |
| NNE            | 4500                 | Co-60   | 1.08E-09                | 1.94E-16                           | 5.64E-16                           | 7.58E-16                              |
| NNE            | 7500                 | Fe-60   | 5.26E-04                | 9.47E-11                           | 3.30E-10                           | 4.25E-10                              |
| NNE            | 7500                 | Co-60m  | 3.94E-04                | 7.09E-11                           | 2.47E-10                           | 3.18E-10                              |
| NNE            | 7500                 | Co-60   | 1.25E-09                | 2.25E-16                           | 7.86E-16                           | 1.01E-15                              |
| NNE            | 15000                | Fe-60   | 2.09E-04                | 3.76E-11                           | 1.56E-10                           | 1.93E-10                              |
| NNE            | 15000                | Co-60m  | 1.96E-04                | 3.52E-11                           | 1.46E-10                           | 1.81E-10                              |
| NNE            | 15000                | Co-60   | 1.44E-09                | 2.58E-16                           | 1.07E-15                           | 1.33E-15                              |
| NNE            | 25000                | Fe-60   | 1.04E-04                | 1.87E-11                           | 8.58E-11                           | 1.04E-10                              |
| NNE            | 25000                | Co-60m  | 1.03E-04                | 1.85E-11                           | 8.49E-11                           | 1.03E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNE            | 25000                | Co-60   | 1.41E-09                | 2.54E-16                           | 1.17E-15                           | 1.42E-15                              |
| NNE            | 35000                | Fe-60   | 6.58E-05                | 1.18E-11                           | 5.70E-11                           | 6.88E-11                              |
| NNE            | 35000                | Co-60m  | 6.57E-05                | 1.18E-11                           | 5.69E-11                           | 6.87E-11                              |
| NNE            | 35000                | Co-60   | 1.35E-09                | 2.43E-16                           | 1.17E-15                           | 1.41E-15                              |
| NNE            | 45000                | Fe-60   | 4.58E-05                | 8.24E-12                           | 4.12E-11                           | 4.94E-11                              |
| NNE            | 45000                | Co-60m  | 4.58E-05                | 8.24E-12                           | 4.12E-11                           | 4.94E-11                              |
| NNE            | 45000                | Co-60   | 1.26E-09                | 2.26E-16                           | 1.13E-15                           | 1.35E-15                              |
| NNE            | 55000                | Fe-60   | 3.33E-05                | 6.00E-12                           | 3.11E-11                           | 3.71E-11                              |
| NNE            | 55000                | Co-60m  | 3.33E-05                | 6.00E-12                           | 3.11E-11                           | 3.71E-11                              |
| NNE            | 55000                | Co-60   | 1.15E-09                | 2.06E-16                           | 1.07E-15                           | 1.28E-15                              |
| NNE            | 70000                | Fe-60   | 2.14E-05                | 3.86E-12                           | 2.15E-11                           | 2.54E-11                              |
| NNE            | 70000                | Co-60m  | 2.14E-05                | 3.86E-12                           | 2.15E-11                           | 2.54E-11                              |
| NNE            | 70000                | Co-60   | 9.60E-10                | 1.73E-16                           | 9.64E-16                           | 1.14E-15                              |





## C.2.7 Chi/Q Tables

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

C H I / Q T A B L E S

Non-Radon Population Assessment  
Fri Jun 07 18:33:17 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: MI Zip: 49037

Source Category:  
Source Type: Stack  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_003.  
Dataset Date: Jun 7, 2013 06:33 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind  
Files\SPRG2010.wnd  
Population File: C:\Documents and Settings\XPMUser\Documents\CAP88\Population  
Files\sprg2000.pop



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CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR Fe-60  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 250       | 750       | 1500      | 2500      | 3500      | 4500      | 7500      |
| N                 | 8.474E-06 | 2.636E-06 | 1.093E-06 | 5.135E-07 | 3.002E-07 | 1.997E-07 | 8.292E-08 |
| NNW               | 6.383E-06 | 2.002E-06 | 8.400E-07 | 4.011E-07 | 2.385E-07 | 1.613E-07 | 7.024E-08 |
| NW                | 5.117E-06 | 1.612E-06 | 6.815E-07 | 3.287E-07 | 1.974E-07 | 1.348E-07 | 6.043E-08 |
| WNW               | 4.272E-06 | 1.350E-06 | 5.736E-07 | 2.784E-07 | 1.683E-07 | 1.157E-07 | 5.288E-08 |
| W                 | 3.666E-06 | 1.162E-06 | 4.952E-07 | 2.414E-07 | 1.466E-07 | 1.013E-07 | 4.694E-08 |
| WSW               | 3.210E-06 | 1.019E-06 | 4.354E-07 | 2.130E-07 | 1.299E-07 | 9.004E-08 | 4.215E-08 |
| SW                | 2.856E-06 | 9.076E-07 | 3.887E-07 | 1.907E-07 | 1.166E-07 | 8.103E-08 | 3.824E-08 |
| SSW               | 2.572E-06 | 8.182E-07 | 3.510E-07 | 1.726E-07 | 1.057E-07 | 7.366E-08 | 3.498E-08 |
| S                 | 2.339E-06 | 7.447E-07 | 3.198E-07 | 1.575E-07 | 9.669E-08 | 6.749E-08 | 3.222E-08 |
| SSE               | 2.145E-06 | 6.835E-07 | 2.939E-07 | 1.450E-07 | 8.910E-08 | 6.229E-08 | 2.987E-08 |
| SE                | 1.980E-06 | 6.315E-07 | 2.718E-07 | 1.342E-07 | 8.262E-08 | 5.783E-08 | 2.784E-08 |
| ESE               | 1.839E-06 | 5.868E-07 | 2.527E-07 | 1.250E-07 | 7.700E-08 | 5.395E-08 | 2.605E-08 |
| E                 | 1.717E-06 | 5.481E-07 | 2.362E-07 | 1.169E-07 | 7.210E-08 | 5.057E-08 | 2.449E-08 |
| ENE               | 1.610E-06 | 5.142E-07 | 2.218E-07 | 1.098E-07 | 6.779E-08 | 4.759E-08 | 2.310E-08 |
| NE                | 1.516E-06 | 4.841E-07 | 2.089E-07 | 1.035E-07 | 6.396E-08 | 4.493E-08 | 2.186E-08 |
| NNE               | 1.432E-06 | 4.575E-07 | 1.975E-07 | 9.795E-08 | 6.055E-08 | 4.256E-08 | 2.074E-08 |

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| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 15000     | 25000     | 35000     | 45000     | 55000     | 70000     |
| N                 | 2.348E-08 | 6.885E-09 | 2.997E-09 | 1.409E-09 | 6.600E-10 | 2.006E-10 |
| NNW               | 2.200E-08 | 7.529E-09 | 3.665E-09 | 1.937E-09 | 1.032E-09 | 3.850E-10 |
| NW                | 2.012E-08 | 7.567E-09 | 3.942E-09 | 2.235E-09 | 1.289E-09 | 5.484E-10 |
| WNW               | 1.833E-08 | 7.347E-09 | 4.003E-09 | 2.379E-09 | 1.447E-09 | 6.741E-10 |
| W                 | 1.675E-08 | 7.026E-09 | 3.954E-09 | 2.430E-09 | 1.535E-09 | 7.647E-10 |
| WSW               | 1.538E-08 | 6.675E-09 | 3.849E-09 | 2.426E-09 | 1.578E-09 | 8.269E-10 |
| SW                | 1.419E-08 | 6.326E-09 | 3.717E-09 | 2.390E-09 | 1.590E-09 | 8.671E-10 |
| SSW               | 1.316E-08 | 5.994E-09 | 3.576E-09 | 2.336E-09 | 1.582E-09 | 8.911E-10 |
| S                 | 1.226E-08 | 5.683E-09 | 3.432E-09 | 2.271E-09 | 1.561E-09 | 9.033E-10 |
| SSE               | 1.147E-08 | 5.396E-09 | 3.293E-09 | 2.203E-09 | 1.533E-09 | 9.069E-10 |
| SE                | 1.077E-08 | 5.131E-09 | 3.159E-09 | 2.132E-09 | 1.499E-09 | 9.043E-10 |
| ESE               | 1.015E-08 | 4.887E-09 | 3.031E-09 | 2.062E-09 | 1.463E-09 | 8.972E-10 |
| E                 | 9.596E-09 | 4.664E-09 | 2.911E-09 | 1.994E-09 | 1.426E-09 | 8.869E-10 |
| ENE               | 9.099E-09 | 4.458E-09 | 2.799E-09 | 1.929E-09 | 1.389E-09 | 8.744E-10 |
| NE                | 8.648E-09 | 4.268E-09 | 2.693E-09 | 1.865E-09 | 1.351E-09 | 8.604E-10 |
| NNE               | 8.240E-09 | 4.092E-09 | 2.594E-09 | 1.805E-09 | 1.315E-09 | 8.454E-10 |

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## ***Appendix D: Test Case 4 Inputs and Reports***

### **D.1 Inputs**

#### ***D.1.1 Dataset***

The screenshot shows the CAP88-PC software window titled "CAP88-PC - [Dataset Edit - Test\_004.dat]". The interface includes a menu bar (File, Tools, Window, Help) and a toolbar. Below the menu bar is a tabbed interface with tabs for Dataset, Facility, Population, Meteorological, Sources, Agricultural, Nuclides, and Reports. The Reports tab is active, displaying a "Generate" button, a "Print" button, and radio buttons for "Current" (selected) and "Selected". To the right of these are checkboxes for "Synopsis", "General", "Weather", "D/R Summaries", "D/R Factors", "Concentration", and "Chi/Q". A message states "Reports can take several minutes to generate". Below this is another set of tabs: Synopsis (selected), General, Weather, D/R Summaries, D/R Factors, Concentration, and Chi/Q. The main display area shows the following text:

```
C A P 8 8 - P C
Version 4.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S   R E P O R T

Non-Radon Individual Assessment
Fri Jun 07 20:40:10 2013
```

At the bottom of the window are two empty panels labeled "ERRORS" and "CHANGES".



### D.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Name: Springfield Nuclear Power Plant Emission Year: 2013

Address: 100 Industrial Way Source Category:

City: Springfield

Zip: 83277 (Note: State is found on the Agricultural tab)

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

ERRORS CHANGES



### D.1.3 Population

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Individual Population Age: Five Build up time: 100 years

☒ Create dose and risk summaries  
☒ Create dose and risk factors  
☒ Create concentration table  
☒ Create Chi/Q table

Midpoints 12

|       |          |          |         |         |          |
|-------|----------|----------|---------|---------|----------|
| 1 - 5 | 1000.00  | 2000.00  | 3000.00 | 4000.00 | 5000.00  |
| 6-10  | 6000.00  | 7000.00  | 8000.00 | 9000.00 | 10000.00 |
| 11-15 | 15000.00 | 20000.00 | 0.00    | 0.00    | 0.00     |
| 16-20 | 0.00     | 0.00     | 0.00    | 0.00    | 0.00     |

Maximum Exposed Individual

Direction: S Midpoint index: 3 ☐ Auto-determine

ERRORS

CHANGES



### D.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd

File SPRG2000 Springfield

|                            |         |                |
|----------------------------|---------|----------------|
| Annual Precipitation       | 100.00  | cm/year        |
| Annual Ambient Temperature | 10.00   | Celsius        |
| Lid Height                 | 1000.00 | meters         |
| Absolute Humidity          | 8.00    | grams/cu meter |

ERRORS

CHANGES



### D.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Source Type: Area

Sources: 4

|             | 1      | 2     | 3     | 4      |
|-------------|--------|-------|-------|--------|
| ▶ Height(m) | 5.00   | 10.00 | 8.00  | 2.00   |
| Area(m2)    | 100.00 | 50.00 | 70.00 | 120.00 |

Plume Type: None

Plume rise is zero for each Pasquill category

|          | A    | B    | C    | D    | E    | F    | G    |
|----------|------|------|------|------|------|------|------|
| ▶ meters | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

ERRORS

CHANGES



### D.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source: Imported

|                               | Vegetable | Milk | Meat |
|-------------------------------|-----------|------|------|
| Fraction home produced        | 0.0       | 0.0  | 0.0  |
| Fraction from assessment area | 0.0       | 0.0  | 0.0  |
| Fraction imported             | 1.0       | 1.0  | 1.0  |

Agriculture State: Idaho

Beef cattle density: 7.190e-02 #/ha2

Milk cattle density: 8.560e-03 #/ha2

Land fraction cultivated for vegetables: 7.150e-02

ERRORS

CHANGES





### D.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_004.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length: max ☐ Radon Only Ac-223 Add

Released Nuclide Count 3 Total Nuclide Count 3 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form        | Type | Size | RR1       | RR2       | RR3       | RR4       |
|-----|---------|------------------|------|------|-----------|-----------|-----------|-----------|
| 0   | S-35    | Sulfur Dioxid... | V    | 0... | 2.000e+04 | 1.000e+03 | 1.000e+04 | 5.000e+03 |
| 0   | S-35    | Carbon Disulf... | V    | 0... | 2.000e+04 | 1.000e+03 | 1.000e+04 | 5.000e+03 |
| 0   | S-35    | Particulate      | S    | 1... | 4.000e+02 | 1.200e+03 | 1.000e+04 | 8.000e+03 |

ERRORS

CHANGES



## D.2 Reports

### *D.2.1 Synopsis Report*

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: ID                      Zip: 83277

Source Category:  
Source Type: Area  
Emission Year: 2013  
DOSE Age Group: Five

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Committed Effective Dose Equivalent  
(mrem)

---

7.32E+00

---

At This Location: 3000 Meters South

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000



Fri Jun 07 20:40:10 2013

SYNOPSIS  
Page 1

#### MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 3000 Meters South  
Lifetime Fatal Cancer Risk: 6.09E-07

#### ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

| Organ    | Dose<br>Equivalent<br>(mrem) |
|----------|------------------------------|
| Adrenal  | 4.44E+00                     |
| UB_Wall  | 5.10E+00                     |
| Bone_Sur | 4.45E+00                     |
| Brain    | 4.44E+00                     |
| Breasts  | 4.45E+00                     |
| St_Wall  | 4.54E+00                     |
| SI_Wall  | 4.59E+00                     |
| ULI_Wall | 5.90E+00                     |
| LLI_Wall | 8.55E+00                     |
| Kidneys  | 4.44E+00                     |
| Liver    | 4.44E+00                     |
| Muscle   | 4.45E+00                     |
| Ovaries  | 4.44E+00                     |
| Pancreas | 4.44E+00                     |
| R_Marrow | 4.44E+00                     |
| Skin     | 4.47E+00                     |
| Spleen   | 4.44E+00                     |
| Testes   | 4.45E+00                     |
| Thymus   | 4.44E+00                     |
| Thyroid  | 4.44E+00                     |
| GB_Wall  | 4.44E+00                     |
| Ht_Wall  | 4.44E+00                     |
| Uterus   | 4.44E+00                     |
| ET_Reg   | 9.82E+00                     |
| Lung_66  | 2.52E+01                     |
| Effectiv | 7.32E+00                     |

#### RADIONUCLIDE EMISSIONS DURING THE YEAR 2013

| Nuclide | Type | Size  | Source<br>#1 | Source<br>#2 | Source<br>#3 | Source<br>#4 | TOTAL   |
|---------|------|-------|--------------|--------------|--------------|--------------|---------|
|         |      |       | Ci/y         | Ci/y         | Ci/y         | Ci/y         | Ci/y    |
| S-35    | V    | 0.000 | 2.0E+04      | 1.0E+03      | 1.0E+04      | 5.0E+03      | 3.6E+04 |
| S-35    | V    | 0.000 | 2.0E+04      | 1.0E+03      | 1.0E+04      | 5.0E+03      | 3.6E+04 |
| S-35    | S    | 1.000 | 4.0E+02      | 1.2E+03      | 1.0E+04      | 8.0E+03      | 2.0E+04 |

#### SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 100.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m

User specified location of max exposed individual.



( ILOC, JLOC ):    9,   3



Fri Jun 07 20:40:10 2013

SYNOPSIS  
Page 2

#### SOURCE INFORMATION

|                    |        |       |       |        |       |       |       |
|--------------------|--------|-------|-------|--------|-------|-------|-------|
| Source Number:     | 1      | 2     | 3     | 4      |       |       |       |
|                    | _____  | _____ | _____ | _____  |       |       |       |
| Source Height (m): | 5.00   | 10.00 | 8.00  | 2.00   |       |       |       |
| Area (sq m):       | 100.00 | 50.00 | 70.00 | 120.00 |       |       |       |
| Plume Rise         |        |       |       |        |       |       |       |
| Pasquill Cat:      | A      | B     | C     | D      | E     | F     | G     |
|                    | _____  | _____ | _____ | _____  | _____ | _____ | _____ |
| Fixed (m):         | None   | None  | None  | None   | None  | None  | None  |

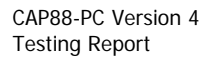
#### AGRICULTURAL DATA

|                                |           |       |       |
|--------------------------------|-----------|-------|-------|
|                                | Vegetable | Milk  | Meat  |
|                                | _____     | _____ | _____ |
| Fraction Home Produced:        | 0.000     | 0.000 | 0.000 |
| Fraction From Assessment Area: | 0.000     | 0.000 | 0.000 |
| Fraction Imported:             | 1.000     | 1.000 | 1.000 |

Food Arrays were not generated for this run.  
Default Values used.

#### DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

|      |      |       |       |       |      |      |
|------|------|-------|-------|-------|------|------|
| 1000 | 2000 | 3000  | 4000  | 5000  | 6000 | 7000 |
| 8000 | 9000 | 10000 | 15000 | 20000 |      |      |



Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: ID Zip: 83277
```

Source Category:  
Source Type: Area  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| S-35    | V                 | 0.000                         | 0.00E+00                                  | 0.00E+00                               |
| S-35    | V                 | 0.000                         | 0.00E+00                                  | 0.00E+00                               |
| S-35    | S                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-active             | Surface  | Water    | Milk (1)             | Meat (2) |
| S-35    | 7.92E-03                 | 5.48E-05 | 0.00E+00 | 2.00E-02             | 2.00E-01 |
| S-35    | 7.92E-03                 | 5.48E-05 | 0.00E+00 | 2.00E-02             | 2.00E-01 |
| S-35    | 7.92E-03                 | 5.48E-05 | 0.00E+00 | 2.00E-02             | 2.00E-01 |

FOOTNOTES:

(1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)

(2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)





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GENERAL  
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| S-35    | 2.00E+00                       | 6.00E-01   | 1.00E+00           | 1.00E+00  |
| S-35    | 2.00E+00                       | 6.00E-01   | 1.00E+00           | 1.00E+00  |
| S-35    | 2.00E+00                       | 6.00E-01   | 1.00E+00           | 1.00E+00  |

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)



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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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|  |          |
|--|----------|
| HUMAN INHALATION RATE                              |          |
| Cubic meters/yr                                    | 2.68E+03 |
| SOIL PARAMETERS                                    |          |
| Effective surface density (kg/sq m, dry weight)    |          |
| (Assumes 15 cm plow layer)                         | 2.15E+02 |
| BUILDUP TIMES                                      |          |
| For activity in soil (years)                       | 1.00E+02 |
| For radionuclides deposited on ground/water (days) | 3.65E+04 |
| DELAY TIMES  |          |
| Ingestion of pasture grass by animals (hr)         | 0.00E+00 |
| Ingestion of stored feed by animals (hr)           | 2.16E+03 |
| Ingestion of leafy vegetables by man (hr)          | 3.36E+02 |
| Ingestion of produce by man (hr)                   | 3.36E+02 |
| Transport time from animal feed-milk-man (day)     | 2.00E+00 |
| Time from slaughter to consumption (day)           | 2.00E+01 |
| WEATHERING   |          |
| Removal rate constant for physical loss (per hr)   | 2.90E-03 |
| CROP EXPOSURE DURATION                             |          |
| Pasture grass (hr)                                 | 7.20E+02 |
| Crops/leafy vegetables (hr)                        | 1.44E+03 |
| AGRICULTURAL PRODUCTIVITY                          |          |
| Grass-cow-milk-man pathway (kg/sq m)               | 2.80E-01 |
| Produce/leafy veg for human consumption (kg/sq m)  | 7.16E-01 |
| FALLOUT INTERCEPTION FRACTIONS                     |          |
| Vegetables   | 2.00E-01 |
| Pasture  | 5.70E-01 |
| GRAZING PARAMETERS                                 |          |
| Fraction of year animals graze on pasture          | 4.00E-01 |
| Fraction of daily feed that is pasture grass       |          |
| when animal grazes on pasture                      | 4.30E-01 |

---



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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside  
area listed below are actual fixed values.)

Vegetables 1.00E+00

Meat 1.00E+00

Milk 1.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 3.90E+01

Milk ingestion (L/y) 1.20E+02

Meat ingestion (kg/y) 4.40E+01

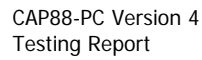
Leafy vegetable ingestion (kg/y) 3.99E+00

SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

---



Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: ID                               Zip: 83277
```

```
Source Category:
Source Type: Area
Emission Year: 2013
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |



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WEATHER  
Page 2

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

---

| Pasquill Stability Class |   |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|---|
| Dir                      | A | B | C | D | E | F | G |

---

|       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| N     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

---

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 100.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *D.2.4 Dose and Risk Equivalent Summaries*

### D O S E   A N D   R I S K   S U M M A R I E S

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: ID                      Zip: 83277

Source Category:  
Source Type: Area  
Emission Year: 2013  
DOSE Age Group: Five

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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SUMMARY  
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ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem) |
|----------|----------------------------------|
| Adrenal  | 4.44E+00                         |
| UB_Wall  | 5.10E+00                         |
| Bone_Sur | 4.45E+00                         |
| Brain    | 4.44E+00                         |
| Breasts  | 4.45E+00                         |
| St_Wall  | 4.54E+00                         |
| SI_Wall  | 4.59E+00                         |
| ULI_Wall | 5.90E+00                         |
| LLI_Wall | 8.55E+00                         |
| Kidneys  | 4.44E+00                         |
| Liver    | 4.44E+00                         |
| Muscle   | 4.45E+00                         |
| Ovaries  | 4.44E+00                         |
| Pancreas | 4.44E+00                         |
| R_Marrow | 4.44E+00                         |
| Skin     | 4.47E+00                         |
| Spleen   | 4.44E+00                         |
| Testes   | 4.45E+00                         |
| Thymus   | 4.44E+00                         |
| Thyroid  | 4.44E+00                         |
| GB_Wall  | 4.44E+00                         |
| Ht_Wall  | 4.44E+00                         |
| Uterus   | 4.44E+00                         |
| ET_Reg   | 9.82E+00                         |
| Lung_66  | 2.52E+01                         |
| Effectiv | 7.32E+00                         |

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem) |
|----------------|----------------------------------|
| INGESTION      | 0.00E+00                         |
| INHALATION     | 7.31E+00                         |
| AIR IMMERSION  | 1.56E-04                         |
| GROUND SURFACE | 2.05E-03                         |
| INTERNAL       | 7.31E+00                         |
| EXTERNAL       | 2.21E-03                         |
| TOTAL          | 7.32E+00                         |





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SUMMARY  
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclide | Selected<br>Individual<br>(mrem) |
|---------|----------------------------------|
| S-35    | 7.32E+00                         |
| TOTAL   | 7.32E+00                         |



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SUMMARY  
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CANCER RISK SUMMARY

| Cancer | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|--------|--|
|        |  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|----------------|--|
| INGESTION      | 0.00E+00   |
| INHALATION     | 6.09E-07   |
| AIR IMMERSION  | 1.91E-11   |
| GROUND SURFACE | 8.62E-10   |
| INTERNAL       | 6.09E-07   |
| EXTERNAL       | 8.81E-10   |
| TOTAL          | 6.09E-07   |



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SUMMARY  
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NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|---------|--|
| S-35    | 6.09E-07   |
| TOTAL   | 6.09E-07   |



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SUMMARY  
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INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 1000    | 2000    | 3000    | 4000    | 5000    | 6000    | 7000    |
| N            | 1.6E+02 | 5.0E+01 | 2.5E+01 | 1.6E+01 | 1.2E+01 | 9.0E+00 | 7.1E+00 |
| NNW          | 1.2E+02 | 3.8E+01 | 1.9E+01 | 1.3E+01 | 9.1E+00 | 6.9E+00 | 5.5E+00 |
| NW           | 9.7E+01 | 3.1E+01 | 1.6E+01 | 1.0E+01 | 7.4E+00 | 5.6E+00 | 4.5E+00 |
| WNW          | 8.1E+01 | 2.6E+01 | 1.3E+01 | 8.6E+00 | 6.2E+00 | 4.8E+00 | 3.8E+00 |
| W            | 7.0E+01 | 2.2E+01 | 1.1E+01 | 7.4E+00 | 5.4E+00 | 4.1E+00 | 3.3E+00 |
| WSW          | 6.1E+01 | 2.0E+01 | 1.0E+01 | 6.5E+00 | 4.7E+00 | 3.6E+00 | 2.9E+00 |
| SW           | 5.5E+01 | 1.7E+01 | 8.9E+00 | 5.8E+00 | 4.2E+00 | 3.2E+00 | 2.6E+00 |
| SSW          | 4.9E+01 | 1.6E+01 | 8.0E+00 | 5.3E+00 | 3.8E+00 | 2.9E+00 | 2.3E+00 |
| S            | 4.5E+01 | 1.4E+01 | 7.3E+00 | 4.8E+00 | 3.5E+00 | 2.7E+00 | 2.1E+00 |
| SSE          | 4.1E+01 | 1.3E+01 | 6.7E+00 | 4.4E+00 | 3.2E+00 | 2.5E+00 | 2.0E+00 |
| SSE          | 3.8E+01 | 1.2E+01 | 6.2E+00 | 4.1E+00 | 3.0E+00 | 2.3E+00 | 1.8E+00 |
| ESE          | 3.5E+01 | 1.1E+01 | 5.8E+00 | 3.8E+00 | 2.7E+00 | 2.1E+00 | 1.7E+00 |
| E            | 3.3E+01 | 1.1E+01 | 5.4E+00 | 3.5E+00 | 2.6E+00 | 2.0E+00 | 1.6E+00 |
| ENE          | 3.1E+01 | 9.9E+00 | 5.1E+00 | 3.3E+00 | 2.4E+00 | 1.9E+00 | 1.5E+00 |
| NE           | 2.9E+01 | 9.3E+00 | 4.8E+00 | 3.1E+00 | 2.3E+00 | 1.7E+00 | 1.4E+00 |
| NNE          | 2.8E+01 | 8.8E+00 | 4.5E+00 | 3.0E+00 | 2.1E+00 | 1.7E+00 | 1.3E+00 |

| Distance (m) |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|
| Direction    | 8000    | 9000    | 10000   | 15000   | 20000   |
| N            | 5.9E+00 | 4.9E+00 | 4.2E+00 | 2.5E+00 | 1.8E+00 |
| NNW          | 4.5E+00 | 3.8E+00 | 3.3E+00 | 2.0E+00 | 1.4E+00 |
| NW           | 3.7E+00 | 3.1E+00 | 2.7E+00 | 1.6E+00 | 1.1E+00 |
| WNW          | 3.1E+00 | 2.6E+00 | 2.3E+00 | 1.4E+00 | 9.6E-01 |
| W            | 2.7E+00 | 2.3E+00 | 2.0E+00 | 1.2E+00 | 8.4E-01 |
| WSW          | 2.4E+00 | 2.0E+00 | 1.7E+00 | 1.1E+00 | 7.4E-01 |
| SW           | 2.1E+00 | 1.8E+00 | 1.6E+00 | 9.5E-01 | 6.7E-01 |
| SSW          | 1.9E+00 | 1.6E+00 | 1.4E+00 | 8.6E-01 | 6.0E-01 |
| S            | 1.8E+00 | 1.5E+00 | 1.3E+00 | 7.9E-01 | 5.5E-01 |
| SSE          | 1.6E+00 | 1.4E+00 | 1.2E+00 | 7.2E-01 | 5.1E-01 |
| SSE          | 1.5E+00 | 1.3E+00 | 1.1E+00 | 6.7E-01 | 4.7E-01 |
| ESE          | 1.4E+00 | 1.2E+00 | 1.0E+00 | 6.3E-01 | 4.4E-01 |
| E            | 1.3E+00 | 1.1E+00 | 9.5E-01 | 5.9E-01 | 4.1E-01 |
| ENE          | 1.2E+00 | 1.0E+00 | 8.9E-01 | 5.5E-01 | 3.9E-01 |
| NE           | 1.2E+00 | 9.8E-01 | 8.4E-01 | 5.2E-01 | 3.7E-01 |
| NNE          | 1.1E+00 | 9.3E-01 | 8.0E-01 | 4.9E-01 | 3.5E-01 |



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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 1000    | 2000    | 3000    | 4000    | 5000    | 6000    | 7000    |
| N            | 1.3E-05 | 4.1E-06 | 2.0E-06 | 1.3E-06 | 9.3E-07 | 7.0E-07 | 5.5E-07 |
| NNW          | 1.0E-05 | 3.1E-06 | 1.6E-06 | 1.0E-06 | 7.3E-07 | 5.5E-07 | 4.4E-07 |
| NW           | 8.1E-06 | 2.5E-06 | 1.3E-06 | 8.3E-07 | 6.0E-07 | 4.5E-07 | 3.6E-07 |
| WNW          | 6.8E-06 | 2.1E-06 | 1.1E-06 | 7.0E-07 | 5.1E-07 | 3.9E-07 | 3.1E-07 |
| W            | 5.8E-06 | 1.9E-06 | 9.4E-07 | 6.1E-07 | 4.4E-07 | 3.4E-07 | 2.7E-07 |
| WSW          | 5.1E-06 | 1.6E-06 | 8.3E-07 | 5.4E-07 | 3.9E-07 | 3.0E-07 | 2.4E-07 |
| SW           | 4.6E-06 | 1.5E-06 | 7.4E-07 | 4.8E-07 | 3.5E-07 | 2.7E-07 | 2.1E-07 |
| SSW          | 4.1E-06 | 1.3E-06 | 6.7E-07 | 4.4E-07 | 3.2E-07 | 2.4E-07 | 1.9E-07 |
| S            | 3.8E-06 | 1.2E-06 | 6.1E-07 | 4.0E-07 | 2.9E-07 | 2.2E-07 | 1.8E-07 |
| SSE          | 3.4E-06 | 1.1E-06 | 5.6E-07 | 3.7E-07 | 2.6E-07 | 2.0E-07 | 1.6E-07 |
| SSE          | 3.2E-06 | 1.0E-06 | 5.2E-07 | 3.4E-07 | 2.5E-07 | 1.9E-07 | 1.5E-07 |
| ESE          | 3.0E-06 | 9.5E-07 | 4.8E-07 | 3.2E-07 | 2.3E-07 | 1.8E-07 | 1.4E-07 |
| E            | 2.8E-06 | 8.9E-07 | 4.5E-07 | 3.0E-07 | 2.1E-07 | 1.6E-07 | 1.3E-07 |
| ENE          | 2.6E-06 | 8.3E-07 | 4.2E-07 | 2.8E-07 | 2.0E-07 | 1.5E-07 | 1.2E-07 |
| NE           | 2.4E-06 | 7.8E-07 | 4.0E-07 | 2.6E-07 | 1.9E-07 | 1.5E-07 | 1.2E-07 |
| NNE          | 2.3E-06 | 7.4E-07 | 3.8E-07 | 2.5E-07 | 1.8E-07 | 1.4E-07 | 1.1E-07 |

| Distance (m) |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|
| Direction    | 8000    | 9000    | 10000   | 15000   | 20000   |
| N            | 4.5E-07 | 3.8E-07 | 3.2E-07 | 1.9E-07 | 1.3E-07 |
| NNW          | 3.6E-07 | 3.0E-07 | 2.5E-07 | 1.5E-07 | 1.0E-07 |
| NW           | 2.9E-07 | 2.5E-07 | 2.1E-07 | 1.3E-07 | 8.6E-08 |
| WNW          | 2.5E-07 | 2.1E-07 | 1.8E-07 | 1.1E-07 | 7.5E-08 |
| W            | 2.2E-07 | 1.8E-07 | 1.6E-07 | 9.5E-08 | 6.6E-08 |
| WSW          | 1.9E-07 | 1.6E-07 | 1.4E-07 | 8.5E-08 | 5.9E-08 |
| SW           | 1.7E-07 | 1.5E-07 | 1.3E-07 | 7.7E-08 | 5.3E-08 |
| SSW          | 1.6E-07 | 1.3E-07 | 1.1E-07 | 7.0E-08 | 4.8E-08 |
| S            | 1.4E-07 | 1.2E-07 | 1.0E-07 | 6.4E-08 | 4.5E-08 |
| SSE          | 1.3E-07 | 1.1E-07 | 9.7E-08 | 5.9E-08 | 4.1E-08 |
| SSE          | 1.2E-07 | 1.0E-07 | 9.0E-08 | 5.5E-08 | 3.8E-08 |
| ESE          | 1.2E-07 | 9.8E-08 | 8.4E-08 | 5.1E-08 | 3.6E-08 |
| E            | 1.1E-07 | 9.2E-08 | 7.9E-08 | 4.8E-08 | 3.4E-08 |
| ENE          | 1.0E-07 | 8.6E-08 | 7.4E-08 | 4.5E-08 | 3.2E-08 |
| NE           | 9.6E-08 | 8.1E-08 | 7.0E-08 | 4.3E-08 | 3.0E-08 |
| NNE          | 9.1E-08 | 7.7E-08 | 6.6E-08 | 4.1E-08 | 2.8E-08 |



## *D.2.5 Dose and Risk Conversion Factors*

### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

Facility: Springfield Nuclear Power Plant  
Address: 100 Industrial Way  
City: Springfield  
State: ID                      Zip: 83277

Source Category:  
Source Type: Area  
Emission Year: 2013  
DOSE Age Group: Five

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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FACTOR  
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#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie intake.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units                                     |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries          |
| Inhalation | lifetime risk/100,000 picoCuries          |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie  |
| Surface    | lifetime risk-square cm/100,000 picoCurie |



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FACTOR  
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\* NUCLIDE S-35 :Sulfur Dioxide (SO2)

\*

\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Five

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.236E-06 | 9.335E-07  | 1.235E+04        | 6.990E+00         |
| UB_Wall  | 2.501E-06 | 1.888E-06  | 1.491E+04        | 9.471E+00         |
| Bone_Sur | 1.236E-06 | 9.335E-07  | 8.889E+04        | 5.639E+01         |
| Brain    | 1.236E-06 | 9.335E-07  | 1.689E+04        | 6.652E+00         |
| Breasts  | 1.236E-06 | 9.335E-07  | 4.357E+04        | 3.017E+01         |
| St_Wall  | 1.931E-06 | 9.938E-07  | 1.584E+04        | 9.355E+00         |
| SI_Wall  | 1.254E-06 | 9.679E-07  | 1.048E+04        | 6.163E+00         |
| ULI_Wall | 2.446E-06 | 1.963E-06  | 1.200E+04        | 7.072E+00         |
| LLI_Wall | 4.662E-06 | 3.844E-06  | 1.058E+04        | 6.407E+00         |
| Kidneys  | 1.236E-06 | 9.335E-07  | 1.864E+04        | 1.165E+01         |
| Liver    | 1.236E-06 | 9.335E-07  | 1.596E+04        | 9.250E+00         |
| Muscle   | 1.236E-06 | 9.335E-07  | 2.586E+04        | 2.120E+01         |
| Ovaries  | 1.236E-06 | 9.335E-07  | 9.087E+03        | 5.918E+00         |
| Pancreas | 1.236E-06 | 9.335E-07  | 9.413E+03        | 5.266E+00         |
| R_Marrow | 1.236E-06 | 9.335E-07  | 1.549E+04        | 8.947E+00         |
| Skin     | 1.236E-06 | 9.335E-07  | 3.367E+07        | 8.761E+01         |
| Spleen   | 1.236E-06 | 9.335E-07  | 1.561E+04        | 8.994E+00         |
| Testes   | 1.236E-06 | 9.335E-07  | 3.227E+04        | 2.668E+01         |
| Thymus   | 1.236E-06 | 9.335E-07  | 2.004E+04        | 1.117E+01         |
| Thyroid  | 1.236E-06 | 9.335E-07  | 2.749E+04        | 1.515E+01         |
| GB_Wall  | 1.236E-06 | 9.335E-07  | 1.155E+04        | 6.373E+00         |
| Ht_Wall  | 1.236E-06 | 9.335E-07  | 1.410E+04        | 8.038E+00         |
| Uterus   | 1.236E-06 | 9.335E-07  | 9.716E+03        | 5.802E+00         |
| ET_Reg   | 1.236E-06 | 2.429E-06  | 9.413E+03        | 5.266E+00         |
| Lung_66  | 1.236E-06 | 1.419E-06  | 1.957E+04        | 1.069E+01         |
| Effectiv | 1.643E-06 | 1.268E-06  | 3.577E+05        | 1.549E+01         |

RISK CONVERSION FACTORS FOR: Five

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 3.511E-09 | 2.960E+03  | 1.054E-05        | 4.963E-09         |
| Stomach  | 1.295E-08 | 3.737E-10  | 6.396E-05        | 3.775E-08         |
| Colon    | 3.648E-08 | 1.495E-09  | 1.177E-04        | 7.002E-08         |
| Liver    | 4.958E-09 | 1.154E-08  | 2.423E-05        | 1.398E-08         |
| LUNG     | 3.167E-08 | 5.032E-10  | 1.911E-04        | 1.046E-07         |
| Bone     | 3.030E-10 | 6.068E-09  | 8.446E-06        | 5.359E-09         |
| Skin     | 3.156E-10 | 3.119E-11  | 3.355E-03        | 8.738E-09         |
| Breast   | 1.432E-08 | 3.485E-11  | 2.109E-04        | 1.456E-07         |
| Ovary    | 4.033E-09 | 1.743E-09  | 1.293E-05        | 8.423E-09         |
| Bladder  | 8.843E-09 | 4.514E-10  | 3.600E-05        | 2.295E-08         |
| Kidneys  | 1.698E-09 | 2.235E-09  | 9.693E-06        | 6.058E-09         |
| Thyroid  | 1.010E-09 | 1.728E-10  | 8.749E-06        | 4.823E-09         |
| Leukemia | 1.876E-08 | 1.162E-10  | 8.703E-05        | 5.021E-08         |
| Residual | 4.588E-08 | 1.872E-09  | 2.365E-04        | 1.666E-07         |
| Total    | 1.846E-07 | 5.328E-09  | 4.380E-03        | 6.501E-07         |





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FACTOR  
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\* NUCLIDE S-35 :Carbon Disulfide (CS2) \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Five

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.236E-06 | 8.643E-06  | 1.235E+04        | 6.990E+00         |
| UB_Wall  | 2.501E-06 | 9.106E-06  | 1.491E+04        | 9.471E+00         |
| Bone_Sur | 1.236E-06 | 8.643E-06  | 8.889E+04        | 5.639E+01         |
| Brain    | 1.236E-06 | 8.643E-06  | 1.689E+04        | 6.652E+00         |
| Breasts  | 1.236E-06 | 8.643E-06  | 4.357E+04        | 3.017E+01         |
| St_Wall  | 1.931E-06 | 8.713E-06  | 1.584E+04        | 9.355E+00         |
| SI_Wall  | 1.254E-06 | 8.680E-06  | 1.048E+04        | 6.163E+00         |
| ULI_Wall | 2.446E-06 | 9.283E-06  | 1.200E+04        | 7.072E+00         |
| LLI_Wall | 4.662E-06 | 1.045E-05  | 1.058E+04        | 6.407E+00         |
| Kidneys  | 1.236E-06 | 8.643E-06  | 1.864E+04        | 1.165E+01         |
| Liver    | 1.236E-06 | 8.643E-06  | 1.596E+04        | 9.250E+00         |
| Muscle   | 1.236E-06 | 8.643E-06  | 2.586E+04        | 2.120E+01         |
| Ovaries  | 1.236E-06 | 8.643E-06  | 9.087E+03        | 5.918E+00         |
| Pancreas | 1.236E-06 | 8.643E-06  | 9.413E+03        | 5.266E+00         |
| R_Marrow | 1.236E-06 | 8.643E-06  | 1.549E+04        | 8.947E+00         |
| Skin     | 1.236E-06 | 8.643E-06  | 3.367E+07        | 8.761E+01         |
| Spleen   | 1.236E-06 | 8.643E-06  | 1.561E+04        | 8.994E+00         |
| Testes   | 1.236E-06 | 8.643E-06  | 3.227E+04        | 2.668E+01         |
| Thymus   | 1.236E-06 | 8.643E-06  | 2.004E+04        | 1.117E+01         |
| Thyroid  | 1.236E-06 | 8.643E-06  | 2.749E+04        | 1.515E+01         |
| GB_Wall  | 1.236E-06 | 8.643E-06  | 1.155E+04        | 6.373E+00         |
| Ht_Wall  | 1.236E-06 | 8.643E-06  | 1.410E+04        | 8.038E+00         |
| Uterus   | 1.236E-06 | 8.643E-06  | 9.716E+03        | 5.802E+00         |
| ET_Reg   | 1.236E-06 | 1.040E-05  | 9.413E+03        | 5.266E+00         |
| Lung_66  | 1.236E-06 | 9.213E-06  | 1.957E+04        | 1.069E+01         |
| Effectiv | 1.643E-06 | 8.924E-06  | 3.577E+05        | 1.549E+01         |

RISK CONVERSION FACTORS FOR: Five

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 3.511E-09 | 2.960E+03  | 1.054E-05        | 4.963E-09         |
| Stomach  | 1.295E-08 | 3.452E-09  | 6.396E-05        | 3.775E-08         |
| Colon    | 3.648E-08 | 1.306E-08  | 1.177E-04        | 7.002E-08         |
| Liver    | 4.958E-09 | 4.107E-08  | 2.423E-05        | 1.398E-08         |
| LUNG     | 3.167E-08 | 4.662E-09  | 1.911E-04        | 1.046E-07         |
| Bone     | 3.030E-10 | 3.556E-08  | 8.446E-06        | 5.359E-09         |
| Skin     | 3.156E-10 | 2.886E-10  | 3.355E-03        | 8.738E-09         |
| Breast   | 1.432E-08 | 3.226E-10  | 2.109E-04        | 1.456E-07         |
| Ovary    | 4.033E-09 | 1.613E-08  | 1.293E-05        | 8.423E-09         |
| Bladder  | 8.843E-09 | 4.181E-09  | 3.600E-05        | 2.295E-08         |
| Kidneys  | 1.698E-09 | 8.103E-09  | 9.693E-06        | 6.058E-09         |
| Thyroid  | 1.010E-09 | 1.598E-09  | 8.749E-06        | 4.823E-09         |
| Leukemia | 1.876E-08 | 1.077E-09  | 8.703E-05        | 5.021E-08         |
| Residual | 4.588E-08 | 1.735E-08  | 2.365E-04        | 1.666E-07         |
| Total    | 1.846E-07 | 4.921E-08  | 4.380E-03        | 6.501E-07         |



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FACTOR  
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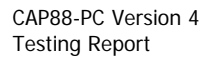
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\* NUCLIDE S-35 :Particulate \*  
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DOSE RATE CONVERSION FACTORS FOR: Five

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.236E-06 | 4.462E-09  | 1.235E+04        | 6.990E+00         |
| UB_Wall  | 2.501E-06 | 9.050E-09  | 1.491E+04        | 9.471E+00         |
| Bone_Sur | 1.236E-06 | 4.462E-09  | 8.889E+04        | 5.639E+01         |
| Brain    | 1.236E-06 | 4.462E-09  | 1.689E+04        | 6.652E+00         |
| Breasts  | 1.236E-06 | 4.462E-09  | 4.357E+04        | 3.017E+01         |
| St_Wall  | 1.931E-06 | 1.721E-07  | 1.584E+04        | 9.355E+00         |
| SI_Wall  | 1.254E-06 | 4.740E-07  | 1.048E+04        | 6.163E+00         |
| ULI_Wall | 2.446E-06 | 2.862E-06  | 1.200E+04        | 7.072E+00         |
| LLI_Wall | 4.662E-06 | 8.077E-06  | 1.058E+04        | 6.407E+00         |
| Kidneys  | 1.236E-06 | 4.462E-09  | 1.864E+04        | 1.165E+01         |
| Liver    | 1.236E-06 | 4.462E-09  | 1.596E+04        | 9.250E+00         |
| Muscle   | 1.236E-06 | 4.462E-09  | 2.586E+04        | 2.120E+01         |
| Ovaries  | 1.236E-06 | 4.462E-09  | 9.087E+03        | 5.918E+00         |
| Pancreas | 1.236E-06 | 4.462E-09  | 9.413E+03        | 5.266E+00         |
| R_Marrow | 1.236E-06 | 4.462E-09  | 1.549E+04        | 8.947E+00         |
| Skin     | 1.236E-06 | 4.462E-09  | 3.367E+07        | 8.761E+01         |
| Spleen   | 1.236E-06 | 4.462E-09  | 1.561E+04        | 8.994E+00         |
| Testes   | 1.236E-06 | 4.462E-09  | 3.227E+04        | 2.668E+01         |
| Thymus   | 1.236E-06 | 4.462E-09  | 2.004E+04        | 1.117E+01         |
| Thyroid  | 1.236E-06 | 4.462E-09  | 2.749E+04        | 1.515E+01         |
| GB_Wall  | 1.236E-06 | 4.462E-09  | 1.155E+04        | 6.373E+00         |
| Ht_Wall  | 1.236E-06 | 4.462E-09  | 1.410E+04        | 8.038E+00         |
| Uterus   | 1.236E-06 | 4.462E-09  | 9.716E+03        | 5.802E+00         |
| ET_Reg   | 1.236E-06 | 1.633E-05  | 9.413E+03        | 5.266E+00         |
| Lung_66  | 1.236E-06 | 8.554E-05  | 1.957E+04        | 1.069E+01         |
| Effectiv | 1.643E-06 | 1.090E-05  | 3.577E+05        | 1.549E+01         |

RISK CONVERSION FACTORS FOR: Five

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 3.511E-09 | 3.591E-13  | 1.054E-05        | 4.963E-09         |
| Stomach  | 1.295E-08 | 7.855E-11  | 6.396E-05        | 3.775E-08         |
| Colon    | 3.648E-08 | 8.810E-09  | 1.177E-04        | 7.002E-08         |
| Liver    | 4.958E-09 | 4.662E-13  | 2.423E-05        | 1.398E-08         |
| LUNG     | 3.167E-08 | 1.410E-07  | 1.911E-04        | 1.046E-07         |
| Bone     | 3.030E-10 | 2.922E-14  | 8.446E-06        | 5.359E-09         |
| Skin     | 3.156E-10 | 4.669E-14  | 3.355E-03        | 8.738E-09         |
| Breast   | 1.432E-08 | 3.061E-12  | 2.109E-04        | 1.456E-07         |
| Ovary    | 4.033E-09 | 4.614E-13  | 1.293E-05        | 8.423E-09         |
| Bladder  | 8.843E-09 | 1.725E-12  | 3.600E-05        | 2.295E-08         |
| Kidneys  | 1.698E-09 | 1.622E-13  | 9.693E-06        | 6.058E-09         |
| Thyroid  | 1.010E-09 | 1.934E-13  | 8.749E-06        | 4.823E-09         |
| Leukemia | 1.876E-08 | 1.577E-12  | 8.703E-05        | 5.021E-08         |
| Residual | 4.588E-08 | 8.203E-12  | 2.365E-04        | 1.666E-07         |
| Total    | 1.846E-07 | 1.500E-07  | 4.380E-03        | 6.501E-07         |



Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: ID Zip: 83277
```

```
Source Category:
Source Type: Area
Emission Year: 2013
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 1000                 | S-35    | 9.59E+03                | 3.36E-04                           | 9.01E-05                           | 4.26E-04                              |
| N              | 2000                 | S-35    | 3.05E+03                | 1.02E-04                           | 4.33E-05                           | 1.45E-04                              |
| N              | 3000                 | S-35    | 1.55E+03                | 5.00E-05                           | 2.81E-05                           | 7.81E-05                              |
| N              | 4000                 | S-35    | 1.01E+03                | 3.12E-05                           | 2.05E-05                           | 5.17E-05                              |
| N              | 5000                 | S-35    | 7.30E+02                | 2.19E-05                           | 1.60E-05                           | 3.79E-05                              |
| N              | 6000                 | S-35    | 5.59E+02                | 1.62E-05                           | 1.30E-05                           | 2.93E-05                              |
| N              | 7000                 | S-35    | 4.45E+02                | 1.24E-05                           | 1.09E-05                           | 2.33E-05                              |
| N              | 8000                 | S-35    | 3.67E+02                | 9.97E-06                           | 9.36E-06                           | 1.93E-05                              |
| N              | 9000                 | S-35    | 3.11E+02                | 8.22E-06                           | 8.15E-06                           | 1.64E-05                              |
| N              | 10000                | S-35    | 2.67E+02                | 6.83E-06                           | 7.18E-06                           | 1.40E-05                              |
| N              | 15000                | S-35    | 1.63E+02                | 3.80E-06                           | 4.44E-06                           | 8.24E-06                              |
| N              | 20000                | S-35    | 1.14E+02                | 2.37E-06                           | 3.06E-06                           | 5.43E-06                              |
| NNW            | 1000                 | S-35    | 7.24E+03                | 2.59E-04                           | 6.89E-05                           | 3.28E-04                              |
| NNW            | 2000                 | S-35    | 2.31E+03                | 7.97E-05                           | 3.35E-05                           | 1.13E-04                              |
| NNW            | 3000                 | S-35    | 1.17E+03                | 3.96E-05                           | 2.19E-05                           | 6.14E-05                              |
| NNW            | 4000                 | S-35    | 7.68E+02                | 2.50E-05                           | 1.60E-05                           | 4.11E-05                              |
| NNW            | 5000                 | S-35    | 5.55E+02                | 1.77E-05                           | 1.26E-05                           | 3.03E-05                              |
| NNW            | 6000                 | S-35    | 4.25E+02                | 1.33E-05                           | 1.03E-05                           | 2.36E-05                              |
| NNW            | 7000                 | S-35    | 3.39E+02                | 1.03E-05                           | 8.68E-06                           | 1.90E-05                              |
| NNW            | 8000                 | S-35    | 2.80E+02                | 8.30E-06                           | 7.49E-06                           | 1.58E-05                              |
| NNW            | 9000                 | S-35    | 2.37E+02                | 6.89E-06                           | 6.55E-06                           | 1.34E-05                              |
| NNW            | 10000                | S-35    | 2.04E+02                | 5.78E-06                           | 5.80E-06                           | 1.16E-05                              |
| NNW            | 15000                | S-35    | 1.25E+02                | 3.30E-06                           | 3.65E-06                           | 6.95E-06                              |
| NNW            | 20000                | S-35    | 8.73E+01                | 2.13E-06                           | 2.57E-06                           | 4.69E-06                              |
| NW             | 1000                 | S-35    | 5.81E+03                | 2.11E-04                           | 5.58E-05                           | 2.66E-04                              |
| NW             | 2000                 | S-35    | 1.85E+03                | 6.55E-05                           | 2.72E-05                           | 9.27E-05                              |
| NW             | 3000                 | S-35    | 9.44E+02                | 3.27E-05                           | 1.79E-05                           | 5.05E-05                              |
| NW             | 4000                 | S-35    | 6.19E+02                | 2.09E-05                           | 1.32E-05                           | 3.40E-05                              |
| NW             | 5000                 | S-35    | 4.48E+02                | 1.48E-05                           | 1.04E-05                           | 2.52E-05                              |
| NW             | 6000                 | S-35    | 3.43E+02                | 1.12E-05                           | 8.53E-06                           | 1.97E-05                              |
| NW             | 7000                 | S-35    | 2.74E+02                | 8.71E-06                           | 7.20E-06                           | 1.59E-05                              |
| NW             | 8000                 | S-35    | 2.26E+02                | 7.07E-06                           | 6.23E-06                           | 1.33E-05                              |
| NW             | 9000                 | S-35    | 1.92E+02                | 5.90E-06                           | 5.47E-06                           | 1.14E-05                              |
| NW             | 10000                | S-35    | 1.65E+02                | 4.97E-06                           | 4.85E-06                           | 9.83E-06                              |
| NW             | 15000                | S-35    | 1.01E+02                | 2.89E-06                           | 3.09E-06                           | 5.98E-06                              |
| NW             | 20000                | S-35    | 7.09E+01                | 1.90E-06                           | 2.20E-06                           | 4.09E-06                              |
| WNW            | 1000                 | S-35    | 4.85E+03                | 1.78E-04                           | 4.69E-05                           | 2.24E-04                              |
| WNW            | 2000                 | S-35    | 1.55E+03                | 5.55E-05                           | 2.30E-05                           | 7.85E-05                              |
| WNW            | 3000                 | S-35    | 7.90E+02                | 2.78E-05                           | 1.51E-05                           | 4.30E-05                              |
| WNW            | 4000                 | S-35    | 5.18E+02                | 1.79E-05                           | 1.12E-05                           | 2.90E-05                              |
| WNW            | 5000                 | S-35    | 3.75E+02                | 1.27E-05                           | 8.83E-06                           | 2.16E-05                              |
| WNW            | 6000                 | S-35    | 2.88E+02                | 9.63E-06                           | 7.27E-06                           | 1.69E-05                              |
| WNW            | 7000                 | S-35    | 2.30E+02                | 7.55E-06                           | 6.15E-06                           | 1.37E-05                              |
| WNW            | 8000                 | S-35    | 1.90E+02                | 6.14E-06                           | 5.33E-06                           | 1.15E-05                              |
| WNW            | 9000                 | S-35    | 1.61E+02                | 5.15E-06                           | 4.69E-06                           | 9.83E-06                              |
| WNW            | 10000                | S-35    | 1.39E+02                | 4.35E-06                           | 4.17E-06                           | 8.52E-06                              |
| WNW            | 15000                | S-35    | 8.50E+01                | 2.56E-06                           | 2.67E-06                           | 5.23E-06                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WNW            | 20000                | S-35    | 5.98E+01                | 1.70E-06                           | 1.92E-06                           | 3.62E-06                              |
| W              | 1000                 | S-35    | 4.16E+03                | 1.53E-04                           | 4.04E-05                           | 1.94E-04                              |
| W              | 2000                 | S-35    | 1.33E+03                | 4.82E-05                           | 1.99E-05                           | 6.81E-05                              |
| W              | 3000                 | S-35    | 6.80E+02                | 2.42E-05                           | 1.31E-05                           | 3.73E-05                              |
| W              | 4000                 | S-35    | 4.46E+02                | 1.56E-05                           | 9.69E-06                           | 2.53E-05                              |
| W              | 5000                 | S-35    | 3.23E+02                | 1.12E-05                           | 7.68E-06                           | 1.88E-05                              |
| W              | 6000                 | S-35    | 2.48E+02                | 8.46E-06                           | 6.33E-06                           | 1.48E-05                              |
| W              | 7000                 | S-35    | 1.98E+02                | 6.66E-06                           | 5.37E-06                           | 1.20E-05                              |
| W              | 8000                 | S-35    | 1.64E+02                | 5.43E-06                           | 4.66E-06                           | 1.01E-05                              |
| W              | 9000                 | S-35    | 1.39E+02                | 4.56E-06                           | 4.10E-06                           | 8.66E-06                              |
| W              | 10000                | S-35    | 1.20E+02                | 3.87E-06                           | 3.65E-06                           | 7.52E-06                              |
| W              | 15000                | S-35    | 7.34E+01                | 2.29E-06                           | 2.36E-06                           | 4.64E-06                              |
| W              | 20000                | S-35    | 5.17E+01                | 1.54E-06                           | 1.70E-06                           | 3.24E-06                              |
| WSW            | 1000                 | S-35    | 3.65E+03                | 1.35E-04                           | 3.55E-05                           | 1.71E-04                              |
| WSW            | 2000                 | S-35    | 1.17E+03                | 4.26E-05                           | 1.75E-05                           | 6.00E-05                              |
| WSW            | 3000                 | S-35    | 5.96E+02                | 2.15E-05                           | 1.15E-05                           | 3.30E-05                              |
| WSW            | 4000                 | S-35    | 3.91E+02                | 1.39E-05                           | 8.56E-06                           | 2.24E-05                              |
| WSW            | 5000                 | S-35    | 2.83E+02                | 9.93E-06                           | 6.79E-06                           | 1.67E-05                              |
| WSW            | 6000                 | S-35    | 2.18E+02                | 7.54E-06                           | 5.61E-06                           | 1.31E-05                              |
| WSW            | 7000                 | S-35    | 1.74E+02                | 5.95E-06                           | 4.76E-06                           | 1.07E-05                              |
| WSW            | 8000                 | S-35    | 1.44E+02                | 4.86E-06                           | 4.13E-06                           | 8.99E-06                              |
| WSW            | 9000                 | S-35    | 1.22E+02                | 4.09E-06                           | 3.64E-06                           | 7.73E-06                              |
| WSW            | 10000                | S-35    | 1.05E+02                | 3.47E-06                           | 3.25E-06                           | 6.73E-06                              |
| WSW            | 15000                | S-35    | 6.46E+01                | 2.07E-06                           | 2.10E-06                           | 4.17E-06                              |
| WSW            | 20000                | S-35    | 4.55E+01                | 1.40E-06                           | 1.53E-06                           | 2.92E-06                              |
| SW             | 1000                 | S-35    | 3.25E+03                | 1.21E-04                           | 3.17E-05                           | 1.52E-04                              |
| SW             | 2000                 | S-35    | 1.04E+03                | 3.81E-05                           | 1.56E-05                           | 5.37E-05                              |
| SW             | 3000                 | S-35    | 5.31E+02                | 1.92E-05                           | 1.03E-05                           | 2.96E-05                              |
| SW             | 4000                 | S-35    | 3.49E+02                | 1.25E-05                           | 7.66E-06                           | 2.01E-05                              |
| SW             | 5000                 | S-35    | 2.53E+02                | 8.95E-06                           | 6.09E-06                           | 1.50E-05                              |
| SW             | 6000                 | S-35    | 1.94E+02                | 6.80E-06                           | 5.03E-06                           | 1.18E-05                              |
| SW             | 7000                 | S-35    | 1.55E+02                | 5.38E-06                           | 4.27E-06                           | 9.65E-06                              |
| SW             | 8000                 | S-35    | 1.28E+02                | 4.40E-06                           | 3.71E-06                           | 8.11E-06                              |
| SW             | 9000                 | S-35    | 1.09E+02                | 3.70E-06                           | 3.28E-06                           | 6.98E-06                              |
| SW             | 10000                | S-35    | 9.38E+01                | 3.15E-06                           | 2.93E-06                           | 6.08E-06                              |
| SW             | 15000                | S-35    | 5.77E+01                | 1.88E-06                           | 1.90E-06                           | 3.79E-06                              |
| SW             | 20000                | S-35    | 4.07E+01                | 1.28E-06                           | 1.38E-06                           | 2.67E-06                              |
| SSW            | 1000                 | S-35    | 2.92E+03                | 1.09E-04                           | 2.86E-05                           | 1.38E-04                              |
| SSW            | 2000                 | S-35    | 9.37E+02                | 3.45E-05                           | 1.41E-05                           | 4.86E-05                              |
| SSW            | 3000                 | S-35    | 4.78E+02                | 1.75E-05                           | 9.34E-06                           | 2.68E-05                              |
| SSW            | 4000                 | S-35    | 3.14E+02                | 1.13E-05                           | 6.94E-06                           | 1.83E-05                              |
| SSW            | 5000                 | S-35    | 2.28E+02                | 8.14E-06                           | 5.51E-06                           | 1.37E-05                              |
| SSW            | 6000                 | S-35    | 1.75E+02                | 6.20E-06                           | 4.56E-06                           | 1.08E-05                              |
| SSW            | 7000                 | S-35    | 1.40E+02                | 4.90E-06                           | 3.88E-06                           | 8.78E-06                              |
| SSW            | 8000                 | S-35    | 1.16E+02                | 4.02E-06                           | 3.37E-06                           | 7.39E-06                              |
| SSW            | 9000                 | S-35    | 9.83E+01                | 3.38E-06                           | 2.98E-06                           | 6.36E-06                              |
| SSW            | 10000                | S-35    | 8.47E+01                | 2.89E-06                           | 2.66E-06                           | 5.55E-06                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 15000                | S-35    | 5.21E+01                | 1.73E-06                           | 1.73E-06                           | 3.46E-06                              |
| SSW            | 20000                | S-35    | 3.68E+01                | 1.18E-06                           | 1.27E-06                           | 2.45E-06                              |
| S              | 1000                 | S-35    | 2.66E+03                | 9.93E-05                           | 2.60E-05                           | 1.25E-04                              |
| S              | 2000                 | S-35    | 8.53E+02                | 3.15E-05                           | 1.29E-05                           | 4.44E-05                              |
| S              | 3000                 | S-35    | 4.35E+02                | 1.60E-05                           | 8.52E-06                           | 2.45E-05                              |
| S              | 4000                 | S-35    | 2.86E+02                | 1.04E-05                           | 6.34E-06                           | 1.67E-05                              |
| S              | 5000                 | S-35    | 2.07E+02                | 7.46E-06                           | 5.04E-06                           | 1.25E-05                              |
| S              | 6000                 | S-35    | 1.60E+02                | 5.69E-06                           | 4.17E-06                           | 9.86E-06                              |
| S              | 7000                 | S-35    | 1.28E+02                | 4.50E-06                           | 3.55E-06                           | 8.05E-06                              |
| S              | 8000                 | S-35    | 1.05E+02                | 3.69E-06                           | 3.09E-06                           | 6.78E-06                              |
| S              | 9000                 | S-35    | 8.96E+01                | 3.12E-06                           | 2.73E-06                           | 5.85E-06                              |
| S              | 10000                | S-35    | 7.72E+01                | 2.66E-06                           | 2.44E-06                           | 5.10E-06                              |
| S              | 15000                | S-35    | 4.75E+01                | 1.60E-06                           | 1.59E-06                           | 3.19E-06                              |
| S              | 20000                | S-35    | 3.36E+01                | 1.10E-06                           | 1.17E-06                           | 2.26E-06                              |
| SSE            | 1000                 | S-35    | 2.44E+03                | 9.13E-05                           | 2.39E-05                           | 1.15E-04                              |
| SSE            | 2000                 | S-35    | 7.82E+02                | 2.90E-05                           | 1.18E-05                           | 4.08E-05                              |
| SSE            | 3000                 | S-35    | 4.00E+02                | 1.47E-05                           | 7.84E-06                           | 2.25E-05                              |
| SSE            | 4000                 | S-35    | 2.63E+02                | 9.56E-06                           | 5.83E-06                           | 1.54E-05                              |
| SSE            | 5000                 | S-35    | 1.90E+02                | 6.89E-06                           | 4.64E-06                           | 1.15E-05                              |
| SSE            | 6000                 | S-35    | 1.46E+02                | 5.25E-06                           | 3.84E-06                           | 9.10E-06                              |
| SSE            | 7000                 | S-35    | 1.17E+02                | 4.17E-06                           | 3.27E-06                           | 7.44E-06                              |
| SSE            | 8000                 | S-35    | 9.68E+01                | 3.42E-06                           | 2.85E-06                           | 6.27E-06                              |
| SSE            | 9000                 | S-35    | 8.23E+01                | 2.89E-06                           | 2.52E-06                           | 5.41E-06                              |
| SSE            | 10000                | S-35    | 7.09E+01                | 2.47E-06                           | 2.25E-06                           | 4.72E-06                              |
| SSE            | 15000                | S-35    | 4.37E+01                | 1.49E-06                           | 1.47E-06                           | 2.96E-06                              |
| SSE            | 20000                | S-35    | 3.09E+01                | 1.02E-06                           | 1.08E-06                           | 2.10E-06                              |
| SE             | 1000                 | S-35    | 2.25E+03                | 8.44E-05                           | 2.21E-05                           | 1.07E-04                              |
| SE             | 2000                 | S-35    | 7.23E+02                | 2.69E-05                           | 1.10E-05                           | 3.78E-05                              |
| SE             | 3000                 | S-35    | 3.69E+02                | 1.36E-05                           | 7.26E-06                           | 2.09E-05                              |
| SE             | 4000                 | S-35    | 2.43E+02                | 8.88E-06                           | 5.40E-06                           | 1.43E-05                              |
| SE             | 5000                 | S-35    | 1.76E+02                | 6.39E-06                           | 4.30E-06                           | 1.07E-05                              |
| SE             | 6000                 | S-35    | 1.35E+02                | 4.88E-06                           | 3.56E-06                           | 8.45E-06                              |
| SE             | 7000                 | S-35    | 1.08E+02                | 3.88E-06                           | 3.04E-06                           | 6.91E-06                              |
| SE             | 8000                 | S-35    | 8.95E+01                | 3.18E-06                           | 2.64E-06                           | 5.83E-06                              |
| SE             | 9000                 | S-35    | 7.61E+01                | 2.69E-06                           | 2.34E-06                           | 5.03E-06                              |
| SE             | 10000                | S-35    | 6.56E+01                | 2.30E-06                           | 2.09E-06                           | 4.39E-06                              |
| SE             | 15000                | S-35    | 4.04E+01                | 1.39E-06                           | 1.37E-06                           | 2.76E-06                              |
| SE             | 20000                | S-35    | 2.86E+01                | 9.57E-07                           | 1.01E-06                           | 1.96E-06                              |
| ESE            | 1000                 | S-35    | 2.09E+03                | 7.86E-05                           | 2.06E-05                           | 9.91E-05                              |
| ESE            | 2000                 | S-35    | 6.71E+02                | 2.50E-05                           | 1.02E-05                           | 3.52E-05                              |
| ESE            | 3000                 | S-35    | 3.43E+02                | 1.27E-05                           | 6.75E-06                           | 1.95E-05                              |
| ESE            | 4000                 | S-35    | 2.26E+02                | 8.28E-06                           | 5.03E-06                           | 1.33E-05                              |
| ESE            | 5000                 | S-35    | 1.64E+02                | 5.97E-06                           | 4.01E-06                           | 9.97E-06                              |
| ESE            | 6000                 | S-35    | 1.26E+02                | 4.56E-06                           | 3.32E-06                           | 7.88E-06                              |
| ESE            | 7000                 | S-35    | 1.01E+02                | 3.62E-06                           | 2.83E-06                           | 6.45E-06                              |
| ESE            | 8000                 | S-35    | 8.32E+01                | 2.98E-06                           | 2.47E-06                           | 5.44E-06                              |
| ESE            | 9000                 | S-35    | 7.08E+01                | 2.52E-06                           | 2.18E-06                           | 4.70E-06                              |



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CONCEN  
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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 10000                | S-35    | 6.10E+01                | 2.15E-06                           | 1.95E-06                           | 4.11E-06                              |
| ESE            | 15000                | S-35    | 3.76E+01                | 1.30E-06                           | 1.28E-06                           | 2.58E-06                              |
| ESE            | 20000                | S-35    | 2.66E+01                | 9.00E-07                           | 9.42E-07                           | 1.84E-06                              |
| E              | 1000                 | S-35    | 1.95E+03                | 7.34E-05                           | 1.92E-05                           | 9.26E-05                              |
| E              | 2000                 | S-35    | 6.27E+02                | 2.34E-05                           | 9.53E-06                           | 3.29E-05                              |
| E              | 3000                 | S-35    | 3.20E+02                | 1.19E-05                           | 6.32E-06                           | 1.82E-05                              |
| E              | 4000                 | S-35    | 2.11E+02                | 7.76E-06                           | 4.71E-06                           | 1.25E-05                              |
| E              | 5000                 | S-35    | 1.53E+02                | 5.60E-06                           | 3.75E-06                           | 9.35E-06                              |
| E              | 6000                 | S-35    | 1.18E+02                | 4.28E-06                           | 3.11E-06                           | 7.39E-06                              |
| E              | 7000                 | S-35    | 9.42E+01                | 3.40E-06                           | 2.65E-06                           | 6.05E-06                              |
| E              | 8000                 | S-35    | 7.78E+01                | 2.79E-06                           | 2.31E-06                           | 5.10E-06                              |
| E              | 9000                 | S-35    | 6.61E+01                | 2.36E-06                           | 2.04E-06                           | 4.41E-06                              |
| E              | 10000                | S-35    | 5.70E+01                | 2.02E-06                           | 1.83E-06                           | 3.86E-06                              |
| E              | 15000                | S-35    | 3.52E+01                | 1.23E-06                           | 1.20E-06                           | 2.43E-06                              |
| E              | 20000                | S-35    | 2.49E+01                | 8.49E-07                           | 8.85E-07                           | 1.73E-06                              |
| ENE            | 1000                 | S-35    | 1.83E+03                | 6.89E-05                           | 1.80E-05                           | 8.70E-05                              |
| ENE            | 2000                 | S-35    | 5.88E+02                | 2.20E-05                           | 8.95E-06                           | 3.09E-05                              |
| ENE            | 3000                 | S-35    | 3.01E+02                | 1.12E-05                           | 5.93E-06                           | 1.71E-05                              |
| ENE            | 4000                 | S-35    | 1.98E+02                | 7.30E-06                           | 4.42E-06                           | 1.17E-05                              |
| ENE            | 5000                 | S-35    | 1.43E+02                | 5.27E-06                           | 3.52E-06                           | 8.79E-06                              |
| ENE            | 6000                 | S-35    | 1.10E+02                | 4.03E-06                           | 2.92E-06                           | 6.95E-06                              |
| ENE            | 7000                 | S-35    | 8.84E+01                | 3.20E-06                           | 2.49E-06                           | 5.70E-06                              |
| ENE            | 8000                 | S-35    | 7.30E+01                | 2.63E-06                           | 2.17E-06                           | 4.81E-06                              |
| ENE            | 9000                 | S-35    | 6.21E+01                | 2.23E-06                           | 1.92E-06                           | 4.15E-06                              |
| ENE            | 10000                | S-35    | 5.35E+01                | 1.91E-06                           | 1.72E-06                           | 3.63E-06                              |
| ENE            | 15000                | S-35    | 3.30E+01                | 1.16E-06                           | 1.13E-06                           | 2.29E-06                              |
| ENE            | 20000                | S-35    | 2.34E+01                | 8.03E-07                           | 8.35E-07                           | 1.64E-06                              |
| NE             | 1000                 | S-35    | 1.72E+03                | 6.50E-05                           | 1.70E-05                           | 8.19E-05                              |
| NE             | 2000                 | S-35    | 5.54E+02                | 2.07E-05                           | 8.43E-06                           | 2.92E-05                              |
| NE             | 3000                 | S-35    | 2.83E+02                | 1.05E-05                           | 5.59E-06                           | 1.61E-05                              |
| NE             | 4000                 | S-35    | 1.86E+02                | 6.89E-06                           | 4.17E-06                           | 1.11E-05                              |
| NE             | 5000                 | S-35    | 1.35E+02                | 4.97E-06                           | 3.32E-06                           | 8.30E-06                              |
| NE             | 6000                 | S-35    | 1.04E+02                | 3.81E-06                           | 2.76E-06                           | 6.56E-06                              |
| NE             | 7000                 | S-35    | 8.33E+01                | 3.03E-06                           | 2.35E-06                           | 5.38E-06                              |
| NE             | 8000                 | S-35    | 6.88E+01                | 2.49E-06                           | 2.05E-06                           | 4.54E-06                              |
| NE             | 9000                 | S-35    | 5.85E+01                | 2.11E-06                           | 1.82E-06                           | 3.93E-06                              |
| NE             | 10000                | S-35    | 5.04E+01                | 1.81E-06                           | 1.63E-06                           | 3.44E-06                              |
| NE             | 15000                | S-35    | 3.11E+01                | 1.10E-06                           | 1.07E-06                           | 2.17E-06                              |
| NE             | 20000                | S-35    | 2.20E+01                | 7.62E-07                           | 7.90E-07                           | 1.55E-06                              |
| NNE            | 1000                 | S-35    | 1.63E+03                | 6.14E-05                           | 1.61E-05                           | 7.75E-05                              |
| NNE            | 2000                 | S-35    | 5.23E+02                | 1.96E-05                           | 7.97E-06                           | 2.76E-05                              |
| NNE            | 3000                 | S-35    | 2.67E+02                | 9.98E-06                           | 5.29E-06                           | 1.53E-05                              |
| NNE            | 4000                 | S-35    | 1.76E+02                | 6.52E-06                           | 3.95E-06                           | 1.05E-05                              |
| NNE            | 5000                 | S-35    | 1.28E+02                | 4.71E-06                           | 3.15E-06                           | 7.86E-06                              |
| NNE            | 6000                 | S-35    | 9.82E+01                | 3.61E-06                           | 2.61E-06                           | 6.22E-06                              |
| NNE            | 7000                 | S-35    | 7.87E+01                | 2.87E-06                           | 2.23E-06                           | 5.10E-06                              |
| NNE            | 8000                 | S-35    | 6.50E+01                | 2.36E-06                           | 1.94E-06                           | 4.31E-06                              |



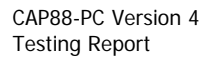
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CONCEN  
Page 5

ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNE            | 9000                 | S-35    | 5.53E+01                | 2.00E-06                           | 1.72E-06                           | 3.72E-06                              |
| NNE            | 10000                | S-35    | 4.77E+01                | 1.71E-06                           | 1.54E-06                           | 3.26E-06                              |
| NNE            | 15000                | S-35    | 2.94E+01                | 1.04E-06                           | 1.01E-06                           | 2.06E-06                              |
| NNE            | 20000                | S-35    | 2.08E+01                | 7.25E-07                           | 7.50E-07                           | 1.48E-06                              |





Version 4.0

Clean Air Act Assessment Package - 1988

Non-Radon Individual Assessment  
Fri Jun 07 20:40:10 2013

```
Facility: Springfield Nuclear Power Plant
Address: 100 Industrial Way
City: Springfield
State: ID                               Zip: 83277
```

```
Source Category:
Source Type: Area
Emission Year: 2013
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_004.  
Dataset Date: Jun 7, 2013 08:39 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\SPRG2000.wnd



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CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR S-35  
SOLUBILITY: V  
CHEMFORM: Sulfur Dioxide (SO2)  
SIZE: 0.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 2000      | 3000      | 4000      | 5000      | 6000      | 7000      |
| N                 | 3.384E-06 | 1.088E-06 | 5.568E-07 | 3.671E-07 | 2.666E-07 | 2.054E-07 | 1.648E-07 |
| NNW               | 2.539E-06 | 8.163E-07 | 4.177E-07 | 2.754E-07 | 2.000E-07 | 1.541E-07 | 1.237E-07 |
| NW                | 2.030E-06 | 6.528E-07 | 3.340E-07 | 2.202E-07 | 1.599E-07 | 1.232E-07 | 9.890E-08 |
| WNW               | 1.692E-06 | 5.441E-07 | 2.784E-07 | 1.836E-07 | 1.333E-07 | 1.027E-07 | 8.244E-08 |
| W                 | 1.451E-06 | 4.664E-07 | 2.387E-07 | 1.574E-07 | 1.143E-07 | 8.806E-08 | 7.068E-08 |
| WSW               | 1.269E-06 | 4.080E-07 | 2.088E-07 | 1.377E-07 | 9.998E-08 | 7.703E-08 | 6.183E-08 |
| SW                | 1.128E-06 | 3.627E-07 | 1.856E-07 | 1.224E-07 | 8.888E-08 | 6.849E-08 | 5.497E-08 |
| SSW               | 1.015E-06 | 3.265E-07 | 1.671E-07 | 1.102E-07 | 8.000E-08 | 6.164E-08 | 4.948E-08 |
| S                 | 9.229E-07 | 2.968E-07 | 1.519E-07 | 1.001E-07 | 7.272E-08 | 5.603E-08 | 4.497E-08 |
| SSE               | 8.461E-07 | 2.721E-07 | 1.392E-07 | 9.180E-08 | 6.666E-08 | 5.137E-08 | 4.123E-08 |
| SE                | 7.811E-07 | 2.512E-07 | 1.285E-07 | 8.474E-08 | 6.154E-08 | 4.742E-08 | 3.806E-08 |
| ESE               | 7.252E-07 | 2.332E-07 | 1.193E-07 | 7.868E-08 | 5.714E-08 | 4.403E-08 | 3.534E-08 |
| E                 | 6.769E-07 | 2.177E-07 | 1.114E-07 | 7.344E-08 | 5.333E-08 | 4.109E-08 | 3.298E-08 |
| ENE               | 6.346E-07 | 2.041E-07 | 1.044E-07 | 6.885E-08 | 5.000E-08 | 3.853E-08 | 3.092E-08 |
| NE                | 5.972E-07 | 1.920E-07 | 9.828E-08 | 6.480E-08 | 4.706E-08 | 3.626E-08 | 2.910E-08 |
| NNE               | 5.641E-07 | 1.814E-07 | 9.282E-08 | 6.120E-08 | 4.444E-08 | 3.425E-08 | 2.749E-08 |

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| Distance (meters) |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 8000      | 9000      | 10000     | 15000     | 20000     |
| N                 | 1.363E-07 | 1.160E-07 | 1.001E-07 | 6.200E-08 | 4.407E-08 |
| NNW               | 1.023E-07 | 8.706E-08 | 7.513E-08 | 4.652E-08 | 3.308E-08 |
| NW                | 8.177E-08 | 6.963E-08 | 6.009E-08 | 3.721E-08 | 2.646E-08 |
| WNW               | 6.816E-08 | 5.804E-08 | 5.009E-08 | 3.102E-08 | 2.206E-08 |
| W                 | 5.844E-08 | 4.976E-08 | 4.294E-08 | 2.659E-08 | 1.891E-08 |
| WSW               | 5.112E-08 | 4.353E-08 | 3.757E-08 | 2.327E-08 | 1.654E-08 |
| SW                | 4.545E-08 | 3.870E-08 | 3.340E-08 | 2.068E-08 | 1.471E-08 |
| SSW               | 4.091E-08 | 3.483E-08 | 3.006E-08 | 1.862E-08 | 1.324E-08 |
| S                 | 3.718E-08 | 3.166E-08 | 2.732E-08 | 1.692E-08 | 1.204E-08 |
| SSE               | 3.409E-08 | 2.903E-08 | 2.505E-08 | 1.552E-08 | 1.103E-08 |
| SE                | 3.147E-08 | 2.680E-08 | 2.313E-08 | 1.432E-08 | 1.019E-08 |
| ESE               | 2.922E-08 | 2.488E-08 | 2.147E-08 | 1.330E-08 | 9.458E-09 |
| E                 | 2.727E-08 | 2.322E-08 | 2.004E-08 | 1.241E-08 | 8.828E-09 |
| ENE               | 2.557E-08 | 2.177E-08 | 1.879E-08 | 1.164E-08 | 8.277E-09 |
| NE                | 2.406E-08 | 2.049E-08 | 1.768E-08 | 1.095E-08 | 7.789E-09 |
| NNE               | 2.273E-08 | 1.935E-08 | 1.670E-08 | 1.034E-08 | 7.357E-09 |

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CHIQ  
Page 2

GROUND-LEVEL CHI/Q VALUES FOR S-35  
SOLUBILITY: V  
CHEMFORM: Carbon Disulfide (CS2)  
SIZE: 0.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 2000      | 3000      | 4000      | 5000      | 6000      | 7000      |
| N                 | 3.384E-06 | 1.088E-06 | 5.568E-07 | 3.671E-07 | 2.666E-07 | 2.054E-07 | 1.648E-07 |
| NNW               | 2.539E-06 | 8.163E-07 | 4.177E-07 | 2.754E-07 | 2.000E-07 | 1.541E-07 | 1.237E-07 |
| NW                | 2.030E-06 | 6.528E-07 | 3.340E-07 | 2.202E-07 | 1.599E-07 | 1.232E-07 | 9.890E-08 |
| WNW               | 1.692E-06 | 5.441E-07 | 2.784E-07 | 1.836E-07 | 1.333E-07 | 1.027E-07 | 8.244E-08 |
| W                 | 1.451E-06 | 4.664E-07 | 2.387E-07 | 1.574E-07 | 1.143E-07 | 8.806E-08 | 7.068E-08 |
| WSW               | 1.269E-06 | 4.080E-07 | 2.088E-07 | 1.377E-07 | 9.998E-08 | 7.703E-08 | 6.183E-08 |
| SW                | 1.128E-06 | 3.627E-07 | 1.856E-07 | 1.224E-07 | 8.888E-08 | 6.849E-08 | 5.497E-08 |
| SSW               | 1.015E-06 | 3.265E-07 | 1.671E-07 | 1.102E-07 | 8.000E-08 | 6.164E-08 | 4.948E-08 |
| S                 | 9.229E-07 | 2.968E-07 | 1.519E-07 | 1.001E-07 | 7.272E-08 | 5.603E-08 | 4.497E-08 |
| SSE               | 8.461E-07 | 2.721E-07 | 1.392E-07 | 9.180E-08 | 6.666E-08 | 5.137E-08 | 4.123E-08 |
| SE                | 7.811E-07 | 2.512E-07 | 1.285E-07 | 8.474E-08 | 6.154E-08 | 4.742E-08 | 3.806E-08 |
| ESE               | 7.252E-07 | 2.332E-07 | 1.193E-07 | 7.868E-08 | 5.714E-08 | 4.403E-08 | 3.534E-08 |
| E                 | 6.769E-07 | 2.177E-07 | 1.114E-07 | 7.344E-08 | 5.333E-08 | 4.109E-08 | 3.298E-08 |
| ENE               | 6.346E-07 | 2.041E-07 | 1.044E-07 | 6.885E-08 | 5.000E-08 | 3.853E-08 | 3.092E-08 |
| NE                | 5.972E-07 | 1.920E-07 | 9.828E-08 | 6.480E-08 | 4.706E-08 | 3.626E-08 | 2.910E-08 |
| NNE               | 5.641E-07 | 1.814E-07 | 9.282E-08 | 6.120E-08 | 4.444E-08 | 3.425E-08 | 2.749E-08 |

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| Distance (meters) |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 8000      | 9000      | 10000     | 15000     | 20000     |
| N                 | 1.363E-07 | 1.160E-07 | 1.001E-07 | 6.200E-08 | 4.407E-08 |
| NNW               | 1.023E-07 | 8.706E-08 | 7.513E-08 | 4.652E-08 | 3.308E-08 |
| NW                | 8.177E-08 | 6.963E-08 | 6.009E-08 | 3.721E-08 | 2.646E-08 |
| WNW               | 6.816E-08 | 5.804E-08 | 5.009E-08 | 3.102E-08 | 2.206E-08 |
| W                 | 5.844E-08 | 4.976E-08 | 4.294E-08 | 2.659E-08 | 1.891E-08 |
| WSW               | 5.112E-08 | 4.353E-08 | 3.757E-08 | 2.327E-08 | 1.654E-08 |
| SW                | 4.545E-08 | 3.870E-08 | 3.340E-08 | 2.068E-08 | 1.471E-08 |
| SSW               | 4.091E-08 | 3.483E-08 | 3.006E-08 | 1.862E-08 | 1.324E-08 |
| S                 | 3.718E-08 | 3.166E-08 | 2.732E-08 | 1.692E-08 | 1.204E-08 |
| SSE               | 3.409E-08 | 2.903E-08 | 2.505E-08 | 1.552E-08 | 1.103E-08 |
| SE                | 3.147E-08 | 2.680E-08 | 2.313E-08 | 1.432E-08 | 1.019E-08 |
| ESE               | 2.922E-08 | 2.488E-08 | 2.147E-08 | 1.330E-08 | 9.458E-09 |
| E                 | 2.727E-08 | 2.322E-08 | 2.004E-08 | 1.241E-08 | 8.828E-09 |
| ENE               | 2.557E-08 | 2.177E-08 | 1.879E-08 | 1.164E-08 | 8.277E-09 |
| NE                | 2.406E-08 | 2.049E-08 | 1.768E-08 | 1.095E-08 | 7.789E-09 |
| NNE               | 2.273E-08 | 1.935E-08 | 1.670E-08 | 1.034E-08 | 7.357E-09 |

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Fri Jun 07 20:40:10 2013

CHIQ  
Page 3

GROUND-LEVEL CHI/Q VALUES FOR S-35  
SOLUBILITY: S  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

---

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 2000      | 3000      | 4000      | 5000      | 6000      | 7000      |
| N                 | 3.003E-06 | 9.100E-07 | 4.467E-07 | 2.790E-07 | 1.957E-07 | 1.450E-07 | 1.112E-07 |
| NNW               | 2.316E-06 | 7.128E-07 | 3.536E-07 | 2.238E-07 | 1.583E-07 | 1.185E-07 | 9.183E-08 |
| NW                | 1.883E-06 | 5.851E-07 | 2.921E-07 | 1.864E-07 | 1.326E-07 | 9.976E-08 | 7.786E-08 |
| WNW               | 1.587E-06 | 4.963E-07 | 2.488E-07 | 1.597E-07 | 1.139E-07 | 8.607E-08 | 6.748E-08 |
| W                 | 1.371E-06 | 4.308E-07 | 2.167E-07 | 1.396E-07 | 9.985E-08 | 7.564E-08 | 5.950E-08 |
| WSW               | 1.207E-06 | 3.804E-07 | 1.918E-07 | 1.239E-07 | 8.880E-08 | 6.742E-08 | 5.316E-08 |
| SW                | 1.078E-06 | 3.407E-07 | 1.721E-07 | 1.114E-07 | 7.997E-08 | 6.081E-08 | 4.805E-08 |
| SSW               | 9.738E-07 | 3.084E-07 | 1.560E-07 | 1.012E-07 | 7.273E-08 | 5.538E-08 | 4.382E-08 |
| S                 | 8.878E-07 | 2.817E-07 | 1.427E-07 | 9.268E-08 | 6.667E-08 | 5.082E-08 | 4.027E-08 |
| SSE               | 8.159E-07 | 2.593E-07 | 1.314E-07 | 8.549E-08 | 6.155E-08 | 4.696E-08 | 3.725E-08 |
| SE                | 7.549E-07 | 2.402E-07 | 1.218E-07 | 7.934E-08 | 5.716E-08 | 4.364E-08 | 3.465E-08 |
| ESE               | 7.021E-07 | 2.236E-07 | 1.135E-07 | 7.400E-08 | 5.334E-08 | 4.076E-08 | 3.238E-08 |
| E                 | 6.564E-07 | 2.093E-07 | 1.063E-07 | 6.934E-08 | 5.001E-08 | 3.823E-08 | 3.040E-08 |
| ENE               | 6.163E-07 | 1.966E-07 | 9.995E-08 | 6.524E-08 | 4.707E-08 | 3.601E-08 | 2.864E-08 |
| NE                | 5.807E-07 | 1.854E-07 | 9.429E-08 | 6.158E-08 | 4.445E-08 | 3.402E-08 | 2.708E-08 |
| NNE               | 5.491E-07 | 1.754E-07 | 8.925E-08 | 5.832E-08 | 4.211E-08 | 3.224E-08 | 2.567E-08 |

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| Distance (meters) |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 8000      | 9000      | 10000     | 15000     | 20000     |
| N                 | 8.910E-08 | 7.347E-08 | 6.104E-08 | 3.400E-08 | 2.122E-08 |
| NNW               | 7.415E-08 | 6.161E-08 | 5.165E-08 | 2.953E-08 | 1.901E-08 |
| NW                | 6.316E-08 | 5.273E-08 | 4.445E-08 | 2.582E-08 | 1.694E-08 |
| WNW               | 5.492E-08 | 4.599E-08 | 3.892E-08 | 2.284E-08 | 1.519E-08 |
| W                 | 4.853E-08 | 4.074E-08 | 3.457E-08 | 2.044E-08 | 1.372E-08 |
| WSW               | 4.344E-08 | 3.653E-08 | 3.106E-08 | 1.847E-08 | 1.249E-08 |
| SW                | 3.931E-08 | 3.310E-08 | 2.819E-08 | 1.684E-08 | 1.145E-08 |
| SSW               | 3.589E-08 | 3.026E-08 | 2.580E-08 | 1.547E-08 | 1.056E-08 |
| S                 | 3.301E-08 | 2.785E-08 | 2.378E-08 | 1.430E-08 | 9.799E-09 |
| SSE               | 3.056E-08 | 2.580E-08 | 2.205E-08 | 1.329E-08 | 9.137E-09 |
| SE                | 2.844E-08 | 2.403E-08 | 2.055E-08 | 1.241E-08 | 8.556E-09 |
| ESE               | 2.659E-08 | 2.248E-08 | 1.924E-08 | 1.164E-08 | 8.043E-09 |
| E                 | 2.498E-08 | 2.113E-08 | 1.809E-08 | 1.096E-08 | 7.588E-09 |
| ENE               | 2.354E-08 | 1.992E-08 | 1.707E-08 | 1.036E-08 | 7.181E-09 |
| NE                | 2.226E-08 | 1.884E-08 | 1.615E-08 | 9.814E-09 | 6.814E-09 |
| NNE               | 2.112E-08 | 1.788E-08 | 1.533E-08 | 9.325E-09 | 6.483E-09 |

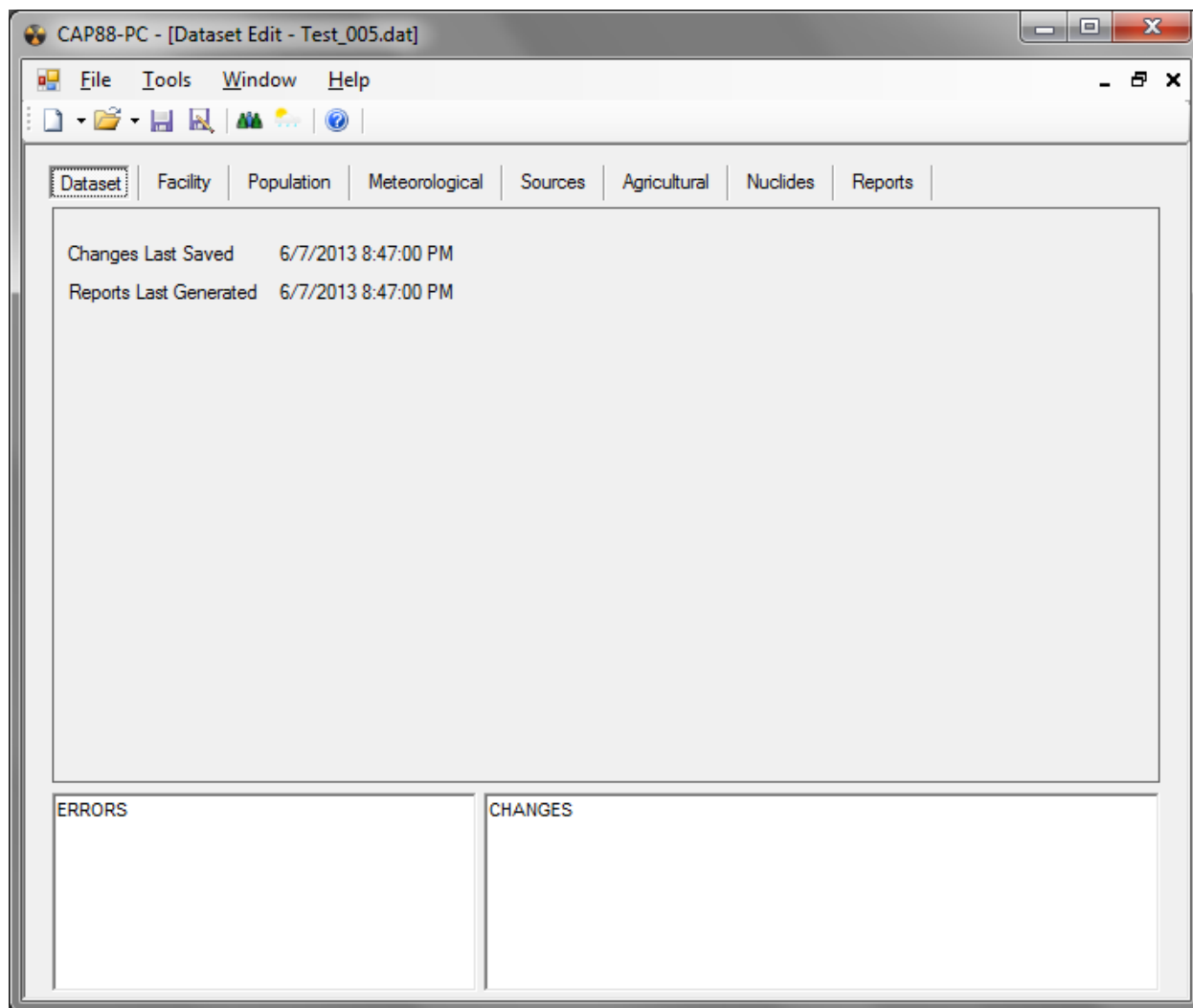
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## ***Appendix E: Test Case 5 Inputs and Reports***

### **E.1 Inputs**

#### ***E.1.1 Dataset***





### E.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Name: The Plants Emission Year: 1992

Address: 3684 Coupland Road Source Category:

City: Lancaster

Zip: 99353 (Note: State is found on the Agricultural tab)

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

ERRORS CHANGES



### E.1.3 Population

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Population Population Age: One Build up time: 100 years

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Users\CAP88 User\Documents\CAP88\Population Files\Incr1990.pop

File: Incr1990 The Plants

Midpoints: 13

|       |          |          |          |          |          |
|-------|----------|----------|----------|----------|----------|
| 1 - 5 | 250.00   | 750.00   | 1500.00  | 2500.00  | 3500.00  |
| 6-10  | 4500.00  | 7500.00  | 15000.00 | 25000.00 | 35000.00 |
| 11-15 | 45000.00 | 55000.00 | 70000.00 | 0.00     | 0.00     |
| 16-20 | 0.00     | 0.00     | 0.00     | 0.00     | 0.00     |

Maximum Exposed Individual

Direction: auto Midpoint index: 0 ☒ Auto-determine

ERRORS

CHANGES



### E.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Users\CAP88 User\Documents\CAP88\Wind Files\Incr1990.wnd

File

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| Annual Precipitation       | <input type="text" value="100.00"/>  | cm/year        |
| Annual Ambient Temperature | <input type="text" value="10.00"/>   | Celsius        |
| Lid Height                 | <input type="text" value="1000.00"/> | meters         |
| Absolute Humidity          | <input type="text" value="8.00"/>    | grams/cu meter |

|        |         |
|--------|---------|
| ERRORS | CHANGES |
|        |         |





### E.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Source Type: Stack

Sources: 5

|             | 1     | 2     | 3     | 4     | 5     |
|-------------|-------|-------|-------|-------|-------|
| ▶ Height(m) | 10.00 | 10.00 | 12.00 | 15.00 | 75.00 |
| Diameter(m) | 1.00  | 1.20  | 1.00  | 1.30  | 0.80  |

Plume Type: Buoyant

Enter the heat release rate for each source

|           | 1     | 2     | 3     | 4     | 5    |
|-----------|-------|-------|-------|-------|------|
| ▶ cal/sec | 10.00 | 20.00 | 15.00 | 25.00 | 5.00 |

ERRORS

CHANGES



### E.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source:

|                               | Vegetable                         | Milk                              | Meat                              |
|-------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Fraction home produced        | <input type="text" value="0.30"/> | <input type="text" value="0.20"/> | <input type="text" value="0.10"/> |
| Fraction from assessment area | <input type="text" value="0.60"/> | <input type="text" value="0.70"/> | <input type="text" value="0.80"/> |
| Fraction imported             | <input type="text" value="0.10"/> | <input type="text" value="0.10"/> | <input type="text" value="0.10"/> |

Agriculture State:

Beef cattle density:  #/ha2

Milk cattle density:  #/ha2

Land fraction cultivated for vegetables:

ERRORS

CHANGES



### E.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_005.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length: max ☐ Radon Only Ac-223 Add

Released Nuclide Count 3 Total Nuclide Count 3 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form   | Type | Size  | RR1       | RR2       | RR3       | RR4       | RR5       |
|-----|---------|-------------|------|-------|-----------|-----------|-----------|-----------|-----------|
| 0   | Tc-97   | Particulate | M    | 1.... | 1.000e+01 | 1.000e+00 | 1.000e+00 | 1.000e+00 | 1.000e+02 |
| 0   | Tc-98   | Particulate | M    | 1.... | 5.000e-02 | 5.000e-03 | 5.000e-03 | 5.000e-03 | 5.000e-01 |
| 0   | Tc-99   | Particulate | M    | 1.... | 1.000e+00 | 1.000e-01 | 1.000e-01 | 1.000e-01 | 1.000e+01 |

ERRORS

CHANGES



## E.2 Reports

### *E.2.1 Synopsis Report*

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Population Assessment  
Fri Jun 07 20:47:10 2013

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA                      Zip: 99353

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: One

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Committed Effective Dose Equivalent  
(mrem)

---

1.74E+00

---

At This Location: 7500 Meters West Northwest

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lncr1990  
p File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lncr1990.



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SYNOPSIS  
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 7500 Meters West Northwest  
Lifetime Fatal Cancer Risk: 3.86E-07

ORGAN DOSE EQUIVALENT SUMMARY  
(RN-222 Working Level Calculations Excluded)

| Organ    | Selected<br>Individual<br>(mrem) | Collective<br>Population<br>(person-rem) |
|----------|----------------------------------|--|
| Adrenal  | 3.81E-01                         | 1.73E+01                                 |
| UB_Wall  | 4.78E-01                         | 2.45E+01                                 |
| Bone_Sur | 1.01E+00                         | 3.83E+01                                 |
| Brain    | 3.81E-01                         | 1.69E+01                                 |
| Breasts  | 1.05E+00                         | 3.42E+01                                 |
| St_Wall  | 3.90E+00                         | 3.48E+02                                 |
| SI_Wall  | 7.93E-01                         | 5.62E+01                                 |
| ULI_Wall | 2.94E+00                         | 2.59E+02                                 |
| LLI_Wall | 7.23E+00                         | 6.63E+02                                 |
| Kidneys  | 4.39E-01                         | 1.89E+01                                 |
| Liver    | 4.23E-01                         | 1.98E+01                                 |
| Muscle   | 8.09E-01                         | 2.94E+01                                 |
| Ovaries  | 6.86E-01                         | 4.39E+01                                 |
| Pancreas | 3.96E-01                         | 1.99E+01                                 |
| R_Marrow | 4.50E-01                         | 1.78E+01                                 |
| Skin     | 2.95E+00                         | 8.65E+01                                 |
| Spleen   | 4.03E-01                         | 1.83E+01                                 |
| Testes   | 9.50E-01                         | 3.27E+01                                 |
| Thymus   | 4.19E-01                         | 1.80E+01                                 |
| Thyroid  | 3.13E+00                         | 2.67E+02                                 |
| GB_Wall  | 4.14E-01                         | 2.09E+01                                 |
| Ht_Wall  | 3.91E-01                         | 1.70E+01                                 |
| Uterus   | 4.18E-01                         | 2.08E+01                                 |
| ET_Reg   | 3.66E-01                         | 1.66E+01                                 |
| Lung_66  | 4.33E-01                         | 1.85E+01                                 |
| Effectiv | 1.74E+00                         | 1.31E+02                                 |



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SYNOPSIS  
Page 2

#### FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

| Risk Range         | # of People | # of People in This Risk Range or Higher | Deaths in This Risk Range | Deaths in This Risk Range or Higher |
|--------------------|-------------|--|---------------------------|-------------------------------------|
| 1.0E+00 TO 1.0E-01 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| 1.0E-01 TO 1.0E-02 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| 1.0E-02 TO 1.0E-03 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| 1.0E-03 TO 1.0E-04 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| 1.0E-04 TO 1.0E-05 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| 1.0E-05 TO 1.0E-06 | 0           | 0  | 0.00E+00                  | 0.00E+00                            |
| LESS THAN 1.0E-06  | 348850      | 348850                                   | 4.39E+03                  | 4.39E+03                            |

#### RADIONUCLIDE EMISSIONS DURING THE YEAR 1992

| Nuclide | Type | Size  | Source #1<br>Ci/y | Source #2<br>Ci/y | Source #3<br>Ci/y | Source #4<br>Ci/y | Source #5<br>Ci/y | TOTAL<br>Ci/y |
|---------|------|-------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|
| Tc-97   | M    | 1.000 | 1.0E+01           | 1.0E+00           | 1.0E+00           | 1.0E+00           | 1.0E+02           | 1.1E+02       |
| Tc-98   | M    | 1.000 | 5.0E-02           | 5.0E-03           | 5.0E-03           | 5.0E-03           | 5.0E-01           | 5.6E-01       |
| Tc-99   | M    | 1.000 | 1.0E+00           | 1.0E-01           | 1.0E-01           | 1.0E-01           | 1.0E+01           | 1.1E+01       |

#### SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 100.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m



Fri Jun 07 20:47:10 2013

SYNOPSIS  
Page 3

SOURCE INFORMATION

| Source Number:      | 1     | 2     | 3     | 4     | 5     |
|---------------------|-------|-------|-------|-------|-------|
| Stack Height (m):   | 10.00 | 10.00 | 12.00 | 15.00 | 75.00 |
| Diameter (m):       | 1.00  | 1.20  | 1.00  | 1.30  | 0.80  |
| Plume Rise          |       |       |       |       |       |
| Buoyant (cal/s):    | 10.00 | 20.00 | 15.00 | 25.00 | 5.00  |
| (Heat Release Rate) |       |       |       |       |       |

AGRICULTURAL DATA

|  | Vegetable | Milk  | Meat  |
|--|-----------|-------|-------|
| Fraction Home Produced:                          | 0.300     | 0.200 | 0.100 |
| Fraction From Assessment Area:                   | 0.600     | 0.700 | 0.800 |
| Fraction Imported:                               | 0.100     | 0.100 | 0.100 |
| Beef Cattle Density:                             | 5.62E-02  |       |       |
| Milk Cattle Density:                             | 1.50E-02  |       |       |
| Land Fraction Cultivated<br>for Vegetable Crops: | 5.20E-02  |       |       |



Fri Jun 07 20:47:10 2013

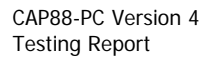
SYNOPSIS  
Page 4

POPULATION DATA

| Direction | Distance (m) |     |      |      |      |      |      |
|-----------|--------------|-----|------|------|------|------|------|
|           | 250          | 750 | 1500 | 2500 | 3500 | 4500 | 7500 |
| N         | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| NNW       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| NW        | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| WNW       | 0            | 0   | 0    | 0    | 0    | 0    | 66   |
| W         | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| WSW       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| SW        | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| SSW       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| S         | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| SSE       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| SE        | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| ESE       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| E         | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| ENE       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| NE        | 0            | 0   | 0    | 0    | 0    | 0    | 0    |
| NNE       | 0            | 0   | 0    | 0    | 0    | 0    | 0    |

| Direction | Distance (m) |       |       |       |       |       |
|-----------|--------------|-------|-------|-------|-------|-------|
|           | 15000        | 25000 | 35000 | 45000 | 55000 | 70000 |
| N         | 0            | 0     | 703   | 0     | 676   | 1708  |
| NNW       | 0            | 0     | 0     | 0     | 1860  | 261   |
| NW        | 0            | 0     | 0     | 299   | 0     | 987   |
| WNW       | 0            | 0     | 0     | 1107  | 64    | 89459 |
| W         | 0            | 603   | 1737  | 2007  | 10196 | 16572 |
| WSW       | 878          | 802   | 12865 | 5286  | 431   | 95    |
| SW        | 0            | 1416  | 8832  | 2101  | 0     | 392   |
| SSW       | 0            | 1508  | 0     | 169   | 0     | 0     |
| S         | 1581         | 1460  | 0     | 0     | 689   | 3297  |
| SSE       | 2195         | 392   | 0     | 452   | 2342  | 20115 |
| SE        | 1097         | 18475 | 25800 | 35863 | 3622  | 15    |
| ESE       | 0            | 12981 | 6430  | 18848 | 2243  | 951   |
| E         | 0            | 0     | 1626  | 0     | 584   | 0     |
| ENE       | 0            | 0     | 0     | 2705  | 0     | 2084  |
| NE        | 0            | 0     | 0     | 0     | 5473  | 1696  |
| NNE       | 0            | 0     | 0     | 1560  | 1306  | 9888  |





C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

```
Non-Radon Population Assessment
Fri Jun 07 20:47:10 2013
```

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA Zip: 99353

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lnchr1990.wnd  
Population File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnchr1990.pop



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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| Tc-97   | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |
| Tc-98   | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |
| Tc-99   | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| Tc-97   | 7.30E-10                 | 5.48E-05 | 0.00E+00 | 1.00E-03             | 1.00E-04 |
| Tc-98   | 4.52E-10                 | 5.48E-05 | 0.00E+00 | 1.00E-03             | 1.00E-04 |
| Tc-99   | 8.99E-09                 | 5.48E-05 | 0.00E+00 | 1.00E-03             | 1.00E-04 |

FOOTNOTES:

(1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)

(2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)



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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

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| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| Tc-97   | 4.00E+01                       | 5.00E+00   | 5.00E-01           | 5.00E-01  |
| Tc-98   | 4.00E+01                       | 5.00E+00   | 5.00E-01           | 5.00E-01  |
| Tc-99   | 4.00E+01                       | 5.00E+00   | 5.00E-01           | 5.00E-01  |

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FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)

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GENERAL  
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NUMBER OF BEEF CATTLE

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| Distance (meters) |     |     |      |      |      |      |      |
|-------------------|-----|-----|------|------|------|------|------|
| Direction         | 250 | 750 | 1500 | 2500 | 3500 | 4500 | 7500 |
| N                 | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| NNW               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| NW                | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| WNW               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| W                 | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| WSW               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| SW                | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| SSW               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| S                 | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| SSE               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| SE                | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| ESE               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| E                 | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| ENE               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| NE                | 0   | 1   | 3    | 6    | 8    | 10   | 83   |
| NNE               | 0   | 1   | 3    | 6    | 8    | 10   | 83   |

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| Distance (meters) |       |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|-------|
| Direction         | 15000 | 25000 | 35000 | 45000 | 55000 | 70000 |
| N                 | 331   | 552   | 772   | 993   | 1214  | 3090  |
| NNW               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| NW                | 331   | 552   | 772   | 993   | 1214  | 3090  |
| WNW               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| W                 | 331   | 552   | 772   | 993   | 1214  | 3090  |
| WSW               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| SW                | 331   | 552   | 772   | 993   | 1214  | 3090  |
| SSW               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| S                 | 331   | 552   | 772   | 993   | 1214  | 3090  |
| SSE               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| SE                | 331   | 552   | 772   | 993   | 1214  | 3090  |
| ESE               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| E                 | 331   | 552   | 772   | 993   | 1214  | 3090  |
| ENE               | 331   | 552   | 772   | 993   | 1214  | 3090  |
| NE                | 331   | 552   | 772   | 993   | 1214  | 3090  |
| NNE               | 331   | 552   | 772   | 993   | 1214  | 3090  |

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NUMBER OF MILK CATTLE

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| Distance (meters) |     |     |      |      |      |      |      |
|-------------------|-----|-----|------|------|------|------|------|
| Direction         | 250 | 750 | 1500 | 2500 | 3500 | 4500 | 7500 |
| N                 | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| NNW               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| NW                | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| WNW               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| W                 | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| WSW               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| SW                | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| SSW               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| S                 | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| SSE               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| SE                | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| ESE               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| E                 | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| ENE               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| NE                | 0   | 0   | 1    | 1    | 2    | 3    | 22   |
| NNE               | 0   | 0   | 1    | 1    | 2    | 3    | 22   |

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| Distance (meters) |       |       |       |       |       |       |
|-------------------|-------|-------|-------|-------|-------|-------|
| Direction         | 15000 | 25000 | 35000 | 45000 | 55000 | 70000 |
| N                 | 88    | 147   | 206   | 265   | 324   | 825   |
| NNW               | 88    | 147   | 206   | 265   | 324   | 825   |
| NW                | 88    | 147   | 206   | 265   | 324   | 825   |
| WNW               | 88    | 147   | 206   | 265   | 324   | 825   |
| W                 | 88    | 147   | 206   | 265   | 324   | 825   |
| WSW               | 88    | 147   | 206   | 265   | 324   | 825   |
| SW                | 88    | 147   | 206   | 265   | 324   | 825   |
| SSW               | 88    | 147   | 206   | 265   | 324   | 825   |
| S                 | 88    | 147   | 206   | 265   | 324   | 825   |
| SSE               | 88    | 147   | 206   | 265   | 324   | 825   |
| SE                | 88    | 147   | 206   | 265   | 324   | 825   |
| ESE               | 88    | 147   | 206   | 265   | 324   | 825   |
| E                 | 88    | 147   | 206   | 265   | 324   | 825   |
| ENE               | 88    | 147   | 206   | 265   | 324   | 825   |
| NE                | 88    | 147   | 206   | 265   | 324   | 825   |
| NNE               | 88    | 147   | 206   | 265   | 324   | 825   |

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AREA OF VEGETABLE CROP PRODUCTION (M\*\*2)

| Direction | Distance (meters) |         |         |         |         |         |         |
|-----------|-------------------|---------|---------|---------|---------|---------|---------|
|           | 250               | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N         | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| NNW       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| NW        | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| WNW       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| W         | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| WSW       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| SW        | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| SSW       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| S         | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| SSE       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| SE        | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| ESE       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| E         | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| ENE       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| NE        | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |
| NNE       | 0.0E+00           | 7.7E+03 | 3.1E+04 | 5.1E+04 | 7.1E+04 | 9.2E+04 | 7.7E+05 |

| Direction | Distance (meters) |         |         |         |         |         |
|-----------|-------------------|---------|---------|---------|---------|---------|
|           | 15000             | 25000   | 35000   | 45000   | 55000   | 70000   |
| N         | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| NNW       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| NW        | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| WNW       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| W         | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| WSW       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| SW        | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| SSW       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| S         | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| SSE       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| SE        | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| ESE       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| E         | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| ENE       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| NE        | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |
| NNE       | 3.1E+06           | 5.1E+06 | 7.1E+06 | 9.2E+06 | 1.1E+07 | 2.9E+07 |



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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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HUMAN INHALATION RATE  
Cubic meters/yr 1.81E+03

SOIL PARAMETERS  
Effective surface density (kg/sq m, dry weight)  
(Assumes 15 cm plow layer) 2.15E+02

BUILDUP TIMES  
For activity in soil (years) 1.00E+02  
For radionuclides deposited on ground/water (days) 3.65E+04

DELAY TIMES  
Ingestion of pasture grass by animals (hr) 0.00E+00  
Ingestion of stored feed by animals (hr) 2.16E+03  
Ingestion of leafy vegetables by man (hr) 3.36E+02  
Ingestion of produce by man (hr) 3.36E+02  
Transport time from animal feed-milk-man (day) 2.00E+00  
Time from slaughter to consumption (day) 2.00E+01

WEATHERING  
Removal rate constant for physical loss (per hr) 2.90E-03

CROP EXPOSURE DURATION  
Pasture grass (hr) 7.20E+02  
Crops/leafy vegetables (hr) 1.44E+03

AGRICULTURAL PRODUCTIVITY  
Grass-cow-milk-man pathway (kg/sq m) 2.80E-01  
Produce/leafy veg for human consumption (kg/sq m) 7.16E-01

FALLOUT INTERCEPTION FRACTIONS  
Vegetables 2.00E-01  
Pasture 5.70E-01

GRAZING PARAMETERS  
Fraction of year animals graze on pasture 4.00E-01  
Fraction of daily feed that is pasture grass  
when animal grazes on pasture 4.30E-01

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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 3.33E-01

Meat 1.11E-01

Milk 2.22E-01

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Actual fractions of food types from outside area can  
be greater than the minimum fractions listed below.)

Vegetables 1.00E-01

Meat 1.00E-01

Milk 1.00E-01

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 2.99E+01

Milk ingestion (L/y) 1.73E+02

Meat ingestion (kg/y) 3.30E+01

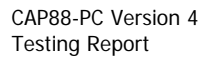
Leafy vegetable ingestion (kg/y) 3.06E+00

SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

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Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Population Assessment  
Fri Jun 07 20:47:10 2013

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA Zip: 99353

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lnchr1990.wnd  
Population File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnchr1990.pop



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WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |



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WEATHER  
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FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

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| Pasquill Stability Class |   |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|---|
| Dir                      | A | B | C | D | E | F | G |

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|       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| N     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

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ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 100.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *E.2.4 Dose and Risk Equivalent Summaries*

### D O S E   A N D   R I S K   S U M M A R I E S

Non-Radon Population Assessment  
Fri Jun 07 20:47:10 2013

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA                      Zip: 99353

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: One

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lncl1990.wnd  
Pop File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lncl1990.pop



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SUMMARY  
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ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem) | Collective<br>Population<br>(person-rem) |
|----------|----------------------------------|--|
| Adrenal  | 3.81E-01                         | 1.73E+01                                 |
| UB_Wall  | 4.78E-01                         | 2.45E+01                                 |
| Bone_Sur | 1.01E+00                         | 3.83E+01                                 |
| Brain    | 3.81E-01                         | 1.69E+01                                 |
| Breasts  | 1.05E+00                         | 3.42E+01                                 |
| St_Wall  | 3.90E+00                         | 3.48E+02                                 |
| SI_Wall  | 7.93E-01                         | 5.62E+01                                 |
| ULI_Wall | 2.94E+00                         | 2.59E+02                                 |
| LLI_Wall | 7.23E+00                         | 6.63E+02                                 |
| Kidneys  | 4.39E-01                         | 1.89E+01                                 |
| Liver    | 4.23E-01                         | 1.98E+01                                 |
| Muscle   | 8.09E-01                         | 2.94E+01                                 |
| Ovaries  | 6.86E-01                         | 4.39E+01                                 |
| Pancreas | 3.96E-01                         | 1.99E+01                                 |
| R_Marrow | 4.50E-01                         | 1.78E+01                                 |
| Skin     | 2.95E+00                         | 8.65E+01                                 |
| Spleen   | 4.03E-01                         | 1.83E+01                                 |
| Testes   | 9.50E-01                         | 3.27E+01                                 |
| Thymus   | 4.19E-01                         | 1.80E+01                                 |
| Thyroid  | 3.13E+00                         | 2.67E+02                                 |
| GB_Wall  | 4.14E-01                         | 2.09E+01                                 |
| Ht_Wall  | 3.91E-01                         | 1.70E+01                                 |
| Uterus   | 4.18E-01                         | 2.08E+01                                 |
| ET_Reg   | 3.66E-01                         | 1.66E+01                                 |
| Lung_66  | 4.33E-01                         | 1.85E+01                                 |
| Effectiv | 1.74E+00                         | 1.31E+02                                 |

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem) | Collective<br>Population<br>(person-rem) |
|----------------|----------------------------------|--|
| INGESTION      | 1.24E+00                         | 1.17E+02                                 |
| INHALATION     | 1.92E-03                         | 4.67E-02                                 |
| AIR IMMERSION  | 4.78E-06                         | 1.16E-04                                 |
| GROUND SURFACE | 5.06E-01                         | 1.40E+01                                 |
| INTERNAL       | 1.24E+00                         | 1.17E+02                                 |
| EXTERNAL       | 5.06E-01                         | 1.40E+01                                 |
| TOTAL          | 1.74E+00                         | 1.31E+02                                 |



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NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclides | Selected<br>Individual<br>(mrem) | Collective<br>Population<br>(person-rem) |
|----------|----------------------------------|--|
| Tc-97    | 7.98E-01                         | 6.15E+01                                 |
| Tc-98    | 3.72E-01                         | 1.49E+01                                 |
| Tc-99    | 5.75E-01                         | 5.41E+01                                 |
| TOTAL    | 1.74E+00                         | 1.31E+02                                 |



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SUMMARY  
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CANCER RISK SUMMARY

| Cancer   | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths) |
|----------|--|---|
| Esophagu | 3.16E-09   | 1.31E-06  |
| Stomach  | 4.42E-08   | 4.34E-05  |
| Colon    | 1.42E-07   | 1.48E-04  |
| Liver    | 4.95E-09   | 2.11E-06  |
| LUNG     | 3.35E-08   | 1.38E-05  |
| Bone     | 8.35E-10   | 3.20E-07  |
| Skin     | 2.88E-09   | 1.04E-06  |
| Breast   | 4.75E-08   | 1.77E-05  |
| Ovary    | 5.19E-09   | 2.51E-06  |
| Bladder  | 8.93E-09   | 4.43E-06  |
| Kidneys  | 1.86E-09   | 7.59E-07  |
| Thyroid  | 3.09E-09   | 2.59E-06  |
| Leukemia | 2.16E-08   | 8.56E-06  |
| Residual | 6.55E-08   | 2.67E-05  |
| Total    | 3.86E-07   | 2.74E-04  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths) |
|----------------|--|---|
| INGESTION      | 1.57E-07   | 1.92E-04  |
| INHALATION     | 6.36E-11   | 2.01E-08  |
| AIR IMMERSION  | 2.53E-12   | 7.99E-10  |
| GROUND SURFACE | 2.28E-07   | 8.15E-05  |
| INTERNAL       | 1.57E-07   | 1.92E-04  |
| EXTERNAL       | 2.28E-07   | 8.15E-05  |
| TOTAL          | 3.86E-07   | 2.74E-04  |





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NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk | Total Collective<br>Population Fatal<br>Cancer Risk<br>(Deaths) |
|---------|--|---|
| Tc-97   | 1.36E-07   | 1.12E-04  |
| Tc-98   | 1.76E-07   | 7.10E-05  |
| Tc-99   | 7.44E-08   | 9.07E-05  |
| TOTAL   | 3.86E-07   | 2.74E-04  |



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INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.7E+00 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| E            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 0.0E+00 | 0.0E+00 | 6.3E-01 | 0.0E+00 | 4.3E-01 | 3.6E-01 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.2E-01 | 3.6E-01 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.5E-01 | 0.0E+00 | 3.5E-01 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.3E-01 | 3.9E-01 | 3.5E-01 |
| W            | 0.0E+00 | 5.8E-01 | 4.7E-01 | 4.2E-01 | 3.8E-01 | 3.4E-01 |
| WSW          | 7.9E-01 | 5.5E-01 | 4.5E-01 | 4.0E-01 | 3.7E-01 | 3.4E-01 |
| SW           | 0.0E+00 | 5.2E-01 | 4.4E-01 | 3.9E-01 | 0.0E+00 | 3.3E-01 |
| SSW          | 0.0E+00 | 5.0E-01 | 0.0E+00 | 3.8E-01 | 0.0E+00 | 0.0E+00 |
| S            | 6.5E-01 | 4.8E-01 | 0.0E+00 | 0.0E+00 | 3.4E-01 | 3.2E-01 |
| SSE          | 6.2E-01 | 4.6E-01 | 0.0E+00 | 3.6E-01 | 3.4E-01 | 3.2E-01 |
| SSE          | 6.0E-01 | 4.5E-01 | 3.9E-01 | 3.6E-01 | 3.3E-01 | 3.1E-01 |
| ESE          | 0.0E+00 | 4.4E-01 | 3.8E-01 | 3.5E-01 | 3.3E-01 | 3.1E-01 |
| E            | 0.0E+00 | 0.0E+00 | 3.7E-01 | 0.0E+00 | 3.3E-01 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.4E-01 | 0.0E+00 | 3.1E-01 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.2E-01 | 3.0E-01 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.3E-01 | 3.2E-01 | 3.0E-01 |



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COLLECTIVE COMMITTED EFFECTIVE DOSE EQUIVALENT (person rem)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.2E-01 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| E            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 0.0E+00 | 0.0E+00 | 4.4E-01 | 0.0E+00 | 2.9E-01 | 6.2E-01 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.7E-01 | 9.4E-02 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.4E-01 | 0.0E+00 | 3.5E-01 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.8E-01 | 2.5E-02 | 3.1E+01 |
| W            | 0.0E+00 | 3.5E-01 | 8.2E-01 | 8.3E-01 | 3.8E+00 | 5.7E+00 |
| WSW          | 6.9E-01 | 4.4E-01 | 5.8E+00 | 2.1E+00 | 1.6E-01 | 3.2E-02 |
| SW           | 0.0E+00 | 7.4E-01 | 3.8E+00 | 8.2E-01 | 0.0E+00 | 1.3E-01 |
| SSW          | 0.0E+00 | 7.5E-01 | 0.0E+00 | 6.4E-02 | 0.0E+00 | 0.0E+00 |
| S            | 1.0E+00 | 7.0E-01 | 0.0E+00 | 0.0E+00 | 2.4E-01 | 1.1E+00 |
| SSE          | 1.4E+00 | 1.8E-01 | 0.0E+00 | 1.6E-01 | 7.9E-01 | 6.4E+00 |
| SSE          | 6.5E-01 | 8.3E+00 | 1.0E+01 | 1.3E+01 | 1.2E+00 | 4.7E-03 |
| ESE          | 0.0E+00 | 5.7E+00 | 2.4E+00 | 6.6E+00 | 7.4E-01 | 3.0E-01 |
| E            | 0.0E+00 | 0.0E+00 | 6.1E-01 | 0.0E+00 | 1.9E-01 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 9.2E-01 | 0.0E+00 | 6.4E-01 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.7E+00 | 5.1E-01 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.2E-01 | 4.1E-01 | 3.0E+00 |



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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.9E-07 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| E            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 0.0E+00 | 0.0E+00 | 1.2E-07 | 0.0E+00 | 7.4E-08 | 5.8E-08 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.1E-08 | 5.7E-08 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.9E-08 | 0.0E+00 | 5.6E-08 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 7.4E-08 | 6.4E-08 | 5.4E-08 |
| W            | 0.0E+00 | 1.1E-07 | 8.4E-08 | 7.0E-08 | 6.1E-08 | 5.3E-08 |
| WSW          | 1.6E-07 | 1.0E-07 | 7.9E-08 | 6.7E-08 | 5.9E-08 | 5.1E-08 |
| SW           | 0.0E+00 | 9.5E-08 | 7.5E-08 | 6.4E-08 | 0.0E+00 | 5.0E-08 |
| SSW          | 0.0E+00 | 9.0E-08 | 0.0E+00 | 6.2E-08 | 0.0E+00 | 0.0E+00 |
| S            | 1.3E-07 | 8.5E-08 | 0.0E+00 | 0.0E+00 | 5.3E-08 | 4.8E-08 |
| SSE          | 1.2E-07 | 8.1E-08 | 0.0E+00 | 5.8E-08 | 5.2E-08 | 4.7E-08 |
| SSE          | 1.1E-07 | 7.8E-08 | 6.4E-08 | 5.6E-08 | 5.1E-08 | 4.6E-08 |
| ESE          | 0.0E+00 | 7.5E-08 | 6.2E-08 | 5.5E-08 | 5.0E-08 | 4.5E-08 |
| E            | 0.0E+00 | 0.0E+00 | 6.0E-08 | 0.0E+00 | 4.9E-08 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.2E-08 | 0.0E+00 | 4.4E-08 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 4.7E-08 | 4.4E-08 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 5.0E-08 | 4.7E-08 | 4.3E-08 |



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COLLECTIVE FATAL CANCER RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 250     | 750     | 1500    | 2500    | 3500    | 4500    | 7500    |
| N            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.3E-07 |
| W            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| WSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| S            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| SSE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ESE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| E            | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 |

| Distance (m) |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|
| Direction    | 15000   | 25000   | 35000   | 45000   | 55000   | 70000   |
| N            | 0.0E+00 | 0.0E+00 | 1.1E-06 | 0.0E+00 | 6.4E-07 | 1.3E-06 |
| NNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.7E-06 | 1.9E-07 |
| NW           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.1E-07 | 0.0E+00 | 7.1E-07 |
| WNW          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.1E-06 | 5.3E-08 | 6.3E-05 |
| W            | 0.0E+00 | 8.6E-07 | 1.9E-06 | 1.8E-06 | 8.1E-06 | 1.1E-05 |
| WSW          | 1.8E-06 | 1.1E-06 | 1.3E-05 | 4.6E-06 | 3.3E-07 | 6.3E-08 |
| SW           | 0.0E+00 | 1.7E-06 | 8.6E-06 | 1.7E-06 | 0.0E+00 | 2.5E-07 |
| SSW          | 0.0E+00 | 1.8E-06 | 0.0E+00 | 1.3E-07 | 0.0E+00 | 0.0E+00 |
| S            | 2.6E-06 | 1.6E-06 | 0.0E+00 | 0.0E+00 | 4.8E-07 | 2.0E-06 |
| SSE          | 3.4E-06 | 4.1E-07 | 0.0E+00 | 3.4E-07 | 1.6E-06 | 1.2E-05 |
| SSE          | 1.6E-06 | 1.9E-05 | 2.1E-05 | 2.6E-05 | 2.4E-06 | 9.0E-09 |
| ESE          | 0.0E+00 | 1.3E-05 | 5.2E-06 | 1.3E-05 | 1.4E-06 | 5.6E-07 |
| E            | 0.0E+00 | 0.0E+00 | 1.3E-06 | 0.0E+00 | 3.7E-07 | 0.0E+00 |
| ENE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.8E-06 | 0.0E+00 | 1.2E-06 |
| NE           | 0.0E+00 | 0.0E+00 | 0.0E+00 | 0.0E+00 | 3.4E-06 | 9.6E-07 |
| NNE          | 0.0E+00 | 0.0E+00 | 0.0E+00 | 1.0E-06 | 7.9E-07 | 5.5E-06 |



## *E.2.5 Dose and Risk Conversion Factors*

### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Population Assessment  
Fri Jun 07 20:47:10 2013

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA                      Zip: 99353

Source Category:  
Source Type: Stack  
Emission Year: 1992  
DOSE Age Group: One

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lnclr1990.wnd  
Pop File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnclr1990.pop



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FACTOR  
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#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie intake.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units                                     |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries          |
| Inhalation | lifetime risk/100,000 picoCuries          |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie  |
| Surface    | lifetime risk-square cm/100,000 picoCurie |



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\* NUCLIDE Tc-97 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: One

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.709E-07 | 6.231E-07  | 8.295E+04        | 2.971E+02         |
| UB_Wall  | 2.731E-07 | 7.411E-08  | 3.146E+05        | 6.629E+02         |
| Bone_Sur | 3.430E-07 | 6.512E-07  | 6.174E+06        | 1.082E+04         |
| Brain    | 1.680E-07 | 3.833E-08  | 5.196E+04        | 3.903E+01         |
| Breasts  | 1.232E-07 | 4.832E-07  | 1.079E+07        | 1.689E+04         |
| St_Wall  | 5.032E-06 | 1.344E-06  | 2.831E+05        | 5.557E+02         |
| SI_Wall  | 9.250E-07 | 4.199E-07  | 3.041E+04        | 6.477E+01         |
| ULI_Wall | 3.885E-06 | 1.732E-06  | 5.184E+04        | 9.728E+01         |
| LLI_Wall | 9.546E-06 | 4.303E-06  | 2.761E+04        | 1.048E+02         |
| Kidneys  | 1.698E-07 | 7.444E-08  | 6.233E+05        | 1.316E+03         |
| Liver    | 2.113E-07 | 6.138E-07  | 2.283E+05        | 4.520E+02         |
| Muscle   | 1.872E-07 | 4.873E-07  | 4.217E+06        | 9.798E+03         |
| Ovaries  | 9.176E-07 | 3.826E-07  | 6.722E+03        | 6.606E+02         |
| Pancreas | 2.523E-07 | 2.669E-07  | 6.116E+03        | 1.596E+01         |
| R_Marrow | 1.143E-07 | 1.148E-07  | 1.038E+06        | 1.678E+03         |
| Skin     | 1.147E-07 | 6.516E-08  | 3.122E+07        | 6.454E+04         |
| Spleen   | 1.850E-07 | 4.847E-07  | 1.270E+05        | 2.237E+02         |
| Testes   | 1.598E-07 | 3.859E-08  | 5.452E+06        | 1.363E+04         |
| Thymus   | 1.661E-07 | 2.626E-07  | 7.013E+05        | 1.114E+03         |
| Thyroid  | 3.696E-06 | 8.847E-07  | 3.169E+06        | 3.134E+03         |
| GB_Wall  | 2.660E-07 | 1.114E-07  | 3.285E+04        | 1.258E+02         |
| Ht_Wall  | 1.510E-07 | 1.183E-06  | 2.481E+05        | 4.217E+02         |
| Uterus   | 2.446E-07 | 7.507E-08  | 2.668E+04        | 5.312E+01         |
| ET_Reg   | 1.691E-07 | 2.058E-05  | 6.116E+03        | 1.596E+01         |
| Lung_66  | 1.724E-07 | 2.656E-05  | 2.959E+05        | 5.452E+02         |
| Effectiv | 1.820E-06 | 3.922E-06  | 2.575E+06        | 5.312E+03         |

RISK CONVERSION FACTORS FOR: One

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 3.530E-11 | 5.668E-12  | 1.946E-05        | 5.079E-09         |
| Stomach  | 4.662E-09 | 1.508E-10  | 1.143E-03        | 2.248E-06         |
| Colon    | 1.584E-08 | 1.411E-09  | 4.276E-04        | 1.038E-06         |
| Liver    | 6.438E-11 | 1.776E-11  | 3.460E-04        | 6.850E-07         |
| LUNG     | 3.700E-10 | 1.074E-08  | 2.889E-03        | 5.336E-06         |
| Bone     | 5.217E-12 | 1.108E-12  | 5.860E-04        | 1.028E-06         |
| Skin     | 2.623E-12 | 2.167E-13  | 3.111E-03        | 6.442E-06         |
| Breast   | 1.424E-10 | 9.872E-11  | 5.208E-02        | 8.167E-05         |
| Ovary    | 1.628E-10 | 1.081E-11  | 9.565E-06        | 9.402E-07         |
| Bladder  | 2.142E-10 | 3.448E-12  | 7.607E-04        | 1.608E-06         |
| Kidneys  | 1.724E-11 | 7.023E-13  | 3.239E-04        | 6.850E-07         |
| Thyroid  | 2.490E-10 | 1.284E-11  | 1.009E-03        | 9.984E-07         |
| Leukemia | 1.210E-10 | 1.504E-11  | 5.825E-03        | 9.413E-06         |
| Residual | 6.586E-10 | 2.287E-10  | 2.132E-02        | 5.021E-05         |
| Total    | 2.253E-08 | 1.269E-08  | 8.994E-02        | 1.619E-04         |





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\* NUCLIDE Tc-98 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: One

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 7.770E-06 | 4.710E-05  | 6.512E+09        | 1.386E+06         |
| UB_Wall  | 1.336E-05 | 7.289E-06  | 6.419E+09        | 1.468E+06         |
| Bone_Sur | 7.104E-06 | 2.130E-05  | 1.270E+10        | 2.248E+06         |
| Brain    | 4.736E-06 | 4.192E-06  | 8.365E+09        | 1.468E+06         |
| Breasts  | 4.699E-06 | 4.096E-05  | 8.912E+09        | 1.619E+06         |
| St_Wall  | 1.103E-04 | 4.792E-05  | 6.932E+09        | 1.468E+06         |
| SI_Wall  | 2.904E-05 | 1.972E-05  | 6.256E+09        | 1.433E+06         |
| ULI_Wall | 8.917E-05 | 4.769E-05  | 6.489E+09        | 1.456E+06         |
| LLI_Wall | 2.146E-04 | 1.005E-04  | 6.396E+09        | 1.491E+06         |
| Kidneys  | 8.251E-06 | 2.011E-05  | 6.978E+09        | 1.480E+06         |
| Liver    | 9.213E-06 | 3.569E-05  | 7.025E+09        | 1.468E+06         |
| Muscle   | 7.437E-06 | 2.032E-05  | 7.607E+09        | 1.678E+06         |
| Ovaries  | 2.657E-05 | 1.506E-05  | 6.209E+09        | 1.480E+06         |
| Pancreas | 1.154E-05 | 3.590E-05  | 6.163E+09        | 1.351E+06         |
| R_Marrow | 6.549E-06 | 1.666E-05  | 7.596E+09        | 1.573E+06         |
| Skin     | 4.884E-06 | 1.073E-05  | 9.809E+09        | 1.969E+06         |
| Spleen   | 9.065E-06 | 3.513E-05  | 7.072E+09        | 1.480E+06         |
| Testes   | 7.733E-06 | 3.778E-06  | 7.829E+09        | 1.689E+06         |
| Thymus   | 5.550E-06 | 4.007E-05  | 7.211E+09        | 1.445E+06         |
| Thyroid  | 7.881E-05 | 3.789E-05  | 8.004E+09        | 1.608E+06         |
| GB_Wall  | 1.332E-05 | 1.978E-05  | 6.396E+09        | 1.386E+06         |
| Ht_Wall  | 6.697E-06 | 6.812E-05  | 6.885E+09        | 1.456E+06         |
| Uterus   | 1.606E-05 | 1.027E-05  | 6.070E+09        | 1.433E+06         |
| ET_Reg   | 5.772E-06 | 2.770E-04  | 6.163E+09        | 1.351E+06         |
| Lung_66  | 5.846E-06 | 6.223E-04  | 7.794E+09        | 1.549E+06         |
| Effectiv | 4.329E-05 | 1.032E-04  | 7.468E+09        | 1.561E+06         |

RISK CONVERSION FACTORS FOR: One

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 1.462E-09 | 1.100E-09  | 7.538E+00        | 1.526E-03         |
| Stomach  | 1.043E-07 | 5.717E-09  | 2.796E+01        | 5.930E-03         |
| Colon    | 3.885E-07 | 3.569E-08  | 6.664E+01        | 1.515E-02         |
| Liver    | 3.374E-09 | 1.166E-09  | 1.065E+01        | 2.225E-03         |
| LUNG     | 1.502E-08 | 2.586E-07  | 7.619E+01        | 1.515E-02         |
| Bone     | 1.684E-10 | 4.218E-11  | 1.212E+00        | 2.132E-04         |
| Skin     | 1.251E-10 | 3.959E-11  | 9.786E-01        | 1.969E-04         |
| Breast   | 5.624E-09 | 9.727E-09  | 4.310E+01        | 7.829E-03         |
| Ovary    | 8.880E-09 | 4.777E-10  | 8.831E+00        | 2.109E-03         |
| Bladder  | 1.066E-08 | 3.321E-10  | 1.549E+01        | 3.553E-03         |
| Kidneys  | 1.188E-09 | 2.201E-10  | 3.635E+00        | 7.701E-04         |
| Thyroid  | 5.180E-09 | 5.717E-10  | 2.551E+00        | 5.114E-04         |
| Leukemia | 1.254E-08 | 2.534E-09  | 4.264E+01        | 8.831E-03         |
| Residual | 3.848E-08 | 2.005E-08  | 1.007E+02        | 2.190E-02         |
| Total    | 5.957E-07 | 3.362E-07  | 4.078E+02        | 8.598E-02         |



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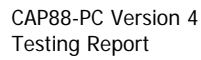
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\* NUCLIDE Tc-99 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: One

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.032E-06 | 2.354E-07  | 1.047E+05        | 4.474E+01         |
| UB_Wall  | 1.813E-06 | 4.174E-07  | 1.188E+05        | 5.592E+01         |
| Bone_Sur | 1.032E-06 | 2.354E-07  | 6.128E+05        | 2.796E+02         |
| Brain    | 1.032E-06 | 2.354E-07  | 1.410E+05        | 4.474E+01         |
| Breasts  | 1.032E-06 | 2.354E-07  | 2.598E+05        | 1.235E+02         |
| St_Wall  | 5.476E-05 | 1.270E-05  | 1.270E+05        | 5.557E+01         |
| SI_Wall  | 5.106E-06 | 2.543E-06  | 9.413E+04        | 4.229E+01         |
| ULI_Wall | 3.848E-05 | 1.734E-05  | 1.040E+05        | 4.648E+01         |
| LLI_Wall | 1.073E-04 | 4.851E-05  | 9.518E+04        | 4.392E+01         |
| Kidneys  | 1.032E-06 | 2.354E-07  | 1.398E+05        | 6.349E+01         |
| Liver    | 1.169E-06 | 2.667E-07  | 1.281E+05        | 5.545E+01         |
| Muscle   | 1.032E-06 | 2.354E-07  | 1.736E+05        | 9.541E+01         |
| Ovaries  | 1.032E-06 | 2.354E-07  | 8.586E+04        | 4.066E+01         |
| Pancreas | 1.032E-06 | 2.354E-07  | 8.866E+04        | 3.833E+01         |
| R_Marrow | 1.032E-06 | 2.354E-07  | 1.247E+05        | 5.289E+01         |
| Skin     | 1.032E-06 | 2.354E-07  | 3.192E+08        | 2.854E+02         |
| Spleen   | 1.032E-06 | 2.354E-07  | 1.270E+05        | 5.499E+01         |
| Testes   | 1.032E-06 | 2.354E-07  | 2.050E+05        | 1.144E+02         |
| Thymus   | 1.032E-06 | 2.354E-07  | 1.503E+05        | 6.186E+01         |
| Thyroid  | 4.218E-05 | 9.616E-06  | 1.864E+05        | 7.666E+01         |
| GB_Wall  | 1.032E-06 | 2.354E-07  | 1.007E+05        | 4.334E+01         |
| Ht_Wall  | 1.032E-06 | 2.354E-07  | 1.177E+05        | 5.009E+01         |
| Uterus   | 1.032E-06 | 2.354E-07  | 8.959E+04        | 4.101E+01         |
| ET_Reg   | 1.032E-06 | 9.542E-05  | 8.866E+04        | 3.833E+01         |
| Lung_66  | 1.032E-06 | 3.268E-04  | 1.526E+05        | 6.233E+01         |
| Effectiv | 1.765E-05 | 4.507E-05  | 3.355E+06        | 7.631E+01         |

RISK CONVERSION FACTORS FOR: One

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 2.179E-10 | 5.535E-12  | 1.007E-04        | 3.833E-08         |
| Stomach  | 4.625E-08 | 1.409E-09  | 5.126E-04        | 2.248E-07         |
| Colon    | 1.687E-07 | 1.517E-08  | 1.035E-03        | 4.683E-07         |
| Liver    | 3.922E-10 | 8.092E-12  | 1.946E-04        | 8.400E-08         |
| LUNG     | 2.209E-09 | 1.357E-07  | 1.491E-03        | 6.093E-07         |
| Bone     | 1.854E-11 | 4.503E-13  | 5.813E-05        | 2.656E-08         |
| Skin     | 2.213E-11 | 8.073E-13  | 3.180E-02        | 2.843E-08         |
| Breast   | 1.069E-09 | 4.777E-11  | 1.258E-03        | 5.965E-07         |
| Ovary    | 2.531E-10 | 7.208E-12  | 1.223E-04        | 5.778E-08         |
| Bladder  | 1.769E-09 | 2.162E-11  | 2.878E-04        | 1.351E-07         |
| Kidneys  | 1.051E-10 | 2.470E-12  | 7.270E-05        | 3.309E-08         |
| Thyroid  | 2.546E-09 | 1.380E-10  | 5.930E-05        | 2.446E-08         |
| Leukemia | 1.140E-09 | 3.189E-11  | 7.002E-04        | 2.971E-07         |
| Residual | 3.415E-09 | 1.262E-10  | 1.817E-03        | 8.854E-07         |
| Total    | 2.283E-07 | 1.527E-07  | 3.961E-02        | 3.507E-06         |



Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Population Assessment  
Fri Jun 07 20:47:10 2013

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA Zip: 99353

```
Source Category:
Source Type: Stack
Emission Year: 1992
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_005.  
Dataset Date: Jun 7, 2013 08:47 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\lnchr1990.wnd  
Population File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnchr1990.pop



Fri Jun 07 20:47:10 2013

CONCEN  
Page 1

ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 250                  | Tc-97   | 7.85E+00                | 1.41E-06                           | 2.24E-06                           | 3.66E-06                              |
| N              | 250                  | Tc-98   | 3.92E-02                | 7.06E-09                           | 1.12E-08                           | 1.83E-08                              |
| N              | 250                  | Tc-99   | 7.85E-01                | 1.41E-07                           | 2.24E-07                           | 3.66E-07                              |
| N              | 750                  | Tc-97   | 3.47E+00                | 6.24E-07                           | 7.41E-07                           | 1.37E-06                              |
| N              | 750                  | Tc-98   | 1.73E-02                | 3.12E-09                           | 3.71E-09                           | 6.83E-09                              |
| N              | 750                  | Tc-99   | 3.47E-01                | 6.24E-08                           | 7.41E-08                           | 1.37E-07                              |
| N              | 1500                 | Tc-97   | 1.54E+00                | 2.77E-07                           | 3.66E-07                           | 6.42E-07                              |
| N              | 1500                 | Tc-98   | 7.69E-03                | 1.38E-09                           | 1.83E-09                           | 3.21E-09                              |
| N              | 1500                 | Tc-99   | 1.54E-01                | 2.77E-08                           | 3.66E-08                           | 6.42E-08                              |
| N              | 2500                 | Tc-97   | 8.45E-01                | 1.52E-07                           | 2.16E-07                           | 3.68E-07                              |
| N              | 2500                 | Tc-98   | 4.22E-03                | 7.60E-10                           | 1.08E-09                           | 1.84E-09                              |
| N              | 2500                 | Tc-99   | 8.45E-02                | 1.52E-08                           | 2.16E-08                           | 3.68E-08                              |
| N              | 3500                 | Tc-97   | 5.60E-01                | 1.01E-07                           | 1.52E-07                           | 2.52E-07                              |
| N              | 3500                 | Tc-98   | 2.80E-03                | 5.04E-10                           | 7.58E-10                           | 1.26E-09                              |
| N              | 3500                 | Tc-99   | 5.60E-02                | 1.01E-08                           | 1.52E-08                           | 2.52E-08                              |
| N              | 4500                 | Tc-97   | 4.07E-01                | 7.33E-08                           | 1.16E-07                           | 1.89E-07                              |
| N              | 4500                 | Tc-98   | 2.04E-03                | 3.67E-10                           | 5.80E-10                           | 9.46E-10                              |
| N              | 4500                 | Tc-99   | 4.07E-02                | 7.33E-09                           | 1.16E-08                           | 1.89E-08                              |
| N              | 7500                 | Tc-97   | 2.17E-01                | 3.90E-08                           | 6.63E-08                           | 1.05E-07                              |
| N              | 7500                 | Tc-98   | 1.08E-03                | 1.95E-10                           | 3.31E-10                           | 5.27E-10                              |
| N              | 7500                 | Tc-99   | 2.17E-02                | 3.90E-09                           | 6.63E-09                           | 1.05E-08                              |
| N              | 15000                | Tc-97   | 8.96E-02                | 1.61E-08                           | 2.97E-08                           | 4.58E-08                              |
| N              | 15000                | Tc-98   | 4.48E-04                | 8.07E-11                           | 1.48E-10                           | 2.29E-10                              |
| N              | 15000                | Tc-99   | 8.96E-03                | 1.61E-09                           | 2.97E-09                           | 4.58E-09                              |
| N              | 25000                | Tc-97   | 4.15E-02                | 7.47E-09                           | 1.52E-08                           | 2.27E-08                              |
| N              | 25000                | Tc-98   | 2.08E-04                | 3.74E-11                           | 7.60E-11                           | 1.13E-10                              |
| N              | 25000                | Tc-99   | 4.15E-03                | 7.47E-10                           | 1.52E-09                           | 2.27E-09                              |
| N              | 35000                | Tc-97   | 2.52E-02                | 4.54E-09                           | 9.54E-09                           | 1.41E-08                              |
| N              | 35000                | Tc-98   | 1.26E-04                | 2.27E-11                           | 4.77E-11                           | 7.04E-11                              |
| N              | 35000                | Tc-99   | 2.52E-03                | 4.54E-10                           | 9.54E-10                           | 1.41E-09                              |
| N              | 45000                | Tc-97   | 1.66E-02                | 2.98E-09                           | 6.48E-09                           | 9.46E-09                              |
| N              | 45000                | Tc-98   | 8.29E-05                | 1.49E-11                           | 3.24E-11                           | 4.73E-11                              |
| N              | 45000                | Tc-99   | 1.66E-03                | 2.98E-10                           | 6.48E-10                           | 9.46E-10                              |
| N              | 55000                | Tc-97   | 1.11E-02                | 2.00E-09                           | 4.56E-09                           | 6.57E-09                              |
| N              | 55000                | Tc-98   | 5.57E-05                | 1.00E-11                           | 2.28E-11                           | 3.28E-11                              |
| N              | 55000                | Tc-99   | 1.11E-03                | 2.00E-10                           | 4.56E-10                           | 6.57E-10                              |
| N              | 70000                | Tc-97   | 6.50E-03                | 1.17E-09                           | 2.88E-09                           | 4.05E-09                              |
| N              | 70000                | Tc-98   | 3.25E-05                | 5.85E-12                           | 1.44E-11                           | 2.03E-11                              |
| N              | 70000                | Tc-99   | 6.50E-04                | 1.17E-10                           | 2.88E-10                           | 4.05E-10                              |
| NNW            | 250                  | Tc-97   | 6.10E+00                | 1.10E-06                           | 1.68E-06                           | 2.78E-06                              |
| NNW            | 250                  | Tc-98   | 3.05E-02                | 5.49E-09                           | 8.42E-09                           | 1.39E-08                              |
| NNW            | 250                  | Tc-99   | 6.10E-01                | 1.10E-07                           | 1.68E-07                           | 2.78E-07                              |
| NNW            | 750                  | Tc-97   | 2.67E+00                | 4.80E-07                           | 5.58E-07                           | 1.04E-06                              |
| NNW            | 750                  | Tc-98   | 1.33E-02                | 2.40E-09                           | 2.79E-09                           | 5.19E-09                              |
| NNW            | 750                  | Tc-99   | 2.67E-01                | 4.80E-08                           | 5.58E-08                           | 1.04E-07                              |
| NNW            | 1500                 | Tc-97   | 1.18E+00                | 2.13E-07                           | 2.76E-07                           | 4.89E-07                              |
| NNW            | 1500                 | Tc-98   | 5.92E-03                | 1.07E-09                           | 1.38E-09                           | 2.45E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNW            | 1500                 | Tc-99   | 1.18E-01                | 2.13E-08                           | 2.76E-08                           | 4.89E-08                              |
| NNW            | 2500                 | Tc-97   | 6.51E-01                | 1.17E-07                           | 1.64E-07                           | 2.81E-07                              |
| NNW            | 2500                 | Tc-98   | 3.25E-03                | 5.86E-10                           | 8.18E-10                           | 1.40E-09                              |
| NNW            | 2500                 | Tc-99   | 6.51E-02                | 1.17E-08                           | 1.64E-08                           | 2.81E-08                              |
| NNW            | 3500                 | Tc-97   | 4.32E-01                | 7.78E-08                           | 1.15E-07                           | 1.93E-07                              |
| NNW            | 3500                 | Tc-98   | 2.16E-03                | 3.89E-10                           | 5.77E-10                           | 9.66E-10                              |
| NNW            | 3500                 | Tc-99   | 4.32E-02                | 7.78E-09                           | 1.15E-08                           | 1.93E-08                              |
| NNW            | 4500                 | Tc-97   | 3.16E-01                | 5.68E-08                           | 8.86E-08                           | 1.45E-07                              |
| NNW            | 4500                 | Tc-98   | 1.58E-03                | 2.84E-10                           | 4.43E-10                           | 7.27E-10                              |
| NNW            | 4500                 | Tc-99   | 3.16E-02                | 5.68E-09                           | 8.86E-09                           | 1.45E-08                              |
| NNW            | 7500                 | Tc-97   | 1.70E-01                | 3.06E-08                           | 5.12E-08                           | 8.19E-08                              |
| NNW            | 7500                 | Tc-98   | 8.51E-04                | 1.53E-10                           | 2.56E-10                           | 4.09E-10                              |
| NNW            | 7500                 | Tc-99   | 1.70E-02                | 3.06E-09                           | 5.12E-09                           | 8.19E-09                              |
| NNW            | 15000                | Tc-97   | 7.24E-02                | 1.30E-08                           | 2.36E-08                           | 3.66E-08                              |
| NNW            | 15000                | Tc-98   | 3.62E-04                | 6.51E-11                           | 1.18E-10                           | 1.83E-10                              |
| NNW            | 15000                | Tc-99   | 7.24E-03                | 1.30E-09                           | 2.36E-09                           | 3.66E-09                              |
| NNW            | 25000                | Tc-97   | 3.52E-02                | 6.33E-09                           | 1.26E-08                           | 1.89E-08                              |
| NNW            | 25000                | Tc-98   | 1.76E-04                | 3.17E-11                           | 6.28E-11                           | 9.44E-11                              |
| NNW            | 25000                | Tc-99   | 3.52E-03                | 6.33E-10                           | 1.26E-09                           | 1.89E-09                              |
| NNW            | 35000                | Tc-97   | 2.21E-02                | 3.98E-09                           | 8.14E-09                           | 1.21E-08                              |
| NNW            | 35000                | Tc-98   | 1.11E-04                | 1.99E-11                           | 4.07E-11                           | 6.06E-11                              |
| NNW            | 35000                | Tc-99   | 2.21E-03                | 3.98E-10                           | 8.14E-10                           | 1.21E-09                              |
| NNW            | 45000                | Tc-97   | 1.51E-02                | 2.72E-09                           | 5.71E-09                           | 8.43E-09                              |
| NNW            | 45000                | Tc-98   | 7.54E-05                | 1.36E-11                           | 2.86E-11                           | 4.21E-11                              |
| NNW            | 45000                | Tc-99   | 1.51E-03                | 2.72E-10                           | 5.71E-10                           | 8.43E-10                              |
| NNW            | 55000                | Tc-97   | 1.06E-02                | 1.91E-09                           | 4.17E-09                           | 6.08E-09                              |
| NNW            | 55000                | Tc-98   | 5.29E-05                | 9.53E-12                           | 2.09E-11                           | 3.04E-11                              |
| NNW            | 55000                | Tc-99   | 1.06E-03                | 1.91E-10                           | 4.17E-10                           | 6.08E-10                              |
| NNW            | 70000                | Tc-97   | 6.58E-03                | 1.18E-09                           | 2.77E-09                           | 3.96E-09                              |
| NNW            | 70000                | Tc-98   | 3.29E-05                | 5.92E-12                           | 1.39E-11                           | 1.98E-11                              |
| NNW            | 70000                | Tc-99   | 6.58E-04                | 1.18E-10                           | 2.77E-10                           | 3.96E-10                              |
| NW             | 250                  | Tc-97   | 4.98E+00                | 8.96E-07                           | 1.35E-06                           | 2.24E-06                              |
| NW             | 250                  | Tc-98   | 2.49E-02                | 4.48E-09                           | 6.74E-09                           | 1.12E-08                              |
| NW             | 250                  | Tc-99   | 4.98E-01                | 8.96E-08                           | 1.35E-07                           | 2.24E-07                              |
| NW             | 750                  | Tc-97   | 2.17E+00                | 3.90E-07                           | 4.47E-07                           | 8.37E-07                              |
| NW             | 750                  | Tc-98   | 1.08E-02                | 1.95E-09                           | 2.23E-09                           | 4.18E-09                              |
| NW             | 750                  | Tc-99   | 2.17E-01                | 3.90E-08                           | 4.47E-08                           | 8.37E-08                              |
| NW             | 1500                 | Tc-97   | 9.62E-01                | 1.73E-07                           | 2.22E-07                           | 3.95E-07                              |
| NW             | 1500                 | Tc-98   | 4.81E-03                | 8.66E-10                           | 1.11E-09                           | 1.97E-09                              |
| NW             | 1500                 | Tc-99   | 9.62E-02                | 1.73E-08                           | 2.22E-08                           | 3.95E-08                              |
| NW             | 2500                 | Tc-97   | 5.29E-01                | 9.52E-08                           | 1.32E-07                           | 2.27E-07                              |
| NW             | 2500                 | Tc-98   | 2.64E-03                | 4.76E-10                           | 6.58E-10                           | 1.13E-09                              |
| NW             | 2500                 | Tc-99   | 5.29E-02                | 9.52E-09                           | 1.32E-08                           | 2.27E-08                              |
| NW             | 3500                 | Tc-97   | 3.52E-01                | 6.33E-08                           | 9.30E-08                           | 1.56E-07                              |
| NW             | 3500                 | Tc-98   | 1.76E-03                | 3.17E-10                           | 4.65E-10                           | 7.82E-10                              |
| NW             | 3500                 | Tc-99   | 3.52E-02                | 6.33E-09                           | 9.30E-09                           | 1.56E-08                              |
| NW             | 4500                 | Tc-97   | 2.57E-01                | 4.63E-08                           | 7.16E-08                           | 1.18E-07                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 4500                 | Tc-98   | 1.29E-03                | 2.32E-10                           | 3.58E-10                           | 5.90E-10                              |
| NW             | 4500                 | Tc-99   | 2.57E-02                | 4.63E-09                           | 7.16E-09                           | 1.18E-08                              |
| NW             | 7500                 | Tc-97   | 1.40E-01                | 2.52E-08                           | 4.17E-08                           | 6.69E-08                              |
| NW             | 7500                 | Tc-98   | 6.99E-04                | 1.26E-10                           | 2.09E-10                           | 3.35E-10                              |
| NW             | 7500                 | Tc-99   | 1.40E-02                | 2.52E-09                           | 4.17E-09                           | 6.69E-09                              |
| NW             | 15000                | Tc-97   | 6.05E-02                | 1.09E-08                           | 1.95E-08                           | 3.04E-08                              |
| NW             | 15000                | Tc-98   | 3.03E-04                | 5.45E-11                           | 9.76E-11                           | 1.52E-10                              |
| NW             | 15000                | Tc-99   | 6.05E-03                | 1.09E-09                           | 1.95E-09                           | 3.04E-09                              |
| NW             | 25000                | Tc-97   | 3.03E-02                | 5.45E-09                           | 1.06E-08                           | 1.61E-08                              |
| NW             | 25000                | Tc-98   | 1.52E-04                | 2.73E-11                           | 5.32E-11                           | 8.05E-11                              |
| NW             | 25000                | Tc-99   | 3.03E-03                | 5.45E-10                           | 1.06E-09                           | 1.61E-09                              |
| NW             | 35000                | Tc-97   | 1.95E-02                | 3.50E-09                           | 7.03E-09                           | 1.05E-08                              |
| NW             | 35000                | Tc-98   | 9.73E-05                | 1.75E-11                           | 3.52E-11                           | 5.27E-11                              |
| NW             | 35000                | Tc-99   | 1.95E-03                | 3.50E-10                           | 7.03E-10                           | 1.05E-09                              |
| NW             | 45000                | Tc-97   | 1.36E-02                | 2.44E-09                           | 5.04E-09                           | 7.48E-09                              |
| NW             | 45000                | Tc-98   | 6.79E-05                | 1.22E-11                           | 2.52E-11                           | 3.74E-11                              |
| NW             | 45000                | Tc-99   | 1.36E-03                | 2.44E-10                           | 5.04E-10                           | 7.48E-10                              |
| NW             | 55000                | Tc-97   | 9.79E-03                | 1.76E-09                           | 3.76E-09                           | 5.52E-09                              |
| NW             | 55000                | Tc-98   | 4.89E-05                | 8.81E-12                           | 1.88E-11                           | 2.76E-11                              |
| NW             | 55000                | Tc-99   | 9.79E-04                | 1.76E-10                           | 3.76E-10                           | 5.52E-10                              |
| NW             | 70000                | Tc-97   | 6.33E-03                | 1.14E-09                           | 2.58E-09                           | 3.72E-09                              |
| NW             | 70000                | Tc-98   | 3.17E-05                | 5.70E-12                           | 1.29E-11                           | 1.86E-11                              |
| NW             | 70000                | Tc-99   | 6.33E-04                | 1.14E-10                           | 2.58E-10                           | 3.72E-10                              |
| WNW            | 250                  | Tc-97   | 4.21E+00                | 7.58E-07                           | 1.12E-06                           | 1.88E-06                              |
| WNW            | 250                  | Tc-98   | 2.11E-02                | 3.79E-09                           | 5.62E-09                           | 9.41E-09                              |
| WNW            | 250                  | Tc-99   | 4.21E-01                | 7.58E-08                           | 1.12E-07                           | 1.88E-07                              |
| WNW            | 750                  | Tc-97   | 1.82E+00                | 3.28E-07                           | 3.73E-07                           | 7.01E-07                              |
| WNW            | 750                  | Tc-98   | 9.12E-03                | 1.64E-09                           | 1.86E-09                           | 3.51E-09                              |
| WNW            | 750                  | Tc-99   | 1.82E-01                | 3.28E-08                           | 3.73E-08                           | 7.01E-08                              |
| WNW            | 1500                 | Tc-97   | 8.10E-01                | 1.46E-07                           | 1.85E-07                           | 3.31E-07                              |
| WNW            | 1500                 | Tc-98   | 4.05E-03                | 7.29E-10                           | 9.26E-10                           | 1.66E-09                              |
| WNW            | 1500                 | Tc-99   | 8.10E-02                | 1.46E-08                           | 1.85E-08                           | 3.31E-08                              |
| WNW            | 2500                 | Tc-97   | 4.45E-01                | 8.02E-08                           | 1.10E-07                           | 1.90E-07                              |
| WNW            | 2500                 | Tc-98   | 2.23E-03                | 4.01E-10                           | 5.51E-10                           | 9.52E-10                              |
| WNW            | 2500                 | Tc-99   | 4.45E-02                | 8.02E-09                           | 1.10E-08                           | 1.90E-08                              |
| WNW            | 3500                 | Tc-97   | 2.97E-01                | 5.34E-08                           | 7.80E-08                           | 1.31E-07                              |
| WNW            | 3500                 | Tc-98   | 1.48E-03                | 2.67E-10                           | 3.90E-10                           | 6.57E-10                              |
| WNW            | 3500                 | Tc-99   | 2.97E-02                | 5.34E-09                           | 7.80E-09                           | 1.31E-08                              |
| WNW            | 4500                 | Tc-97   | 2.17E-01                | 3.91E-08                           | 6.02E-08                           | 9.93E-08                              |
| WNW            | 4500                 | Tc-98   | 1.09E-03                | 1.96E-10                           | 3.01E-10                           | 4.97E-10                              |
| WNW            | 4500                 | Tc-99   | 2.17E-02                | 3.91E-09                           | 6.02E-09                           | 9.93E-09                              |
| WNW            | 7500                 | Tc-97   | 1.19E-01                | 2.14E-08                           | 3.52E-08                           | 5.66E-08                              |
| WNW            | 7500                 | Tc-98   | 5.93E-04                | 1.07E-10                           | 1.76E-10                           | 2.83E-10                              |
| WNW            | 7500                 | Tc-99   | 1.19E-02                | 2.14E-09                           | 3.52E-09                           | 5.66E-09                              |
| WNW            | 15000                | Tc-97   | 5.20E-02                | 9.36E-09                           | 1.67E-08                           | 2.60E-08                              |
| WNW            | 15000                | Tc-98   | 2.60E-04                | 4.68E-11                           | 8.33E-11                           | 1.30E-10                              |
| WNW            | 15000                | Tc-99   | 5.20E-03                | 9.36E-10                           | 1.67E-09                           | 2.60E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WNW            | 25000                | Tc-97   | 2.66E-02                | 4.78E-09                           | 9.23E-09                           | 1.40E-08                              |
| WNW            | 25000                | Tc-98   | 1.33E-04                | 2.39E-11                           | 4.61E-11                           | 7.00E-11                              |
| WNW            | 25000                | Tc-99   | 2.66E-03                | 4.78E-10                           | 9.23E-10                           | 1.40E-09                              |
| WNW            | 35000                | Tc-97   | 1.73E-02                | 3.11E-09                           | 6.17E-09                           | 9.29E-09                              |
| WNW            | 35000                | Tc-98   | 8.64E-05                | 1.56E-11                           | 3.09E-11                           | 4.64E-11                              |
| WNW            | 35000                | Tc-99   | 1.73E-03                | 3.11E-10                           | 6.17E-10                           | 9.29E-10                              |
| WNW            | 45000                | Tc-97   | 1.22E-02                | 2.20E-09                           | 4.48E-09                           | 6.69E-09                              |
| WNW            | 45000                | Tc-98   | 6.12E-05                | 1.10E-11                           | 2.24E-11                           | 3.34E-11                              |
| WNW            | 45000                | Tc-99   | 1.22E-03                | 2.20E-10                           | 4.48E-10                           | 6.69E-10                              |
| WNW            | 55000                | Tc-97   | 8.99E-03                | 1.62E-09                           | 3.40E-09                           | 5.02E-09                              |
| WNW            | 55000                | Tc-98   | 4.50E-05                | 8.10E-12                           | 1.70E-11                           | 2.51E-11                              |
| WNW            | 55000                | Tc-99   | 8.99E-04                | 1.62E-10                           | 3.40E-10                           | 5.02E-10                              |
| WNW            | 70000                | Tc-97   | 5.98E-03                | 1.08E-09                           | 2.38E-09                           | 3.46E-09                              |
| WNW            | 70000                | Tc-98   | 2.99E-05                | 5.38E-12                           | 1.19E-11                           | 1.73E-11                              |
| WNW            | 70000                | Tc-99   | 5.98E-04                | 1.08E-10                           | 2.38E-10                           | 3.46E-10                              |
| W              | 250                  | Tc-97   | 3.65E+00                | 6.57E-07                           | 9.64E-07                           | 1.62E-06                              |
| W              | 250                  | Tc-98   | 1.82E-02                | 3.28E-09                           | 4.82E-09                           | 8.10E-09                              |
| W              | 250                  | Tc-99   | 3.65E-01                | 6.57E-08                           | 9.64E-08                           | 1.62E-07                              |
| W              | 750                  | Tc-97   | 1.58E+00                | 2.84E-07                           | 3.20E-07                           | 6.04E-07                              |
| W              | 750                  | Tc-98   | 7.88E-03                | 1.42E-09                           | 1.60E-09                           | 3.02E-09                              |
| W              | 750                  | Tc-99   | 1.58E-01                | 2.84E-08                           | 3.20E-08                           | 6.04E-08                              |
| W              | 1500                 | Tc-97   | 7.00E-01                | 1.26E-07                           | 1.59E-07                           | 2.85E-07                              |
| W              | 1500                 | Tc-98   | 3.50E-03                | 6.30E-10                           | 7.95E-10                           | 1.43E-09                              |
| W              | 1500                 | Tc-99   | 7.00E-02                | 1.26E-08                           | 1.59E-08                           | 2.85E-08                              |
| W              | 2500                 | Tc-97   | 3.85E-01                | 6.93E-08                           | 9.47E-08                           | 1.64E-07                              |
| W              | 2500                 | Tc-98   | 1.92E-03                | 3.46E-10                           | 4.74E-10                           | 8.20E-10                              |
| W              | 2500                 | Tc-99   | 3.85E-02                | 6.93E-09                           | 9.47E-09                           | 1.64E-08                              |
| W              | 3500                 | Tc-97   | 2.56E-01                | 4.62E-08                           | 6.72E-08                           | 1.13E-07                              |
| W              | 3500                 | Tc-98   | 1.28E-03                | 2.31E-10                           | 3.36E-10                           | 5.67E-10                              |
| W              | 3500                 | Tc-99   | 2.56E-02                | 4.62E-09                           | 6.72E-09                           | 1.13E-08                              |
| W              | 4500                 | Tc-97   | 1.88E-01                | 3.39E-08                           | 5.19E-08                           | 8.57E-08                              |
| W              | 4500                 | Tc-98   | 9.41E-04                | 1.69E-10                           | 2.59E-10                           | 4.29E-10                              |
| W              | 4500                 | Tc-99   | 1.88E-02                | 3.39E-09                           | 5.19E-09                           | 8.57E-09                              |
| W              | 7500                 | Tc-97   | 1.03E-01                | 1.86E-08                           | 3.05E-08                           | 4.90E-08                              |
| W              | 7500                 | Tc-98   | 5.15E-04                | 9.28E-11                           | 1.52E-10                           | 2.45E-10                              |
| W              | 7500                 | Tc-99   | 1.03E-02                | 1.86E-09                           | 3.05E-09                           | 4.90E-09                              |
| W              | 15000                | Tc-97   | 4.56E-02                | 8.20E-09                           | 1.45E-08                           | 2.27E-08                              |
| W              | 15000                | Tc-98   | 2.28E-04                | 4.10E-11                           | 7.26E-11                           | 1.14E-10                              |
| W              | 15000                | Tc-99   | 4.56E-03                | 8.20E-10                           | 1.45E-09                           | 2.27E-09                              |
| W              | 25000                | Tc-97   | 2.36E-02                | 4.25E-09                           | 8.13E-09                           | 1.24E-08                              |
| W              | 25000                | Tc-98   | 1.18E-04                | 2.13E-11                           | 4.07E-11                           | 6.19E-11                              |
| W              | 25000                | Tc-99   | 2.36E-03                | 4.25E-10                           | 8.13E-10                           | 1.24E-09                              |
| W              | 35000                | Tc-97   | 1.55E-02                | 2.79E-09                           | 5.49E-09                           | 8.29E-09                              |
| W              | 35000                | Tc-98   | 7.76E-05                | 1.40E-11                           | 2.75E-11                           | 4.14E-11                              |
| W              | 35000                | Tc-99   | 1.55E-03                | 2.79E-10                           | 5.49E-10                           | 8.29E-10                              |
| W              | 45000                | Tc-97   | 1.11E-02                | 2.00E-09                           | 4.03E-09                           | 6.03E-09                              |
| W              | 45000                | Tc-98   | 5.56E-05                | 1.00E-11                           | 2.01E-11                           | 3.01E-11                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 45000                | Tc-99   | 1.11E-03                | 2.00E-10                           | 4.03E-10                           | 6.03E-10                              |
| W              | 55000                | Tc-97   | 8.27E-03                | 1.49E-09                           | 3.09E-09                           | 4.58E-09                              |
| W              | 55000                | Tc-98   | 4.14E-05                | 7.44E-12                           | 1.54E-11                           | 2.29E-11                              |
| W              | 55000                | Tc-99   | 8.27E-04                | 1.49E-10                           | 3.09E-10                           | 4.58E-10                              |
| W              | 70000                | Tc-97   | 5.61E-03                | 1.01E-09                           | 2.20E-09                           | 3.21E-09                              |
| W              | 70000                | Tc-98   | 2.80E-05                | 5.05E-12                           | 1.10E-11                           | 1.60E-11                              |
| W              | 70000                | Tc-99   | 5.61E-04                | 1.01E-10                           | 2.20E-10                           | 3.21E-10                              |
| WSW            | 250                  | Tc-97   | 3.22E+00                | 5.79E-07                           | 8.43E-07                           | 1.42E-06                              |
| WSW            | 250                  | Tc-98   | 1.61E-02                | 2.90E-09                           | 4.22E-09                           | 7.11E-09                              |
| WSW            | 250                  | Tc-99   | 3.22E-01                | 5.79E-08                           | 8.43E-08                           | 1.42E-07                              |
| WSW            | 750                  | Tc-97   | 1.39E+00                | 2.50E-07                           | 2.80E-07                           | 5.30E-07                              |
| WSW            | 750                  | Tc-98   | 6.93E-03                | 1.25E-09                           | 1.40E-09                           | 2.65E-09                              |
| WSW            | 750                  | Tc-99   | 1.39E-01                | 2.50E-08                           | 2.80E-08                           | 5.30E-08                              |
| WSW            | 1500                 | Tc-97   | 6.16E-01                | 1.11E-07                           | 1.39E-07                           | 2.50E-07                              |
| WSW            | 1500                 | Tc-98   | 3.08E-03                | 5.54E-10                           | 6.97E-10                           | 1.25E-09                              |
| WSW            | 1500                 | Tc-99   | 6.16E-02                | 1.11E-08                           | 1.39E-08                           | 2.50E-08                              |
| WSW            | 2500                 | Tc-97   | 3.39E-01                | 6.09E-08                           | 8.31E-08                           | 1.44E-07                              |
| WSW            | 2500                 | Tc-98   | 1.69E-03                | 3.05E-10                           | 4.15E-10                           | 7.20E-10                              |
| WSW            | 2500                 | Tc-99   | 3.39E-02                | 6.09E-09                           | 8.31E-09                           | 1.44E-08                              |
| WSW            | 3500                 | Tc-97   | 2.26E-01                | 4.06E-08                           | 5.89E-08                           | 9.96E-08                              |
| WSW            | 3500                 | Tc-98   | 1.13E-03                | 2.03E-10                           | 2.95E-10                           | 4.98E-10                              |
| WSW            | 3500                 | Tc-99   | 2.26E-02                | 4.06E-09                           | 5.89E-09                           | 9.96E-09                              |
| WSW            | 4500                 | Tc-97   | 1.66E-01                | 2.99E-08                           | 4.56E-08                           | 7.54E-08                              |
| WSW            | 4500                 | Tc-98   | 8.29E-04                | 1.49E-10                           | 2.28E-10                           | 3.77E-10                              |
| WSW            | 4500                 | Tc-99   | 1.66E-02                | 2.99E-09                           | 4.56E-09                           | 7.54E-09                              |
| WSW            | 7500                 | Tc-97   | 9.11E-02                | 1.64E-08                           | 2.68E-08                           | 4.32E-08                              |
| WSW            | 7500                 | Tc-98   | 4.55E-04                | 8.20E-11                           | 1.34E-10                           | 2.16E-10                              |
| WSW            | 7500                 | Tc-99   | 9.11E-03                | 1.64E-09                           | 2.68E-09                           | 4.32E-09                              |
| WSW            | 15000                | Tc-97   | 4.05E-02                | 7.30E-09                           | 1.29E-08                           | 2.02E-08                              |
| WSW            | 15000                | Tc-98   | 2.03E-04                | 3.65E-11                           | 6.43E-11                           | 1.01E-10                              |
| WSW            | 15000                | Tc-99   | 4.05E-03                | 7.30E-10                           | 1.29E-09                           | 2.02E-09                              |
| WSW            | 25000                | Tc-97   | 2.12E-02                | 3.82E-09                           | 7.27E-09                           | 1.11E-08                              |
| WSW            | 25000                | Tc-98   | 1.06E-04                | 1.91E-11                           | 3.63E-11                           | 5.55E-11                              |
| WSW            | 25000                | Tc-99   | 2.12E-03                | 3.82E-10                           | 7.27E-10                           | 1.11E-09                              |
| WSW            | 35000                | Tc-97   | 1.41E-02                | 2.53E-09                           | 4.94E-09                           | 7.47E-09                              |
| WSW            | 35000                | Tc-98   | 7.03E-05                | 1.27E-11                           | 2.47E-11                           | 3.74E-11                              |
| WSW            | 35000                | Tc-99   | 1.41E-03                | 2.53E-10                           | 4.94E-10                           | 7.47E-10                              |
| WSW            | 45000                | Tc-97   | 1.01E-02                | 1.83E-09                           | 3.65E-09                           | 5.48E-09                              |
| WSW            | 45000                | Tc-98   | 5.07E-05                | 9.13E-12                           | 1.83E-11                           | 2.74E-11                              |
| WSW            | 45000                | Tc-99   | 1.01E-03                | 1.83E-10                           | 3.65E-10                           | 5.48E-10                              |
| WSW            | 55000                | Tc-97   | 7.63E-03                | 1.37E-09                           | 2.82E-09                           | 4.19E-09                              |
| WSW            | 55000                | Tc-98   | 3.82E-05                | 6.87E-12                           | 1.41E-11                           | 2.10E-11                              |
| WSW            | 55000                | Tc-99   | 7.63E-04                | 1.37E-10                           | 2.82E-10                           | 4.19E-10                              |
| WSW            | 70000                | Tc-97   | 5.26E-03                | 9.46E-10                           | 2.03E-09                           | 2.98E-09                              |
| WSW            | 70000                | Tc-98   | 2.63E-05                | 4.73E-12                           | 1.02E-11                           | 1.49E-11                              |
| WSW            | 70000                | Tc-99   | 5.26E-04                | 9.46E-11                           | 2.03E-10                           | 2.98E-10                              |
| SW             | 250                  | Tc-97   | 2.88E+00                | 5.18E-07                           | 7.50E-07                           | 1.27E-06                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SW             | 250                  | Tc-98   | 1.44E-02                | 2.59E-09                           | 3.75E-09                           | 6.34E-09                              |
| SW             | 250                  | Tc-99   | 2.88E-01                | 5.18E-08                           | 7.50E-08                           | 1.27E-07                              |
| SW             | 750                  | Tc-97   | 1.24E+00                | 2.23E-07                           | 2.49E-07                           | 4.72E-07                              |
| SW             | 750                  | Tc-98   | 6.19E-03                | 1.11E-09                           | 1.25E-09                           | 2.36E-09                              |
| SW             | 750                  | Tc-99   | 1.24E-01                | 2.23E-08                           | 2.49E-08                           | 4.72E-08                              |
| SW             | 1500                 | Tc-97   | 5.50E-01                | 9.90E-08                           | 1.24E-07                           | 2.23E-07                              |
| SW             | 1500                 | Tc-98   | 2.75E-03                | 4.95E-10                           | 6.20E-10                           | 1.12E-09                              |
| SW             | 1500                 | Tc-99   | 5.50E-02                | 9.90E-09                           | 1.24E-08                           | 2.23E-08                              |
| SW             | 2500                 | Tc-97   | 3.02E-01                | 5.44E-08                           | 7.40E-08                           | 1.28E-07                              |
| SW             | 2500                 | Tc-98   | 1.51E-03                | 2.72E-10                           | 3.70E-10                           | 6.42E-10                              |
| SW             | 2500                 | Tc-99   | 3.02E-02                | 5.44E-09                           | 7.40E-09                           | 1.28E-08                              |
| SW             | 3500                 | Tc-97   | 2.02E-01                | 3.63E-08                           | 5.25E-08                           | 8.88E-08                              |
| SW             | 3500                 | Tc-98   | 1.01E-03                | 1.82E-10                           | 2.63E-10                           | 4.44E-10                              |
| SW             | 3500                 | Tc-99   | 2.02E-02                | 3.63E-09                           | 5.25E-09                           | 8.88E-09                              |
| SW             | 4500                 | Tc-97   | 1.48E-01                | 2.67E-08                           | 4.06E-08                           | 6.73E-08                              |
| SW             | 4500                 | Tc-98   | 7.41E-04                | 1.33E-10                           | 2.03E-10                           | 3.37E-10                              |
| SW             | 4500                 | Tc-99   | 1.48E-02                | 2.67E-09                           | 4.06E-09                           | 6.73E-09                              |
| SW             | 7500                 | Tc-97   | 8.16E-02                | 1.47E-08                           | 2.40E-08                           | 3.87E-08                              |
| SW             | 7500                 | Tc-98   | 4.08E-04                | 7.35E-11                           | 1.20E-10                           | 1.93E-10                              |
| SW             | 7500                 | Tc-99   | 8.16E-03                | 1.47E-09                           | 2.40E-09                           | 3.87E-09                              |
| SW             | 15000                | Tc-97   | 3.65E-02                | 6.57E-09                           | 1.16E-08                           | 1.81E-08                              |
| SW             | 15000                | Tc-98   | 1.83E-04                | 3.29E-11                           | 5.78E-11                           | 9.06E-11                              |
| SW             | 15000                | Tc-99   | 3.65E-03                | 6.57E-10                           | 1.16E-09                           | 1.81E-09                              |
| SW             | 25000                | Tc-97   | 1.93E-02                | 3.47E-09                           | 6.57E-09                           | 1.00E-08                              |
| SW             | 25000                | Tc-98   | 9.64E-05                | 1.74E-11                           | 3.28E-11                           | 5.02E-11                              |
| SW             | 25000                | Tc-99   | 1.93E-03                | 3.47E-10                           | 6.57E-10                           | 1.00E-09                              |
| SW             | 35000                | Tc-97   | 1.28E-02                | 2.31E-09                           | 4.49E-09                           | 6.80E-09                              |
| SW             | 35000                | Tc-98   | 6.42E-05                | 1.16E-11                           | 2.25E-11                           | 3.40E-11                              |
| SW             | 35000                | Tc-99   | 1.28E-03                | 2.31E-10                           | 4.49E-10                           | 6.80E-10                              |
| SW             | 45000                | Tc-97   | 9.33E-03                | 1.68E-09                           | 3.34E-09                           | 5.02E-09                              |
| SW             | 45000                | Tc-98   | 4.67E-05                | 8.40E-12                           | 1.67E-11                           | 2.51E-11                              |
| SW             | 45000                | Tc-99   | 9.33E-04                | 1.68E-10                           | 3.34E-10                           | 5.02E-10                              |
| SW             | 55000                | Tc-97   | 7.07E-03                | 1.27E-09                           | 2.59E-09                           | 3.87E-09                              |
| SW             | 55000                | Tc-98   | 3.54E-05                | 6.36E-12                           | 1.30E-11                           | 1.93E-11                              |
| SW             | 55000                | Tc-99   | 7.07E-04                | 1.27E-10                           | 2.59E-10                           | 3.87E-10                              |
| SW             | 70000                | Tc-97   | 4.93E-03                | 8.87E-10                           | 1.89E-09                           | 2.77E-09                              |
| SW             | 70000                | Tc-98   | 2.46E-05                | 4.44E-12                           | 9.43E-12                           | 1.39E-11                              |
| SW             | 70000                | Tc-99   | 4.93E-04                | 8.87E-11                           | 1.89E-10                           | 2.77E-10                              |
| SSW            | 250                  | Tc-97   | 2.61E+00                | 4.69E-07                           | 6.75E-07                           | 1.14E-06                              |
| SSW            | 250                  | Tc-98   | 1.30E-02                | 2.35E-09                           | 3.37E-09                           | 5.72E-09                              |
| SSW            | 250                  | Tc-99   | 2.61E-01                | 4.69E-08                           | 6.75E-08                           | 1.14E-07                              |
| SSW            | 750                  | Tc-97   | 1.12E+00                | 2.01E-07                           | 2.24E-07                           | 4.26E-07                              |
| SSW            | 750                  | Tc-98   | 5.59E-03                | 1.01E-09                           | 1.12E-09                           | 2.13E-09                              |
| SSW            | 750                  | Tc-99   | 1.12E-01                | 2.01E-08                           | 2.24E-08                           | 4.26E-08                              |
| SSW            | 1500                 | Tc-97   | 4.97E-01                | 8.95E-08                           | 1.12E-07                           | 2.01E-07                              |
| SSW            | 1500                 | Tc-98   | 2.49E-03                | 4.47E-10                           | 5.58E-10                           | 1.01E-09                              |
| SSW            | 1500                 | Tc-99   | 4.97E-02                | 8.95E-09                           | 1.12E-08                           | 2.01E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m <sup>3</sup> ) | Dry<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Wet<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) | Ground<br>Depo<br>Rate<br>(pCi/cm <sup>2</sup> -s) |
|----------------|----------------------|---------|--------------------------------------|---|---|--|
| SSW            | 2500                 | Tc-97   | 2.73E-01                             | 4.92E-08  | 6.67E-08  | 1.16E-07   |
| SSW            | 2500                 | Tc-98   | 1.37E-03                             | 2.46E-10  | 3.33E-10  | 5.79E-10   |
| SSW            | 2500                 | Tc-99   | 2.73E-02                             | 4.92E-09  | 6.67E-09  | 1.16E-08   |
| SSW            | 3500                 | Tc-97   | 1.82E-01                             | 3.28E-08  | 4.74E-08  | 8.02E-08   |
| SSW            | 3500                 | Tc-98   | 9.12E-04                             | 1.64E-10  | 2.37E-10  | 4.01E-10   |
| SSW            | 3500                 | Tc-99   | 1.82E-02                             | 3.28E-09  | 4.74E-09  | 8.02E-09   |
| SSW            | 4500                 | Tc-97   | 1.34E-01                             | 2.41E-08  | 3.67E-08  | 6.08E-08   |
| SSW            | 4500                 | Tc-98   | 6.70E-04                             | 1.21E-10  | 1.83E-10  | 3.04E-10   |
| SSW            | 4500                 | Tc-99   | 1.34E-02                             | 2.41E-09  | 3.67E-09  | 6.08E-09   |
| SSW            | 7500                 | Tc-97   | 7.39E-02                             | 1.33E-08  | 2.17E-08  | 3.50E-08   |
| SSW            | 7500                 | Tc-98   | 3.70E-04                             | 6.65E-11  | 1.08E-10  | 1.75E-10   |
| SSW            | 7500                 | Tc-99   | 7.39E-03                             | 1.33E-09  | 2.17E-09  | 3.50E-09   |
| SSW            | 15000                | Tc-97   | 3.32E-02                             | 5.98E-09  | 1.05E-08  | 1.65E-08   |
| SSW            | 15000                | Tc-98   | 1.66E-04                             | 2.99E-11  | 5.24E-11  | 8.23E-11   |
| SSW            | 15000                | Tc-99   | 3.32E-03                             | 5.98E-10  | 1.05E-09  | 1.65E-09   |
| SSW            | 25000                | Tc-97   | 1.77E-02                             | 3.18E-09  | 5.99E-09  | 9.17E-09   |
| SSW            | 25000                | Tc-98   | 8.83E-05                             | 1.59E-11  | 3.00E-11  | 4.59E-11   |
| SSW            | 25000                | Tc-99   | 1.77E-03                             | 3.18E-10  | 5.99E-10  | 9.17E-10   |
| SSW            | 35000                | Tc-97   | 1.18E-02                             | 2.13E-09  | 4.11E-09  | 6.24E-09   |
| SSW            | 35000                | Tc-98   | 5.91E-05                             | 1.06E-11  | 2.06E-11  | 3.12E-11   |
| SSW            | 35000                | Tc-99   | 1.18E-03                             | 2.13E-10  | 4.11E-10  | 6.24E-10   |
| SSW            | 45000                | Tc-97   | 8.63E-03                             | 1.55E-09  | 3.07E-09  | 4.62E-09   |
| SSW            | 45000                | Tc-98   | 4.31E-05                             | 7.77E-12  | 1.54E-11  | 2.31E-11   |
| SSW            | 45000                | Tc-99   | 8.63E-04                             | 1.55E-10  | 3.07E-10  | 4.62E-10   |
| SSW            | 55000                | Tc-97   | 6.58E-03                             | 1.18E-09  | 2.40E-09  | 3.58E-09   |
| SSW            | 55000                | Tc-98   | 3.29E-05                             | 5.92E-12  | 1.20E-11  | 1.79E-11   |
| SSW            | 55000                | Tc-99   | 6.58E-04                             | 1.18E-10  | 2.40E-10  | 3.58E-10   |
| SSW            | 70000                | Tc-97   | 4.63E-03                             | 8.34E-10  | 1.76E-09  | 2.59E-09   |
| SSW            | 70000                | Tc-98   | 2.32E-05                             | 4.17E-12  | 8.79E-12  | 1.30E-11   |
| SSW            | 70000                | Tc-99   | 4.63E-04                             | 8.34E-11  | 1.76E-10  | 2.59E-10   |
| S              | 250                  | Tc-97   | 2.38E+00                             | 4.28E-07  | 6.13E-07  | 1.04E-06   |
| S              | 250                  | Tc-98   | 1.19E-02                             | 2.14E-09  | 3.07E-09  | 5.21E-09   |
| S              | 250                  | Tc-99   | 2.38E-01                             | 4.28E-08  | 6.13E-08  | 1.04E-07   |
| S              | 750                  | Tc-97   | 1.02E+00                             | 1.84E-07  | 2.04E-07  | 3.88E-07   |
| S              | 750                  | Tc-98   | 5.10E-03                             | 9.18E-10  | 1.02E-09  | 1.94E-09   |
| S              | 750                  | Tc-99   | 1.02E-01                             | 1.84E-08  | 2.04E-08  | 3.88E-08   |
| S              | 1500                 | Tc-97   | 4.53E-01                             | 8.16E-08  | 1.02E-07  | 1.83E-07   |
| S              | 1500                 | Tc-98   | 2.27E-03                             | 4.08E-10  | 5.08E-10  | 9.16E-10   |
| S              | 1500                 | Tc-99   | 4.53E-02                             | 8.16E-09  | 1.02E-08  | 1.83E-08   |
| S              | 2500                 | Tc-97   | 2.49E-01                             | 4.48E-08  | 6.07E-08  | 1.06E-07   |
| S              | 2500                 | Tc-98   | 1.25E-03                             | 2.24E-10  | 3.03E-10  | 5.28E-10   |
| S              | 2500                 | Tc-99   | 2.49E-02                             | 4.48E-09  | 6.07E-09  | 1.06E-08   |
| S              | 3500                 | Tc-97   | 1.66E-01                             | 2.99E-08  | 4.31E-08  | 7.31E-08   |
| S              | 3500                 | Tc-98   | 8.31E-04                             | 1.50E-10  | 2.16E-10  | 3.65E-10   |
| S              | 3500                 | Tc-99   | 1.66E-02                             | 2.99E-09  | 4.31E-09  | 7.31E-09   |
| S              | 4500                 | Tc-97   | 1.22E-01                             | 2.20E-08  | 3.34E-08  | 5.54E-08   |
| S              | 4500                 | Tc-98   | 6.12E-04                             | 1.10E-10  | 1.67E-10  | 2.77E-10   |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| S              | 4500                 | Tc-99   | 1.22E-02                | 2.20E-09                           | 3.34E-09                           | 5.54E-09                              |
| S              | 7500                 | Tc-97   | 6.76E-02                | 1.22E-08                           | 1.98E-08                           | 3.19E-08                              |
| S              | 7500                 | Tc-98   | 3.38E-04                | 6.08E-11                           | 9.89E-11                           | 1.60E-10                              |
| S              | 7500                 | Tc-99   | 6.76E-03                | 1.22E-09                           | 1.98E-09                           | 3.19E-09                              |
| S              | 15000                | Tc-97   | 3.04E-02                | 5.48E-09                           | 9.59E-09                           | 1.51E-08                              |
| S              | 15000                | Tc-98   | 1.52E-04                | 2.74E-11                           | 4.79E-11                           | 7.53E-11                              |
| S              | 15000                | Tc-99   | 3.04E-03                | 5.48E-10                           | 9.59E-10                           | 1.51E-09                              |
| S              | 25000                | Tc-97   | 1.63E-02                | 2.93E-09                           | 5.50E-09                           | 8.44E-09                              |
| S              | 25000                | Tc-98   | 8.14E-05                | 1.47E-11                           | 2.75E-11                           | 4.22E-11                              |
| S              | 25000                | Tc-99   | 1.63E-03                | 2.93E-10                           | 5.50E-10                           | 8.44E-10                              |
| S              | 35000                | Tc-97   | 1.09E-02                | 1.97E-09                           | 3.79E-09                           | 5.76E-09                              |
| S              | 35000                | Tc-98   | 5.47E-05                | 9.84E-12                           | 1.90E-11                           | 2.88E-11                              |
| S              | 35000                | Tc-99   | 1.09E-03                | 1.97E-10                           | 3.79E-10                           | 5.76E-10                              |
| S              | 45000                | Tc-97   | 8.02E-03                | 1.44E-09                           | 2.84E-09                           | 4.29E-09                              |
| S              | 45000                | Tc-98   | 4.01E-05                | 7.22E-12                           | 1.42E-11                           | 2.14E-11                              |
| S              | 45000                | Tc-99   | 8.02E-04                | 1.44E-10                           | 2.84E-10                           | 4.29E-10                              |
| S              | 55000                | Tc-97   | 6.15E-03                | 1.11E-09                           | 2.23E-09                           | 3.34E-09                              |
| S              | 55000                | Tc-98   | 3.07E-05                | 5.53E-12                           | 1.11E-11                           | 1.67E-11                              |
| S              | 55000                | Tc-99   | 6.15E-04                | 1.11E-10                           | 2.23E-10                           | 3.34E-10                              |
| S              | 70000                | Tc-97   | 4.36E-03                | 7.86E-10                           | 1.64E-09                           | 2.43E-09                              |
| S              | 70000                | Tc-98   | 2.18E-05                | 3.93E-12                           | 8.22E-12                           | 1.21E-11                              |
| S              | 70000                | Tc-99   | 4.36E-04                | 7.86E-11                           | 1.64E-10                           | 2.43E-10                              |
| SSE            | 250                  | Tc-97   | 2.19E+00                | 3.94E-07                           | 5.62E-07                           | 9.57E-07                              |
| SSE            | 250                  | Tc-98   | 1.09E-02                | 1.97E-09                           | 2.81E-09                           | 4.78E-09                              |
| SSE            | 250                  | Tc-99   | 2.19E-01                | 3.94E-08                           | 5.62E-08                           | 9.57E-08                              |
| SSE            | 750                  | Tc-97   | 9.38E-01                | 1.69E-07                           | 1.87E-07                           | 3.56E-07                              |
| SSE            | 750                  | Tc-98   | 4.69E-03                | 8.44E-10                           | 9.35E-10                           | 1.78E-09                              |
| SSE            | 750                  | Tc-99   | 9.38E-02                | 1.69E-08                           | 1.87E-08                           | 3.56E-08                              |
| SSE            | 1500                 | Tc-97   | 4.16E-01                | 7.50E-08                           | 9.32E-08                           | 1.68E-07                              |
| SSE            | 1500                 | Tc-98   | 2.08E-03                | 3.75E-10                           | 4.66E-10                           | 8.41E-10                              |
| SSE            | 1500                 | Tc-99   | 4.16E-02                | 7.50E-09                           | 9.32E-09                           | 1.68E-08                              |
| SSE            | 2500                 | Tc-97   | 2.29E-01                | 4.12E-08                           | 5.57E-08                           | 9.69E-08                              |
| SSE            | 2500                 | Tc-98   | 1.14E-03                | 2.06E-10                           | 2.78E-10                           | 4.84E-10                              |
| SSE            | 2500                 | Tc-99   | 2.29E-02                | 4.12E-09                           | 5.57E-09                           | 9.69E-09                              |
| SSE            | 3500                 | Tc-97   | 1.53E-01                | 2.75E-08                           | 3.96E-08                           | 6.71E-08                              |
| SSE            | 3500                 | Tc-98   | 7.64E-04                | 1.38E-10                           | 1.98E-10                           | 3.36E-10                              |
| SSE            | 3500                 | Tc-99   | 1.53E-02                | 2.75E-09                           | 3.96E-09                           | 6.71E-09                              |
| SSE            | 4500                 | Tc-97   | 1.13E-01                | 2.03E-08                           | 3.07E-08                           | 5.09E-08                              |
| SSE            | 4500                 | Tc-98   | 5.63E-04                | 1.01E-10                           | 1.53E-10                           | 2.55E-10                              |
| SSE            | 4500                 | Tc-99   | 1.13E-02                | 2.03E-09                           | 3.07E-09                           | 5.09E-09                              |
| SSE            | 7500                 | Tc-97   | 6.22E-02                | 1.12E-08                           | 1.82E-08                           | 2.94E-08                              |
| SSE            | 7500                 | Tc-98   | 3.11E-04                | 5.60E-11                           | 9.09E-11                           | 1.47E-10                              |
| SSE            | 7500                 | Tc-99   | 6.22E-03                | 1.12E-09                           | 1.82E-09                           | 2.94E-09                              |
| SSE            | 15000                | Tc-97   | 2.81E-02                | 5.06E-09                           | 8.84E-09                           | 1.39E-08                              |
| SSE            | 15000                | Tc-98   | 1.41E-04                | 2.53E-11                           | 4.42E-11                           | 6.95E-11                              |
| SSE            | 15000                | Tc-99   | 2.81E-03                | 5.06E-10                           | 8.84E-10                           | 1.39E-09                              |
| SSE            | 25000                | Tc-97   | 1.51E-02                | 2.72E-09                           | 5.09E-09                           | 7.81E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSE            | 25000                | Tc-98   | 7.55E-05                | 1.36E-11                           | 2.55E-11                           | 3.91E-11                              |
| SSE            | 25000                | Tc-99   | 1.51E-03                | 2.72E-10                           | 5.09E-10                           | 7.81E-10                              |
| SSE            | 35000                | Tc-97   | 1.02E-02                | 1.83E-09                           | 3.52E-09                           | 5.35E-09                              |
| SSE            | 35000                | Tc-98   | 5.09E-05                | 9.16E-12                           | 1.76E-11                           | 2.68E-11                              |
| SSE            | 35000                | Tc-99   | 1.02E-03                | 1.83E-10                           | 3.52E-10                           | 5.35E-10                              |
| SSE            | 45000                | Tc-97   | 7.49E-03                | 1.35E-09                           | 2.64E-09                           | 3.99E-09                              |
| SSE            | 45000                | Tc-98   | 3.74E-05                | 6.74E-12                           | 1.32E-11                           | 2.00E-11                              |
| SSE            | 45000                | Tc-99   | 7.49E-04                | 1.35E-10                           | 2.64E-10                           | 3.99E-10                              |
| SSE            | 55000                | Tc-97   | 5.77E-03                | 1.04E-09                           | 2.08E-09                           | 3.12E-09                              |
| SSE            | 55000                | Tc-98   | 2.88E-05                | 5.19E-12                           | 1.04E-11                           | 1.56E-11                              |
| SSE            | 55000                | Tc-99   | 5.77E-04                | 1.04E-10                           | 2.08E-10                           | 3.12E-10                              |
| SSE            | 70000                | Tc-97   | 4.12E-03                | 7.42E-10                           | 1.54E-09                           | 2.29E-09                              |
| SSE            | 70000                | Tc-98   | 2.06E-05                | 3.71E-12                           | 7.72E-12                           | 1.14E-11                              |
| SSE            | 70000                | Tc-99   | 4.12E-04                | 7.42E-11                           | 1.54E-10                           | 2.29E-10                              |
| SE             | 250                  | Tc-97   | 2.03E+00                | 3.65E-07                           | 5.19E-07                           | 8.84E-07                              |
| SE             | 250                  | Tc-98   | 1.01E-02                | 1.82E-09                           | 2.60E-09                           | 4.42E-09                              |
| SE             | 250                  | Tc-99   | 2.03E-01                | 3.65E-08                           | 5.19E-08                           | 8.84E-08                              |
| SE             | 750                  | Tc-97   | 8.68E-01                | 1.56E-07                           | 1.73E-07                           | 3.29E-07                              |
| SE             | 750                  | Tc-98   | 4.34E-03                | 7.81E-10                           | 8.64E-10                           | 1.64E-09                              |
| SE             | 750                  | Tc-99   | 8.68E-02                | 1.56E-08                           | 1.73E-08                           | 3.29E-08                              |
| SE             | 1500                 | Tc-97   | 3.85E-01                | 6.94E-08                           | 8.61E-08                           | 1.55E-07                              |
| SE             | 1500                 | Tc-98   | 1.93E-03                | 3.47E-10                           | 4.30E-10                           | 7.77E-10                              |
| SE             | 1500                 | Tc-99   | 3.85E-02                | 6.94E-09                           | 8.61E-09                           | 1.55E-08                              |
| SE             | 2500                 | Tc-97   | 2.12E-01                | 3.81E-08                           | 5.14E-08                           | 8.96E-08                              |
| SE             | 2500                 | Tc-98   | 1.06E-03                | 1.91E-10                           | 2.57E-10                           | 4.48E-10                              |
| SE             | 2500                 | Tc-99   | 2.12E-02                | 3.81E-09                           | 5.14E-09                           | 8.96E-09                              |
| SE             | 3500                 | Tc-97   | 1.41E-01                | 2.55E-08                           | 3.66E-08                           | 6.21E-08                              |
| SE             | 3500                 | Tc-98   | 7.07E-04                | 1.27E-10                           | 1.83E-10                           | 3.10E-10                              |
| SE             | 3500                 | Tc-99   | 1.41E-02                | 2.55E-09                           | 3.66E-09                           | 6.21E-09                              |
| SE             | 4500                 | Tc-97   | 1.04E-01                | 1.87E-08                           | 2.84E-08                           | 4.71E-08                              |
| SE             | 4500                 | Tc-98   | 5.21E-04                | 9.37E-11                           | 1.42E-10                           | 2.36E-10                              |
| SE             | 4500                 | Tc-99   | 1.04E-02                | 1.87E-09                           | 2.84E-09                           | 4.71E-09                              |
| SE             | 7500                 | Tc-97   | 5.76E-02                | 1.04E-08                           | 1.68E-08                           | 2.72E-08                              |
| SE             | 7500                 | Tc-98   | 2.88E-04                | 5.19E-11                           | 8.41E-11                           | 1.36E-10                              |
| SE             | 7500                 | Tc-99   | 5.76E-03                | 1.04E-09                           | 1.68E-09                           | 2.72E-09                              |
| SE             | 15000                | Tc-97   | 2.61E-02                | 4.70E-09                           | 8.20E-09                           | 1.29E-08                              |
| SE             | 15000                | Tc-98   | 1.31E-04                | 2.35E-11                           | 4.10E-11                           | 6.45E-11                              |
| SE             | 15000                | Tc-99   | 2.61E-03                | 4.70E-10                           | 8.20E-10                           | 1.29E-09                              |
| SE             | 25000                | Tc-97   | 1.41E-02                | 2.54E-09                           | 4.74E-09                           | 7.27E-09                              |
| SE             | 25000                | Tc-98   | 7.05E-05                | 1.27E-11                           | 2.37E-11                           | 3.64E-11                              |
| SE             | 25000                | Tc-99   | 1.41E-03                | 2.54E-10                           | 4.74E-10                           | 7.27E-10                              |
| SE             | 35000                | Tc-97   | 9.52E-03                | 1.71E-09                           | 3.28E-09                           | 5.00E-09                              |
| SE             | 35000                | Tc-98   | 4.76E-05                | 8.56E-12                           | 1.64E-11                           | 2.50E-11                              |
| SE             | 35000                | Tc-99   | 9.52E-04                | 1.71E-10                           | 3.28E-10                           | 5.00E-10                              |
| SE             | 45000                | Tc-97   | 7.02E-03                | 1.26E-09                           | 2.47E-09                           | 3.74E-09                              |
| SE             | 45000                | Tc-98   | 3.51E-05                | 6.32E-12                           | 1.24E-11                           | 1.87E-11                              |
| SE             | 45000                | Tc-99   | 7.02E-04                | 1.26E-10                           | 2.47E-10                           | 3.74E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SE             | 55000                | Tc-97   | 5.43E-03                | 9.77E-10                           | 1.95E-09                           | 2.93E-09                              |
| SE             | 55000                | Tc-98   | 2.71E-05                | 4.88E-12                           | 9.76E-12                           | 1.46E-11                              |
| SE             | 55000                | Tc-99   | 5.43E-04                | 9.77E-11                           | 1.95E-10                           | 2.93E-10                              |
| SE             | 70000                | Tc-97   | 3.90E-03                | 7.02E-10                           | 1.45E-09                           | 2.16E-09                              |
| SE             | 70000                | Tc-98   | 1.95E-05                | 3.51E-12                           | 7.27E-12                           | 1.08E-11                              |
| SE             | 70000                | Tc-99   | 3.90E-04                | 7.02E-11                           | 1.45E-10                           | 2.16E-10                              |
| ESE            | 250                  | Tc-97   | 1.89E+00                | 3.40E-07                           | 4.82E-07                           | 8.22E-07                              |
| ESE            | 250                  | Tc-98   | 9.44E-03                | 1.70E-09                           | 2.41E-09                           | 4.11E-09                              |
| ESE            | 250                  | Tc-99   | 1.89E-01                | 3.40E-08                           | 4.82E-08                           | 8.22E-08                              |
| ESE            | 750                  | Tc-97   | 8.07E-01                | 1.45E-07                           | 1.60E-07                           | 3.06E-07                              |
| ESE            | 750                  | Tc-98   | 4.04E-03                | 7.26E-10                           | 8.02E-10                           | 1.53E-09                              |
| ESE            | 750                  | Tc-99   | 8.07E-02                | 1.45E-08                           | 1.60E-08                           | 3.06E-08                              |
| ESE            | 1500                 | Tc-97   | 3.58E-01                | 6.45E-08                           | 8.00E-08                           | 1.44E-07                              |
| ESE            | 1500                 | Tc-98   | 1.79E-03                | 3.23E-10                           | 4.00E-10                           | 7.22E-10                              |
| ESE            | 1500                 | Tc-99   | 3.58E-02                | 6.45E-09                           | 8.00E-09                           | 1.44E-08                              |
| ESE            | 2500                 | Tc-97   | 1.97E-01                | 3.55E-08                           | 4.78E-08                           | 8.33E-08                              |
| ESE            | 2500                 | Tc-98   | 9.85E-04                | 1.77E-10                           | 2.39E-10                           | 4.16E-10                              |
| ESE            | 2500                 | Tc-99   | 1.97E-02                | 3.55E-09                           | 4.78E-09                           | 8.33E-09                              |
| ESE            | 3500                 | Tc-97   | 1.32E-01                | 2.37E-08                           | 3.40E-08                           | 5.77E-08                              |
| ESE            | 3500                 | Tc-98   | 6.58E-04                | 1.18E-10                           | 1.70E-10                           | 2.89E-10                              |
| ESE            | 3500                 | Tc-99   | 1.32E-02                | 2.37E-09                           | 3.40E-09                           | 5.77E-09                              |
| ESE            | 4500                 | Tc-97   | 9.69E-02                | 1.74E-08                           | 2.64E-08                           | 4.38E-08                              |
| ESE            | 4500                 | Tc-98   | 4.85E-04                | 8.72E-11                           | 1.32E-10                           | 2.19E-10                              |
| ESE            | 4500                 | Tc-99   | 9.69E-03                | 1.74E-09                           | 2.64E-09                           | 4.38E-09                              |
| ESE            | 7500                 | Tc-97   | 5.37E-02                | 9.66E-09                           | 1.56E-08                           | 2.53E-08                              |
| ESE            | 7500                 | Tc-98   | 2.68E-04                | 4.83E-11                           | 7.82E-11                           | 1.27E-10                              |
| ESE            | 7500                 | Tc-99   | 5.37E-03                | 9.66E-10                           | 1.56E-09                           | 2.53E-09                              |
| ESE            | 15000                | Tc-97   | 2.44E-02                | 4.38E-09                           | 7.64E-09                           | 1.20E-08                              |
| ESE            | 15000                | Tc-98   | 1.22E-04                | 2.19E-11                           | 3.82E-11                           | 6.01E-11                              |
| ESE            | 15000                | Tc-99   | 2.44E-03                | 4.38E-10                           | 7.64E-10                           | 1.20E-09                              |
| ESE            | 25000                | Tc-97   | 1.32E-02                | 2.38E-09                           | 4.43E-09                           | 6.80E-09                              |
| ESE            | 25000                | Tc-98   | 6.60E-05                | 1.19E-11                           | 2.21E-11                           | 3.40E-11                              |
| ESE            | 25000                | Tc-99   | 1.32E-03                | 2.38E-10                           | 4.43E-10                           | 6.80E-10                              |
| ESE            | 35000                | Tc-97   | 8.93E-03                | 1.61E-09                           | 3.07E-09                           | 4.68E-09                              |
| ESE            | 35000                | Tc-98   | 4.47E-05                | 8.04E-12                           | 1.54E-11                           | 2.34E-11                              |
| ESE            | 35000                | Tc-99   | 8.93E-04                | 1.61E-10                           | 3.07E-10                           | 4.68E-10                              |
| ESE            | 45000                | Tc-97   | 6.61E-03                | 1.19E-09                           | 2.32E-09                           | 3.51E-09                              |
| ESE            | 45000                | Tc-98   | 3.31E-05                | 5.95E-12                           | 1.16E-11                           | 1.76E-11                              |
| ESE            | 45000                | Tc-99   | 6.61E-04                | 1.19E-10                           | 2.32E-10                           | 3.51E-10                              |
| ESE            | 55000                | Tc-97   | 5.12E-03                | 9.22E-10                           | 1.84E-09                           | 2.76E-09                              |
| ESE            | 55000                | Tc-98   | 2.56E-05                | 4.61E-12                           | 9.19E-12                           | 1.38E-11                              |
| ESE            | 55000                | Tc-99   | 5.12E-04                | 9.22E-11                           | 1.84E-10                           | 2.76E-10                              |
| ESE            | 70000                | Tc-97   | 3.70E-03                | 6.66E-10                           | 1.37E-09                           | 2.04E-09                              |
| ESE            | 70000                | Tc-98   | 1.85E-05                | 3.33E-12                           | 6.87E-12                           | 1.02E-11                              |
| ESE            | 70000                | Tc-99   | 3.70E-04                | 6.66E-11                           | 1.37E-10                           | 2.04E-10                              |
| E              | 250                  | Tc-97   | 1.77E+00                | 3.18E-07                           | 4.50E-07                           | 7.68E-07                              |
| E              | 250                  | Tc-98   | 8.83E-03                | 1.59E-09                           | 2.25E-09                           | 3.84E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| E              | 250                  | Tc-99   | 1.77E-01                | 3.18E-08                           | 4.50E-08                           | 7.68E-08                              |
| E              | 750                  | Tc-97   | 7.55E-01                | 1.36E-07                           | 1.50E-07                           | 2.86E-07                              |
| E              | 750                  | Tc-98   | 3.77E-03                | 6.79E-10                           | 7.49E-10                           | 1.43E-09                              |
| E              | 750                  | Tc-99   | 7.55E-02                | 1.36E-08                           | 1.50E-08                           | 2.86E-08                              |
| E              | 1500                 | Tc-97   | 3.35E-01                | 6.03E-08                           | 7.47E-08                           | 1.35E-07                              |
| E              | 1500                 | Tc-98   | 1.68E-03                | 3.02E-10                           | 3.73E-10                           | 6.75E-10                              |
| E              | 1500                 | Tc-99   | 3.35E-02                | 6.03E-09                           | 7.47E-09                           | 1.35E-08                              |
| E              | 2500                 | Tc-97   | 1.84E-01                | 3.32E-08                           | 4.46E-08                           | 7.78E-08                              |
| E              | 2500                 | Tc-98   | 9.21E-04                | 1.66E-10                           | 2.23E-10                           | 3.89E-10                              |
| E              | 2500                 | Tc-99   | 1.84E-02                | 3.32E-09                           | 4.46E-09                           | 7.78E-09                              |
| E              | 3500                 | Tc-97   | 1.23E-01                | 2.21E-08                           | 3.18E-08                           | 5.39E-08                              |
| E              | 3500                 | Tc-98   | 6.15E-04                | 1.11E-10                           | 1.59E-10                           | 2.70E-10                              |
| E              | 3500                 | Tc-99   | 1.23E-02                | 2.21E-09                           | 3.18E-09                           | 5.39E-09                              |
| E              | 4500                 | Tc-97   | 9.07E-02                | 1.63E-08                           | 2.46E-08                           | 4.09E-08                              |
| E              | 4500                 | Tc-98   | 4.53E-04                | 8.16E-11                           | 1.23E-10                           | 2.05E-10                              |
| E              | 4500                 | Tc-99   | 9.07E-03                | 1.63E-09                           | 2.46E-09                           | 4.09E-09                              |
| E              | 7500                 | Tc-97   | 5.02E-02                | 9.04E-09                           | 1.46E-08                           | 2.37E-08                              |
| E              | 7500                 | Tc-98   | 2.51E-04                | 4.52E-11                           | 7.32E-11                           | 1.18E-10                              |
| E              | 7500                 | Tc-99   | 5.02E-03                | 9.04E-10                           | 1.46E-09                           | 2.37E-09                              |
| E              | 15000                | Tc-97   | 2.28E-02                | 4.11E-09                           | 7.15E-09                           | 1.13E-08                              |
| E              | 15000                | Tc-98   | 1.14E-04                | 2.06E-11                           | 3.58E-11                           | 5.63E-11                              |
| E              | 15000                | Tc-99   | 2.28E-03                | 4.11E-10                           | 7.15E-10                           | 1.13E-09                              |
| E              | 25000                | Tc-97   | 1.24E-02                | 2.23E-09                           | 4.16E-09                           | 6.39E-09                              |
| E              | 25000                | Tc-98   | 6.21E-05                | 1.12E-11                           | 2.08E-11                           | 3.19E-11                              |
| E              | 25000                | Tc-99   | 1.24E-03                | 2.23E-10                           | 4.16E-10                           | 6.39E-10                              |
| E              | 35000                | Tc-97   | 8.42E-03                | 1.52E-09                           | 2.89E-09                           | 4.41E-09                              |
| E              | 35000                | Tc-98   | 4.21E-05                | 7.58E-12                           | 1.45E-11                           | 2.20E-11                              |
| E              | 35000                | Tc-99   | 8.42E-04                | 1.52E-10                           | 2.89E-10                           | 4.41E-10                              |
| E              | 45000                | Tc-97   | 6.24E-03                | 1.12E-09                           | 2.19E-09                           | 3.31E-09                              |
| E              | 45000                | Tc-98   | 3.12E-05                | 5.62E-12                           | 1.09E-11                           | 1.66E-11                              |
| E              | 45000                | Tc-99   | 6.24E-04                | 1.12E-10                           | 2.19E-10                           | 3.31E-10                              |
| E              | 55000                | Tc-97   | 4.85E-03                | 8.73E-10                           | 1.74E-09                           | 2.61E-09                              |
| E              | 55000                | Tc-98   | 2.43E-05                | 4.37E-12                           | 8.68E-12                           | 1.30E-11                              |
| E              | 55000                | Tc-99   | 4.85E-04                | 8.73E-11                           | 1.74E-10                           | 2.61E-10                              |
| E              | 70000                | Tc-97   | 3.52E-03                | 6.34E-10                           | 1.30E-09                           | 1.93E-09                              |
| E              | 70000                | Tc-98   | 1.76E-05                | 3.17E-12                           | 6.50E-12                           | 9.67E-12                              |
| E              | 70000                | Tc-99   | 3.52E-04                | 6.34E-11                           | 1.30E-10                           | 1.93E-10                              |
| ENE            | 250                  | Tc-97   | 1.66E+00                | 2.99E-07                           | 4.22E-07                           | 7.21E-07                              |
| ENE            | 250                  | Tc-98   | 8.30E-03                | 1.49E-09                           | 2.11E-09                           | 3.60E-09                              |
| ENE            | 250                  | Tc-99   | 1.66E-01                | 2.99E-08                           | 4.22E-08                           | 7.21E-08                              |
| ENE            | 750                  | Tc-97   | 7.09E-01                | 1.28E-07                           | 1.40E-07                           | 2.68E-07                              |
| ENE            | 750                  | Tc-98   | 3.54E-03                | 6.38E-10                           | 7.02E-10                           | 1.34E-09                              |
| ENE            | 750                  | Tc-99   | 7.09E-02                | 1.28E-08                           | 1.40E-08                           | 2.68E-08                              |
| ENE            | 1500                 | Tc-97   | 3.15E-01                | 5.66E-08                           | 7.00E-08                           | 1.27E-07                              |
| ENE            | 1500                 | Tc-98   | 1.57E-03                | 2.83E-10                           | 3.50E-10                           | 6.33E-10                              |
| ENE            | 1500                 | Tc-99   | 3.15E-02                | 5.66E-09                           | 7.00E-09                           | 1.27E-08                              |
| ENE            | 2500                 | Tc-97   | 1.73E-01                | 3.11E-08                           | 4.19E-08                           | 7.30E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ENE            | 2500                 | Tc-98   | 8.65E-04                | 1.56E-10                           | 2.09E-10                           | 3.65E-10                              |
| ENE            | 2500                 | Tc-99   | 1.73E-02                | 3.11E-09                           | 4.19E-09                           | 7.30E-09                              |
| ENE            | 3500                 | Tc-97   | 1.16E-01                | 2.08E-08                           | 2.98E-08                           | 5.06E-08                              |
| ENE            | 3500                 | Tc-98   | 5.78E-04                | 1.04E-10                           | 1.49E-10                           | 2.53E-10                              |
| ENE            | 3500                 | Tc-99   | 1.16E-02                | 2.08E-09                           | 2.98E-09                           | 5.06E-09                              |
| ENE            | 4500                 | Tc-97   | 8.51E-02                | 1.53E-08                           | 2.31E-08                           | 3.84E-08                              |
| ENE            | 4500                 | Tc-98   | 4.26E-04                | 7.66E-11                           | 1.16E-10                           | 1.92E-10                              |
| ENE            | 4500                 | Tc-99   | 8.51E-03                | 1.53E-09                           | 2.31E-09                           | 3.84E-09                              |
| ENE            | 7500                 | Tc-97   | 4.72E-02                | 8.50E-09                           | 1.37E-08                           | 2.22E-08                              |
| ENE            | 7500                 | Tc-98   | 2.36E-04                | 4.25E-11                           | 6.87E-11                           | 1.11E-10                              |
| ENE            | 7500                 | Tc-99   | 4.72E-03                | 8.50E-10                           | 1.37E-09                           | 2.22E-09                              |
| ENE            | 15000                | Tc-97   | 2.15E-02                | 3.87E-09                           | 6.73E-09                           | 1.06E-08                              |
| ENE            | 15000                | Tc-98   | 1.08E-04                | 1.94E-11                           | 3.36E-11                           | 5.30E-11                              |
| ENE            | 15000                | Tc-99   | 2.15E-03                | 3.87E-10                           | 6.73E-10                           | 1.06E-09                              |
| ENE            | 25000                | Tc-97   | 1.17E-02                | 2.11E-09                           | 3.92E-09                           | 6.02E-09                              |
| ENE            | 25000                | Tc-98   | 5.86E-05                | 1.05E-11                           | 1.96E-11                           | 3.01E-11                              |
| ENE            | 25000                | Tc-99   | 1.17E-03                | 2.11E-10                           | 3.92E-10                           | 6.02E-10                              |
| ENE            | 35000                | Tc-97   | 7.96E-03                | 1.43E-09                           | 2.73E-09                           | 4.16E-09                              |
| ENE            | 35000                | Tc-98   | 3.98E-05                | 7.16E-12                           | 1.36E-11                           | 2.08E-11                              |
| ENE            | 35000                | Tc-99   | 7.96E-04                | 1.43E-10                           | 2.73E-10                           | 4.16E-10                              |
| ENE            | 45000                | Tc-97   | 5.91E-03                | 1.06E-09                           | 2.07E-09                           | 3.13E-09                              |
| ENE            | 45000                | Tc-98   | 2.96E-05                | 5.32E-12                           | 1.03E-11                           | 1.57E-11                              |
| ENE            | 45000                | Tc-99   | 5.91E-04                | 1.06E-10                           | 2.07E-10                           | 3.13E-10                              |
| ENE            | 55000                | Tc-97   | 4.61E-03                | 8.29E-10                           | 1.64E-09                           | 2.47E-09                              |
| ENE            | 55000                | Tc-98   | 2.30E-05                | 4.15E-12                           | 8.22E-12                           | 1.24E-11                              |
| ENE            | 55000                | Tc-99   | 4.61E-04                | 8.29E-11                           | 1.64E-10                           | 2.47E-10                              |
| ENE            | 70000                | Tc-97   | 3.36E-03                | 6.04E-10                           | 1.24E-09                           | 1.84E-09                              |
| ENE            | 70000                | Tc-98   | 1.68E-05                | 3.02E-12                           | 6.18E-12                           | 9.20E-12                              |
| ENE            | 70000                | Tc-99   | 3.36E-04                | 6.04E-11                           | 1.24E-10                           | 1.84E-10                              |
| NE             | 250                  | Tc-97   | 1.57E+00                | 2.82E-07                           | 3.97E-07                           | 6.79E-07                              |
| NE             | 250                  | Tc-98   | 7.83E-03                | 1.41E-09                           | 1.99E-09                           | 3.39E-09                              |
| NE             | 250                  | Tc-99   | 1.57E-01                | 2.82E-08                           | 3.97E-08                           | 6.79E-08                              |
| NE             | 750                  | Tc-97   | 6.68E-01                | 1.20E-07                           | 1.32E-07                           | 2.52E-07                              |
| NE             | 750                  | Tc-98   | 3.34E-03                | 6.01E-10                           | 6.61E-10                           | 1.26E-09                              |
| NE             | 750                  | Tc-99   | 6.68E-02                | 1.20E-08                           | 1.32E-08                           | 2.52E-08                              |
| NE             | 1500                 | Tc-97   | 2.96E-01                | 5.34E-08                           | 6.59E-08                           | 1.19E-07                              |
| NE             | 1500                 | Tc-98   | 1.48E-03                | 2.67E-10                           | 3.30E-10                           | 5.96E-10                              |
| NE             | 1500                 | Tc-99   | 2.96E-02                | 5.34E-09                           | 6.59E-09                           | 1.19E-08                              |
| NE             | 2500                 | Tc-97   | 1.63E-01                | 2.93E-08                           | 3.94E-08                           | 6.88E-08                              |
| NE             | 2500                 | Tc-98   | 8.15E-04                | 1.47E-10                           | 1.97E-10                           | 3.44E-10                              |
| NE             | 2500                 | Tc-99   | 1.63E-02                | 2.93E-09                           | 3.94E-09                           | 6.88E-09                              |
| NE             | 3500                 | Tc-97   | 1.09E-01                | 1.96E-08                           | 2.81E-08                           | 4.77E-08                              |
| NE             | 3500                 | Tc-98   | 5.44E-04                | 9.80E-11                           | 1.40E-10                           | 2.38E-10                              |
| NE             | 3500                 | Tc-99   | 1.09E-02                | 1.96E-09                           | 2.81E-09                           | 4.77E-09                              |
| NE             | 4500                 | Tc-97   | 8.03E-02                | 1.44E-08                           | 2.18E-08                           | 3.62E-08                              |
| NE             | 4500                 | Tc-98   | 4.01E-04                | 7.22E-11                           | 1.09E-10                           | 1.81E-10                              |
| NE             | 4500                 | Tc-99   | 8.03E-03                | 1.44E-09                           | 2.18E-09                           | 3.62E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 7500                 | Tc-97   | 4.45E-02                | 8.02E-09                           | 1.29E-08                           | 2.10E-08                              |
| NE             | 7500                 | Tc-98   | 2.23E-04                | 4.01E-11                           | 6.47E-11                           | 1.05E-10                              |
| NE             | 7500                 | Tc-99   | 4.45E-03                | 8.02E-10                           | 1.29E-09                           | 2.10E-09                              |
| NE             | 15000                | Tc-97   | 2.03E-02                | 3.65E-09                           | 6.35E-09                           | 1.00E-08                              |
| NE             | 15000                | Tc-98   | 1.02E-04                | 1.83E-11                           | 3.17E-11                           | 5.00E-11                              |
| NE             | 15000                | Tc-99   | 2.03E-03                | 3.65E-10                           | 6.35E-10                           | 1.00E-09                              |
| NE             | 25000                | Tc-97   | 1.11E-02                | 2.00E-09                           | 3.70E-09                           | 5.70E-09                              |
| NE             | 25000                | Tc-98   | 5.54E-05                | 9.98E-12                           | 1.85E-11                           | 2.85E-11                              |
| NE             | 25000                | Tc-99   | 1.11E-03                | 2.00E-10                           | 3.70E-10                           | 5.70E-10                              |
| NE             | 35000                | Tc-97   | 7.55E-03                | 1.36E-09                           | 2.58E-09                           | 3.94E-09                              |
| NE             | 35000                | Tc-98   | 3.77E-05                | 6.79E-12                           | 1.29E-11                           | 1.97E-11                              |
| NE             | 35000                | Tc-99   | 7.55E-04                | 1.36E-10                           | 2.58E-10                           | 3.94E-10                              |
| NE             | 45000                | Tc-97   | 5.62E-03                | 1.01E-09                           | 1.96E-09                           | 2.97E-09                              |
| NE             | 45000                | Tc-98   | 2.81E-05                | 5.05E-12                           | 9.80E-12                           | 1.49E-11                              |
| NE             | 45000                | Tc-99   | 5.62E-04                | 1.01E-10                           | 1.96E-10                           | 2.97E-10                              |
| NE             | 55000                | Tc-97   | 4.38E-03                | 7.89E-10                           | 1.56E-09                           | 2.35E-09                              |
| NE             | 55000                | Tc-98   | 2.19E-05                | 3.95E-12                           | 7.80E-12                           | 1.18E-11                              |
| NE             | 55000                | Tc-99   | 4.38E-04                | 7.89E-11                           | 1.56E-10                           | 2.35E-10                              |
| NE             | 70000                | Tc-97   | 3.21E-03                | 5.77E-10                           | 1.18E-09                           | 1.75E-09                              |
| NE             | 70000                | Tc-98   | 1.60E-05                | 2.89E-12                           | 5.88E-12                           | 8.77E-12                              |
| NE             | 70000                | Tc-99   | 3.21E-04                | 5.77E-11                           | 1.18E-10                           | 1.75E-10                              |
| NNE            | 250                  | Tc-97   | 1.48E+00                | 2.67E-07                           | 3.75E-07                           | 6.42E-07                              |
| NNE            | 250                  | Tc-98   | 7.42E-03                | 1.33E-09                           | 1.88E-09                           | 3.21E-09                              |
| NNE            | 250                  | Tc-99   | 1.48E-01                | 2.67E-08                           | 3.75E-08                           | 6.42E-08                              |
| NNE            | 750                  | Tc-97   | 6.31E-01                | 1.14E-07                           | 1.25E-07                           | 2.38E-07                              |
| NNE            | 750                  | Tc-98   | 3.16E-03                | 5.68E-10                           | 6.24E-10                           | 1.19E-09                              |
| NNE            | 750                  | Tc-99   | 6.31E-02                | 1.14E-08                           | 1.25E-08                           | 2.38E-08                              |
| NNE            | 1500                 | Tc-97   | 2.80E-01                | 5.05E-08                           | 6.23E-08                           | 1.13E-07                              |
| NNE            | 1500                 | Tc-98   | 1.40E-03                | 2.52E-10                           | 3.11E-10                           | 5.64E-10                              |
| NNE            | 1500                 | Tc-99   | 2.80E-02                | 5.05E-09                           | 6.23E-09                           | 1.13E-08                              |
| NNE            | 2500                 | Tc-97   | 1.54E-01                | 2.77E-08                           | 3.73E-08                           | 6.50E-08                              |
| NNE            | 2500                 | Tc-98   | 7.70E-04                | 1.39E-10                           | 1.86E-10                           | 3.25E-10                              |
| NNE            | 2500                 | Tc-99   | 1.54E-02                | 2.77E-09                           | 3.73E-09                           | 6.50E-09                              |
| NNE            | 3500                 | Tc-97   | 1.03E-01                | 1.85E-08                           | 2.65E-08                           | 4.51E-08                              |
| NNE            | 3500                 | Tc-98   | 5.15E-04                | 9.27E-11                           | 1.33E-10                           | 2.25E-10                              |
| NNE            | 3500                 | Tc-99   | 1.03E-02                | 1.85E-09                           | 2.65E-09                           | 4.51E-09                              |
| NNE            | 4500                 | Tc-97   | 7.59E-02                | 1.37E-08                           | 2.06E-08                           | 3.42E-08                              |
| NNE            | 4500                 | Tc-98   | 3.80E-04                | 6.83E-11                           | 1.03E-10                           | 1.71E-10                              |
| NNE            | 4500                 | Tc-99   | 7.59E-03                | 1.37E-09                           | 2.06E-09                           | 3.42E-09                              |
| NNE            | 7500                 | Tc-97   | 4.21E-02                | 7.59E-09                           | 1.22E-08                           | 1.98E-08                              |
| NNE            | 7500                 | Tc-98   | 2.11E-04                | 3.79E-11                           | 6.12E-11                           | 9.92E-11                              |
| NNE            | 7500                 | Tc-99   | 4.21E-03                | 7.59E-10                           | 1.22E-09                           | 1.98E-09                              |
| NNE            | 15000                | Tc-97   | 1.92E-02                | 3.46E-09                           | 6.01E-09                           | 9.47E-09                              |
| NNE            | 15000                | Tc-98   | 9.62E-05                | 1.73E-11                           | 3.00E-11                           | 4.74E-11                              |
| NNE            | 15000                | Tc-99   | 1.92E-03                | 3.46E-10                           | 6.01E-10                           | 9.47E-10                              |
| NNE            | 25000                | Tc-97   | 1.05E-02                | 1.90E-09                           | 3.51E-09                           | 5.40E-09                              |
| NNE            | 25000                | Tc-98   | 5.26E-05                | 9.48E-12                           | 1.75E-11                           | 2.70E-11                              |



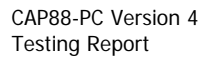


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CONCEN  
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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNE            | 25000                | Tc-99   | 1.05E-03                | 1.90E-10                           | 3.51E-10                           | 5.40E-10                              |
| NNE            | 35000                | Tc-97   | 7.17E-03                | 1.29E-09                           | 2.45E-09                           | 3.74E-09                              |
| NNE            | 35000                | Tc-98   | 3.59E-05                | 6.46E-12                           | 1.23E-11                           | 1.87E-11                              |
| NNE            | 35000                | Tc-99   | 7.17E-04                | 1.29E-10                           | 2.45E-10                           | 3.74E-10                              |
| NNE            | 45000                | Tc-97   | 5.35E-03                | 9.63E-10                           | 1.86E-09                           | 2.83E-09                              |
| NNE            | 45000                | Tc-98   | 2.67E-05                | 4.81E-12                           | 9.32E-12                           | 1.41E-11                              |
| NNE            | 45000                | Tc-99   | 5.35E-04                | 9.63E-11                           | 1.86E-10                           | 2.83E-10                              |
| NNE            | 55000                | Tc-97   | 4.18E-03                | 7.53E-10                           | 1.49E-09                           | 2.24E-09                              |
| NNE            | 55000                | Tc-98   | 2.09E-05                | 3.76E-12                           | 7.43E-12                           | 1.12E-11                              |
| NNE            | 55000                | Tc-99   | 4.18E-04                | 7.53E-11                           | 1.49E-10                           | 2.24E-10                              |
| NNE            | 70000                | Tc-97   | 3.07E-03                | 5.52E-10                           | 1.12E-09                           | 1.68E-09                              |
| NNE            | 70000                | Tc-98   | 1.53E-05                | 2.76E-12                           | 5.61E-12                           | 8.38E-12                              |
| NNE            | 70000                | Tc-99   | 3.07E-04                | 5.52E-11                           | 1.12E-10                           | 1.68E-10                              |



Version 4.0

C H I / Q      T A B L E S

Facility: The Plants  
Address: 3684 Coupland Road  
City: Lancaster  
State: WA Zip: 99353

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

E-54



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CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR Tc-97  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 250       | 750       | 1500      | 2500      | 3500      | 4500      | 7500      |
| N                 | 2.189E-06 | 9.677E-07 | 4.291E-07 | 2.357E-07 | 1.562E-07 | 1.137E-07 | 6.053E-08 |
| NNW               | 1.701E-06 | 7.442E-07 | 3.304E-07 | 1.816E-07 | 1.206E-07 | 8.808E-08 | 4.748E-08 |
| NW                | 1.390E-06 | 6.043E-07 | 2.684E-07 | 1.475E-07 | 9.815E-08 | 7.184E-08 | 3.901E-08 |
| WNW               | 1.176E-06 | 5.090E-07 | 2.261E-07 | 1.243E-07 | 8.278E-08 | 6.069E-08 | 3.312E-08 |
| W                 | 1.019E-06 | 4.397E-07 | 1.954E-07 | 1.074E-07 | 7.157E-08 | 5.253E-08 | 2.877E-08 |
| WSW               | 8.984E-07 | 3.869E-07 | 1.719E-07 | 9.449E-08 | 6.301E-08 | 4.629E-08 | 2.542E-08 |
| SW                | 8.038E-07 | 3.456E-07 | 1.535E-07 | 8.439E-08 | 5.630E-08 | 4.139E-08 | 2.278E-08 |
| SSW               | 7.274E-07 | 3.122E-07 | 1.387E-07 | 7.624E-08 | 5.088E-08 | 3.742E-08 | 2.063E-08 |
| S                 | 6.640E-07 | 2.847E-07 | 1.265E-07 | 6.951E-08 | 4.640E-08 | 3.414E-08 | 1.885E-08 |
| SSE               | 6.110E-07 | 2.617E-07 | 1.162E-07 | 6.389E-08 | 4.266E-08 | 3.140E-08 | 1.736E-08 |
| SE                | 5.659E-07 | 2.421E-07 | 1.075E-07 | 5.911E-08 | 3.948E-08 | 2.907E-08 | 1.608E-08 |
| ESE               | 5.269E-07 | 2.252E-07 | 1.000E-07 | 5.498E-08 | 3.673E-08 | 2.705E-08 | 1.498E-08 |
| E                 | 4.930E-07 | 2.106E-07 | 9.352E-08 | 5.140E-08 | 3.434E-08 | 2.530E-08 | 1.402E-08 |
| ENE               | 4.632E-07 | 1.977E-07 | 8.781E-08 | 4.826E-08 | 3.225E-08 | 2.376E-08 | 1.318E-08 |
| NE                | 4.371E-07 | 1.863E-07 | 8.274E-08 | 4.548E-08 | 3.039E-08 | 2.240E-08 | 1.243E-08 |
| NNE               | 4.139E-07 | 1.762E-07 | 7.824E-08 | 4.300E-08 | 2.874E-08 | 2.118E-08 | 1.176E-08 |

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| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 15000     | 25000     | 35000     | 45000     | 55000     | 70000     |
| N                 | 2.501E-08 | 1.159E-08 | 7.045E-09 | 4.628E-09 | 3.108E-09 | 1.814E-09 |
| NNW               | 2.020E-08 | 9.815E-09 | 6.173E-09 | 4.210E-09 | 2.955E-09 | 1.837E-09 |
| NW                | 1.690E-08 | 8.457E-09 | 5.429E-09 | 3.788E-09 | 2.732E-09 | 1.767E-09 |
| WNW               | 1.452E-08 | 7.413E-09 | 4.825E-09 | 3.417E-09 | 2.510E-09 | 1.668E-09 |
| W                 | 1.272E-08 | 6.590E-09 | 4.331E-09 | 3.101E-09 | 2.309E-09 | 1.566E-09 |
| WSW               | 1.131E-08 | 5.926E-09 | 3.924E-09 | 2.833E-09 | 2.130E-09 | 1.467E-09 |
| SW                | 1.019E-08 | 5.383E-09 | 3.585E-09 | 2.604E-09 | 1.973E-09 | 1.376E-09 |
| SSW               | 9.266E-09 | 4.930E-09 | 3.298E-09 | 2.408E-09 | 1.836E-09 | 1.293E-09 |
| S                 | 8.495E-09 | 4.545E-09 | 3.052E-09 | 2.238E-09 | 1.716E-09 | 1.218E-09 |
| SSE               | 7.843E-09 | 4.217E-09 | 2.840E-09 | 2.090E-09 | 1.609E-09 | 1.150E-09 |
| SE                | 7.285E-09 | 3.932E-09 | 2.656E-09 | 1.960E-09 | 1.515E-09 | 1.089E-09 |
| ESE               | 6.799E-09 | 3.683E-09 | 2.493E-09 | 1.845E-09 | 1.430E-09 | 1.033E-09 |
| E                 | 6.375E-09 | 3.464E-09 | 2.349E-09 | 1.742E-09 | 1.354E-09 | 9.829E-10 |
| ENE               | 6.000E-09 | 3.269E-09 | 2.221E-09 | 1.650E-09 | 1.286E-09 | 9.370E-10 |
| NE                | 5.667E-09 | 3.095E-09 | 2.106E-09 | 1.567E-09 | 1.224E-09 | 8.948E-10 |
| NNE               | 5.369E-09 | 2.938E-09 | 2.002E-09 | 1.492E-09 | 1.167E-09 | 8.563E-10 |

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CHIQ  
Page 2

GROUND-LEVEL CHI/Q VALUES FOR Tc-98  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 250       | 750       | 1500      | 2500      | 3500      | 4500      | 7500      |
| N                 | 2.189E-06 | 9.677E-07 | 4.291E-07 | 2.357E-07 | 1.562E-07 | 1.137E-07 | 6.053E-08 |
| NNW               | 1.701E-06 | 7.442E-07 | 3.304E-07 | 1.816E-07 | 1.206E-07 | 8.808E-08 | 4.748E-08 |
| NW                | 1.390E-06 | 6.043E-07 | 2.684E-07 | 1.475E-07 | 9.815E-08 | 7.184E-08 | 3.901E-08 |
| WNW               | 1.176E-06 | 5.090E-07 | 2.261E-07 | 1.243E-07 | 8.278E-08 | 6.069E-08 | 3.312E-08 |
| W                 | 1.019E-06 | 4.397E-07 | 1.954E-07 | 1.074E-07 | 7.157E-08 | 5.253E-08 | 2.877E-08 |
| WSW               | 8.984E-07 | 3.869E-07 | 1.719E-07 | 9.449E-08 | 6.301E-08 | 4.629E-08 | 2.542E-08 |
| SW                | 8.038E-07 | 3.456E-07 | 1.535E-07 | 8.439E-08 | 5.630E-08 | 4.139E-08 | 2.278E-08 |
| SSW               | 7.274E-07 | 3.122E-07 | 1.387E-07 | 7.624E-08 | 5.088E-08 | 3.742E-08 | 2.063E-08 |
| S                 | 6.640E-07 | 2.847E-07 | 1.265E-07 | 6.951E-08 | 4.640E-08 | 3.414E-08 | 1.885E-08 |
| SSE               | 6.110E-07 | 2.617E-07 | 1.162E-07 | 6.389E-08 | 4.266E-08 | 3.140E-08 | 1.736E-08 |
| SE                | 5.659E-07 | 2.421E-07 | 1.075E-07 | 5.911E-08 | 3.948E-08 | 2.907E-08 | 1.608E-08 |
| ESE               | 5.269E-07 | 2.252E-07 | 1.000E-07 | 5.498E-08 | 3.673E-08 | 2.705E-08 | 1.498E-08 |
| E                 | 4.930E-07 | 2.106E-07 | 9.352E-08 | 5.140E-08 | 3.434E-08 | 2.530E-08 | 1.402E-08 |
| ENE               | 4.632E-07 | 1.977E-07 | 8.781E-08 | 4.826E-08 | 3.225E-08 | 2.376E-08 | 1.318E-08 |
| NE                | 4.371E-07 | 1.863E-07 | 8.274E-08 | 4.548E-08 | 3.039E-08 | 2.240E-08 | 1.243E-08 |
| NNE               | 4.139E-07 | 1.762E-07 | 7.824E-08 | 4.300E-08 | 2.874E-08 | 2.118E-08 | 1.176E-08 |

| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 15000     | 25000     | 35000     | 45000     | 55000     | 70000     |
| N                 | 2.501E-08 | 1.159E-08 | 7.045E-09 | 4.628E-09 | 3.108E-09 | 1.814E-09 |
| NNW               | 2.020E-08 | 9.815E-09 | 6.173E-09 | 4.210E-09 | 2.955E-09 | 1.837E-09 |
| NW                | 1.690E-08 | 8.457E-09 | 5.429E-09 | 3.788E-09 | 2.732E-09 | 1.767E-09 |
| WNW               | 1.452E-08 | 7.413E-09 | 4.825E-09 | 3.417E-09 | 2.510E-09 | 1.668E-09 |
| W                 | 1.272E-08 | 6.590E-09 | 4.331E-09 | 3.101E-09 | 2.309E-09 | 1.566E-09 |
| WSW               | 1.131E-08 | 5.926E-09 | 3.924E-09 | 2.833E-09 | 2.130E-09 | 1.467E-09 |
| SW                | 1.019E-08 | 5.383E-09 | 3.585E-09 | 2.604E-09 | 1.973E-09 | 1.376E-09 |
| SSW               | 9.266E-09 | 4.930E-09 | 3.298E-09 | 2.408E-09 | 1.836E-09 | 1.293E-09 |
| S                 | 8.495E-09 | 4.545E-09 | 3.052E-09 | 2.238E-09 | 1.716E-09 | 1.218E-09 |
| SSE               | 7.843E-09 | 4.217E-09 | 2.840E-09 | 2.090E-09 | 1.609E-09 | 1.150E-09 |
| SE                | 7.285E-09 | 3.932E-09 | 2.656E-09 | 1.960E-09 | 1.515E-09 | 1.089E-09 |
| ESE               | 6.799E-09 | 3.683E-09 | 2.493E-09 | 1.845E-09 | 1.430E-09 | 1.033E-09 |
| E                 | 6.375E-09 | 3.464E-09 | 2.349E-09 | 1.742E-09 | 1.354E-09 | 9.829E-10 |
| ENE               | 6.000E-09 | 3.269E-09 | 2.221E-09 | 1.650E-09 | 1.286E-09 | 9.370E-10 |
| NE                | 5.667E-09 | 3.095E-09 | 2.106E-09 | 1.567E-09 | 1.224E-09 | 8.948E-10 |
| NNE               | 5.369E-09 | 2.938E-09 | 2.002E-09 | 1.492E-09 | 1.167E-09 | 8.563E-10 |



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CHIQ  
Page 3

GROUND-LEVEL CHI/Q VALUES FOR Tc-99  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 250       | 750       | 1500      | 2500      | 3500      | 4500      | 7500      |
| N                 | 2.189E-06 | 9.677E-07 | 4.291E-07 | 2.357E-07 | 1.562E-07 | 1.137E-07 | 6.053E-08 |
| NNW               | 1.701E-06 | 7.442E-07 | 3.304E-07 | 1.816E-07 | 1.206E-07 | 8.808E-08 | 4.748E-08 |
| NW                | 1.390E-06 | 6.043E-07 | 2.684E-07 | 1.475E-07 | 9.815E-08 | 7.184E-08 | 3.901E-08 |
| WNW               | 1.176E-06 | 5.090E-07 | 2.261E-07 | 1.243E-07 | 8.278E-08 | 6.069E-08 | 3.312E-08 |
| W                 | 1.019E-06 | 4.397E-07 | 1.954E-07 | 1.074E-07 | 7.157E-08 | 5.253E-08 | 2.877E-08 |
| WSW               | 8.984E-07 | 3.869E-07 | 1.719E-07 | 9.449E-08 | 6.301E-08 | 4.629E-08 | 2.542E-08 |
| SW                | 8.038E-07 | 3.456E-07 | 1.535E-07 | 8.439E-08 | 5.630E-08 | 4.139E-08 | 2.278E-08 |
| SSW               | 7.274E-07 | 3.122E-07 | 1.387E-07 | 7.624E-08 | 5.088E-08 | 3.742E-08 | 2.063E-08 |
| S                 | 6.640E-07 | 2.847E-07 | 1.265E-07 | 6.951E-08 | 4.640E-08 | 3.414E-08 | 1.885E-08 |
| SSE               | 6.110E-07 | 2.617E-07 | 1.162E-07 | 6.389E-08 | 4.266E-08 | 3.140E-08 | 1.736E-08 |
| SE                | 5.659E-07 | 2.421E-07 | 1.075E-07 | 5.911E-08 | 3.948E-08 | 2.907E-08 | 1.608E-08 |
| ESE               | 5.269E-07 | 2.252E-07 | 1.000E-07 | 5.498E-08 | 3.673E-08 | 2.705E-08 | 1.498E-08 |
| E                 | 4.930E-07 | 2.106E-07 | 9.352E-08 | 5.140E-08 | 3.434E-08 | 2.530E-08 | 1.402E-08 |
| ENE               | 4.632E-07 | 1.977E-07 | 8.781E-08 | 4.826E-08 | 3.225E-08 | 2.376E-08 | 1.318E-08 |
| NE                | 4.371E-07 | 1.863E-07 | 8.274E-08 | 4.548E-08 | 3.039E-08 | 2.240E-08 | 1.243E-08 |
| NNE               | 4.139E-07 | 1.762E-07 | 7.824E-08 | 4.300E-08 | 2.874E-08 | 2.118E-08 | 1.176E-08 |

| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 15000     | 25000     | 35000     | 45000     | 55000     | 70000     |
| N                 | 2.501E-08 | 1.159E-08 | 7.045E-09 | 4.628E-09 | 3.108E-09 | 1.814E-09 |
| NNW               | 2.020E-08 | 9.815E-09 | 6.173E-09 | 4.210E-09 | 2.955E-09 | 1.837E-09 |
| NW                | 1.690E-08 | 8.457E-09 | 5.429E-09 | 3.788E-09 | 2.732E-09 | 1.767E-09 |
| WNW               | 1.452E-08 | 7.413E-09 | 4.825E-09 | 3.417E-09 | 2.510E-09 | 1.668E-09 |
| W                 | 1.272E-08 | 6.590E-09 | 4.331E-09 | 3.101E-09 | 2.309E-09 | 1.566E-09 |
| WSW               | 1.131E-08 | 5.926E-09 | 3.924E-09 | 2.833E-09 | 2.130E-09 | 1.467E-09 |
| SW                | 1.019E-08 | 5.383E-09 | 3.585E-09 | 2.604E-09 | 1.973E-09 | 1.376E-09 |
| SSW               | 9.266E-09 | 4.930E-09 | 3.298E-09 | 2.408E-09 | 1.836E-09 | 1.293E-09 |
| S                 | 8.495E-09 | 4.545E-09 | 3.052E-09 | 2.238E-09 | 1.716E-09 | 1.218E-09 |
| SSE               | 7.843E-09 | 4.217E-09 | 2.840E-09 | 2.090E-09 | 1.609E-09 | 1.150E-09 |
| SE                | 7.285E-09 | 3.932E-09 | 2.656E-09 | 1.960E-09 | 1.515E-09 | 1.089E-09 |
| ESE               | 6.799E-09 | 3.683E-09 | 2.493E-09 | 1.845E-09 | 1.430E-09 | 1.033E-09 |
| E                 | 6.375E-09 | 3.464E-09 | 2.349E-09 | 1.742E-09 | 1.354E-09 | 9.829E-10 |
| ENE               | 6.000E-09 | 3.269E-09 | 2.221E-09 | 1.650E-09 | 1.286E-09 | 9.370E-10 |
| NE                | 5.667E-09 | 3.095E-09 | 2.106E-09 | 1.567E-09 | 1.224E-09 | 8.948E-10 |
| NNE               | 5.369E-09 | 2.938E-09 | 2.002E-09 | 1.492E-09 | 1.167E-09 | 8.563E-10 |



## Appendix F: Test Case 6 Inputs and Reports

### F.1 Inputs

#### F.1.1 Dataset

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Generate Print

☒ Current ☐ Synopsis ☐ General ☐ Weather  
☐ Selected ☐ D/R Summaries ☐ D/R Factors ☐ Concentration ☐ Chi/Q

Reports can take several minutes to generate

Synopsis General Weather D/R Summaries D/R Factors Concentration Chi/Q

DOSE AND RISK SUMMARIES

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY Zip: 12179

Source Category:  
Source Type: Area

ERRORS

CHANGES



### F.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Name General Forge and Foundry Company Emission Year 1963

Address Source Category

City Ilium

Zip 12179 (Note: State is found on the Agricultural tab)

Comments Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

ERRORS CHANGES



### F.1.3 Population

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Individual Population Age: Infant Build up time: 100 years

☒ Create dose and risk summaries  
☒ Create dose and risk factors  
☒ Create concentration table  
☒ Create Chi/Q table

Midpoints 20

|       |          |          |          |          |          |
|-------|----------|----------|----------|----------|----------|
| 1 - 5 | 100.00   | 150.00   | 200.00   | 300.00   | 400.00   |
| 6-10  | 500.00   | 700.00   | 1000.00  | 1500.00  | 2000.00  |
| 11-15 | 3000.00  | 4000.00  | 5000.00  | 7000.00  | 10000.00 |
| 16-20 | 15000.00 | 20000.00 | 30000.00 | 50000.00 | 80000.00 |

Maximum Exposed Individual

Direction: N Midpoint index: 9 ☐ Auto-determine

ERRORS

CHANGES





### F.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd

File

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| Annual Precipitation       | <input type="text" value="100.00"/>  | cm/year        |
| Annual Ambient Temperature | <input type="text" value="10.00"/>   | Celsius        |
| Lid Height                 | <input type="text" value="1000.00"/> | meters         |
| Absolute Humidity          | <input type="text" value="8.00"/>    | grams/cu meter |

ERRORS

CHANGES



### F.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Source Type: Area

Sources: 6

|             | 1    | 2    | 3    | 4    | 5    | 6    |
|-------------|------|------|------|------|------|------|
| ▶ Height(m) | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Area(m2)    | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 |

Plume Type: Fixed

Enter the plume rise for each Pasquill category

|          | A    | B    | C    | D    | E    | F    | G    |
|----------|------|------|------|------|------|------|------|
| ▶ meters | 2.00 | 2.00 | 2.00 | 1.50 | 1.00 | 1.00 | 0.50 |

ERRORS

CHANGES



### F.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source: Local

|                               | Vegetable | Milk | Meat |
|-------------------------------|-----------|------|------|
| Fraction home produced        | 1.0       | 1.0  | 1.0  |
| Fraction from assessment area | 0.0       | 0.0  | 0.0  |
| Fraction imported             | 0.0       | 0.0  | 0.0  |

Agriculture State: New York

|   |           |       |
|---|-----------|-------|
| Beef cattle density                     | 5.830e-02 | #/ha2 |
| Milk cattle density                     | 8.560e-02 | #/ha2 |
| Land fraction cultivated for vegetables | 1.880e-02 |       |

ERRORS

CHANGES



### F.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_006.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length  ☐ Radon Only

Released Nuclide Count 2 Total Nuclide Count 4  Remove selected row

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form   | Type | Size  | RR1       | RR2       | RR3       | RR4       | RR5       | RR6       |
|-----|---------|-------------|------|-------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1   | Fe-52   | Particulate | M    | 1.... | 1.000e+00 | 1.000e+00 | 1.000e+00 | 1.000e+00 | 1.000e+00 | 1.000e+00 |
| 0   | K-40    | Particulate | M    | 1.... | 1.000e-03 | 1.000e-03 | 1.000e-03 | 1.000e-03 | 1.000e-03 | 1.000e-03 |

ERRORS

CHANGES



## F.2 Reports

### F.2.1 Synopsis Report

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY                      Zip: 12179

Source Category:  
Source Type: Area  
Emission Year: 1963  
DOSE Age Group: Infant

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Committed Effective Dose Equivalent  
(mrem)

---

1.15E-01

---

At This Location: 1500 Meters North

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny



Fri Jun 07 22:15:35 2013

SYNOPSIS  
Page 1

#### MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 1500 Meters North  
Lifetime Fatal Cancer Risk: 1.56E-08

#### ORGAN DOSE EQUIVALENT SUMMARY (RN-222 Working Level Calculations Excluded)

| Organ    | Dose<br>Equivalent<br>(mrem) |
|----------|------------------------------|
| Adrenal  | 8.48E-02                     |
| UB_Wall  | 8.92E-02                     |
| Bone_Sur | 1.00E-01                     |
| Brain    | 8.51E-02                     |
| Breasts  | 8.60E-02                     |
| St_Wall  | 1.03E-01                     |
| SI_Wall  | 9.76E-02                     |
| ULI_Wall | 1.88E-01                     |
| LLI_Wall | 3.16E-01                     |
| Kidneys  | 8.59E-02                     |
| Liver    | 8.63E-02                     |
| Muscle   | 8.70E-02                     |
| Ovaries  | 8.67E-02                     |
| Pancreas | 8.53E-02                     |
| R_Marrow | 9.24E-02                     |
| Skin     | 4.54E-01                     |
| Spleen   | 8.61E-02                     |
| Testes   | 8.67E-02                     |
| Thymus   | 8.60E-02                     |
| Thyroid  | 8.64E-02                     |
| GB_Wall  | 8.52E-02                     |
| Ht_Wall  | 8.56E-02                     |
| Uterus   | 8.61E-02                     |
| ET_Reg   | 1.35E-01                     |
| Lung_66  | 9.57E-02                     |
| Effectiv | 1.15E-01                     |

#### RADIONUCLIDE EMISSIONS DURING THE YEAR 1963

| Nuclide | Type | Size  | Source  | Source  | Source  | Source  | Source  | Source  | TOTAL   |
|---------|------|-------|---------|---------|---------|---------|---------|---------|---------|
|         |      |       | #1      | #2      | #3      | #4      | #5      | #6      |         |
|         |      |       | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    |
| Fe-52   | M    | 1.000 | 1.0E+00 | 1.0E+00 | 1.0E+00 | 1.0E+00 | 1.0E+00 | 1.0E+00 | 6.0E+00 |
| K-40    | M    | 1.000 | 1.0E-03 | 1.0E-03 | 1.0E-03 | 1.0E-03 | 1.0E-03 | 1.0E-03 | 6.0E-03 |

#### SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 100.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m

User specified location of max exposed individual.  
(ILOC, JLOC): 1, 9





Fri Jun 07 22:15:35 2013

SYNOPSIS  
Page 2

SOURCE INFORMATION

| Source Number:     | 1    | 2    | 3    | 4    | 5    | 6    |
|--------------------|------|------|------|------|------|------|
| Source Height (m): | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Area (sq m):       | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 |
| Plume Rise         |      |      |      |      |      |      |
| Pasquill Cat:      | A    | B    | C    | D    | E    | F    |
| Fixed (m):         | 2.00 | 2.00 | 2.00 | 1.50 | 1.00 | 1.00 |
| (Fixed Rise)       |      |      |      |      |      | 0.50 |

AGRICULTURAL DATA

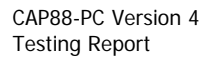
|                                | Vegetable | Milk  | Meat  |
|--------------------------------|-----------|-------|-------|
| Fraction Home Produced:        | 1.000     | 1.000 | 1.000 |
| Fraction From Assessment Area: | 0.000     | 0.000 | 0.000 |
| Fraction Imported:             | 0.000     | 0.000 | 0.000 |

Food Arrays were not generated for this run.  
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

|       |       |       |       |       |       |      |
|-------|-------|-------|-------|-------|-------|------|
| 100   | 150   | 200   | 300   | 400   | 500   | 700  |
| 1000  | 1500  | 2000  | 3000  | 4000  | 5000  | 7000 |
| 10000 | 15000 | 20000 | 30000 | 50000 | 80000 |      |





Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY Zip: 12179

```
Source Category:
Source Type: Area
Emission Year: 1963
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



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GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| Fe-52   | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |
| K-40    | M                 | 1.000                         | 1.00E-07                                  | 1.80E-03                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| Fe-52   | 2.01E+00                 | 5.48E-05 | 0.00E+00 | 3.00E-04             | 3.00E-02 |
| K-40    | 1.52E-12                 | 5.48E-05 | 0.00E+00 | 7.00E-03             | 2.00E-02 |

FOOTNOTES:

(1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)

(2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)



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GENERAL  
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| Fe-52   | 1.00E-01                       | 1.00E-03   | 1.00E-01           | 1.00E-01  |
| K-40    | 3.00E+00                       | 3.00E-01   | 1.00E+00           | 1.00E+00  |

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)



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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

|  |          |
|--|----------|
| HUMAN INHALATION RATE                              |          |
| Cubic meters/yr                                    | 1.37E+03 |
| SOIL PARAMETERS                                    |          |
| Effective surface density (kg/sq m, dry weight)    |          |
| (Assumes 15 cm plow layer)                         | 2.15E+02 |
| BUILDUP TIMES                                      |          |
| For activity in soil (years)                       | 1.00E+02 |
| For radionuclides deposited on ground/water (days) | 3.65E+04 |
| DELAY TIMES  |          |
| Ingestion of pasture grass by animals (hr)         | 0.00E+00 |
| Ingestion of stored feed by animals (hr)           | 2.16E+03 |
| Ingestion of leafy vegetables by man (hr)          | 3.36E+02 |
| Ingestion of produce by man (hr)                   | 3.36E+02 |
| Transport time from animal feed-milk-man (day)     | 2.00E+00 |
| Time from slaughter to consumption (day)           | 2.00E+01 |
| WEATHERING   |          |
| Removal rate constant for physical loss (per hr)   | 2.90E-03 |
| CROP EXPOSURE DURATION                             |          |
| Pasture grass (hr)                                 | 7.20E+02 |
| Crops/leafy vegetables (hr)                        | 1.44E+03 |
| AGRICULTURAL PRODUCTIVITY                          |          |
| Grass-cow-milk-man pathway (kg/sq m)               | 2.80E-01 |
| Produce/leafy veg for human consumption (kg/sq m)  | 7.16E-01 |
| FALLOUT INTERCEPTION FRACTIONS                     |          |
| Vegetables   | 2.00E-01 |
| Pasture  | 5.70E-01 |
| GRAZING PARAMETERS                                 |          |
| Fraction of year animals graze on pasture          | 4.00E-01 |
| Fraction of daily feed that is pasture grass       |          |
| when animal grazes on pasture                      | 4.30E-01 |

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GENERAL  
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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 1.00E+00

Meat 1.00E+00

Milk 1.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside  
area listed below are actual fixed values.)

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 2.54E+01

Milk ingestion (L/y) 1.32E+02

Meat ingestion (kg/y) 2.60E+01

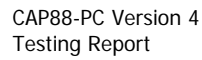
Leafy vegetable ingestion (kg/y) 2.60E+00

SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

---



Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY Zip: 12179

```
Source Category:
Source Type: Area
Emission Year: 1963
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



Fri Jun 07 22:15:35 2013

WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |





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WEATHER  
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FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

---

| Pasquill Stability Class |   |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|---|
| Dir                      | A | B | C | D | E | F | G |

---

|       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| N     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E     | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE   | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

---

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 100.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m



## *F.2.4 Dose and Risk Summaries*

### D O S E   A N D   R I S K   S U M M A R I E S

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY                      Zip: 12179

Source Category:  
Source Type: Area  
Emission Year: 1963  
DOSE Age Group: Infant

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



Fri Jun 07 22:15:35 2013

SUMMARY  
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

| Organ    | Selected<br>Individual<br>(mrem) |
|----------|----------------------------------|
| Adrenal  | 8.48E-02                         |
| UB_Wall  | 8.92E-02                         |
| Bone_Sur | 1.00E-01                         |
| Brain    | 8.51E-02                         |
| Breasts  | 8.60E-02                         |
| St_Wall  | 1.03E-01                         |
| SI_Wall  | 9.76E-02                         |
| ULI_Wall | 1.88E-01                         |
| LLI_Wall | 3.16E-01                         |
| Kidneys  | 8.59E-02                         |
| Liver    | 8.63E-02                         |
| Muscle   | 8.70E-02                         |
| Ovaries  | 8.67E-02                         |
| Pancreas | 8.53E-02                         |
| R_Marrow | 9.24E-02                         |
| Skin     | 4.54E-01                         |
| Spleen   | 8.61E-02                         |
| Testes   | 8.67E-02                         |
| Thymus   | 8.60E-02                         |
| Thyroid  | 8.64E-02                         |
| GB_Wall  | 8.52E-02                         |
| Ht_Wall  | 8.56E-02                         |
| Uterus   | 8.61E-02                         |
| ET_Reg   | 1.35E-01                         |
| Lung_66  | 9.57E-02                         |
| Effectiv | 1.15E-01                         |

PATHWAY COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Pathway        | Selected<br>Individual<br>(mrem) |
|----------------|----------------------------------|
| INGESTION      | 8.61E-02                         |
| INHALATION     | 8.64E-03                         |
| AIR IMMERSION  | 3.19E-03                         |
| GROUND SURFACE | 1.69E-02                         |
| INTERNAL       | 9.47E-02                         |
| EXTERNAL       | 2.01E-02                         |
| TOTAL          | 1.15E-01                         |



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SUMMARY  
Page 2

NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

| Nuclide | Selected<br>Individual<br>(mrem) |
|---------|----------------------------------|
| Fe-52   | 1.06E-02                         |
| Mn-52m  | 6.47E-03                         |
| Mn-52   | 9.98E-05                         |
| K-40    | 9.77E-02                         |
| TOTAL   | 1.15E-01                         |



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SUMMARY  
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CANCER RISK SUMMARY

| Cancer | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|--------|--|
|        |  |

PATHWAY RISK SUMMARY

| Pathway        | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|----------------|--|
| INGESTION      | 6.04E-09   |
| INHALATION     | 1.58E-10   |
| AIR IMMERSION  | 1.74E-09   |
| GROUND SURFACE | 7.68E-09   |
| INTERNAL       | 6.20E-09   |
| EXTERNAL       | 9.42E-09   |
| TOTAL          | 1.56E-08   |



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SUMMARY  
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NUCLIDE RISK SUMMARY

| Nuclide | Selected Individual<br>Total Lifetime<br>Fatal Cancer Risk |
|---------|--|
| Fe-52   | 1.39E-09   |
| Mn-52m  | 3.33E-09   |
| Mn-52   | 5.49E-11   |
| K-40    | 1.08E-08   |
| TOTAL   | 1.56E-08   |



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INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 100          | 150     | 200     | 300     | 400     | 500     | 700     |
| N         | 4.6E+00      | 3.1E+00 | 2.3E+00 | 1.4E+00 | 9.5E-01 | 6.8E-01 | 3.9E-01 |
| NNW       | 3.5E+00      | 2.3E+00 | 1.7E+00 | 1.1E+00 | 7.2E-01 | 5.1E-01 | 3.0E-01 |
| NW        | 2.8E+00      | 1.9E+00 | 1.4E+00 | 8.5E-01 | 5.7E-01 | 4.1E-01 | 2.4E-01 |
| WNW       | 2.3E+00      | 1.6E+00 | 1.1E+00 | 7.1E-01 | 4.8E-01 | 3.5E-01 | 2.0E-01 |
| W         | 2.0E+00      | 1.3E+00 | 9.8E-01 | 6.1E-01 | 4.1E-01 | 3.0E-01 | 1.7E-01 |
| WSW       | 1.7E+00      | 1.2E+00 | 8.6E-01 | 5.3E-01 | 3.6E-01 | 2.6E-01 | 1.5E-01 |
| SW        | 1.5E+00      | 1.0E+00 | 7.6E-01 | 4.7E-01 | 3.2E-01 | 2.3E-01 | 1.4E-01 |
| SSW       | 1.4E+00      | 9.3E-01 | 6.9E-01 | 4.3E-01 | 2.9E-01 | 2.1E-01 | 1.2E-01 |
| S         | 1.3E+00      | 8.5E-01 | 6.2E-01 | 3.9E-01 | 2.6E-01 | 1.9E-01 | 1.1E-01 |
| SSE       | 1.2E+00      | 7.8E-01 | 5.7E-01 | 3.6E-01 | 2.4E-01 | 1.7E-01 | 1.0E-01 |
| SSE       | 1.1E+00      | 7.2E-01 | 5.3E-01 | 3.3E-01 | 2.2E-01 | 1.6E-01 | 9.5E-02 |
| ESE       | 1.0E+00      | 6.7E-01 | 4.9E-01 | 3.1E-01 | 2.1E-01 | 1.5E-01 | 8.8E-02 |
| E         | 9.3E-01      | 6.2E-01 | 4.6E-01 | 2.9E-01 | 1.9E-01 | 1.4E-01 | 8.2E-02 |
| ENE       | 8.7E-01      | 5.8E-01 | 4.3E-01 | 2.7E-01 | 1.8E-01 | 1.3E-01 | 7.7E-02 |
| NE        | 8.2E-01      | 5.5E-01 | 4.0E-01 | 2.5E-01 | 1.7E-01 | 1.2E-01 | 7.3E-02 |
| NNE       | 7.8E-01      | 5.2E-01 | 3.8E-01 | 2.4E-01 | 1.6E-01 | 1.2E-01 | 6.9E-02 |

| Direction | Distance (m) |         |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|---------|
|           | 1000         | 1500    | 2000    | 3000    | 4000    | 5000    | 7000    |
| N         | 2.2E-01      | 1.1E-01 | 7.3E-02 | 3.9E-02 | 2.6E-02 | 1.9E-02 | 1.1E-02 |
| NNW       | 1.7E-01      | 8.9E-02 | 5.7E-02 | 3.1E-02 | 2.0E-02 | 1.5E-02 | 9.3E-03 |
| NW        | 1.3E-01      | 7.2E-02 | 4.6E-02 | 2.5E-02 | 1.7E-02 | 1.2E-02 | 7.8E-03 |
| WNW       | 1.1E-01      | 6.1E-02 | 3.9E-02 | 2.1E-02 | 1.4E-02 | 1.1E-02 | 6.7E-03 |
| W         | 9.7E-02      | 5.2E-02 | 3.4E-02 | 1.8E-02 | 1.2E-02 | 9.3E-03 | 5.9E-03 |
| WSW       | 8.5E-02      | 4.6E-02 | 3.0E-02 | 1.6E-02 | 1.1E-02 | 8.2E-03 | 5.2E-03 |
| SW        | 7.6E-02      | 4.1E-02 | 2.7E-02 | 1.5E-02 | 9.9E-03 | 7.4E-03 | 4.7E-03 |
| SSW       | 6.9E-02      | 3.7E-02 | 2.4E-02 | 1.3E-02 | 9.0E-03 | 6.7E-03 | 4.3E-03 |
| S         | 6.2E-02      | 3.4E-02 | 2.2E-02 | 1.2E-02 | 8.2E-03 | 6.1E-03 | 3.9E-03 |
| SSE       | 5.7E-02      | 3.1E-02 | 2.0E-02 | 1.1E-02 | 7.5E-03 | 5.6E-03 | 3.6E-03 |
| SSE       | 5.3E-02      | 2.9E-02 | 1.9E-02 | 1.0E-02 | 7.0E-03 | 5.2E-03 | 3.4E-03 |
| ESE       | 4.9E-02      | 2.7E-02 | 1.7E-02 | 9.5E-03 | 6.5E-03 | 4.9E-03 | 3.1E-03 |
| E         | 4.6E-02      | 2.5E-02 | 1.6E-02 | 8.9E-03 | 6.1E-03 | 4.6E-03 | 2.9E-03 |
| ENE       | 4.3E-02      | 2.3E-02 | 1.5E-02 | 8.4E-03 | 5.7E-03 | 4.3E-03 | 2.8E-03 |
| NE        | 4.1E-02      | 2.2E-02 | 1.4E-02 | 7.9E-03 | 5.4E-03 | 4.0E-03 | 2.6E-03 |
| NNE       | 3.8E-02      | 2.1E-02 | 1.4E-02 | 7.5E-03 | 5.1E-03 | 3.8E-03 | 2.5E-03 |



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INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|
|           | 10000        | 15000   | 20000   | 30000   | 50000   | 80000   |
| N         | 6.7E-03      | 3.9E-03 | 2.5E-03 | 1.3E-03 | 5.4E-04 | 1.9E-04 |
| NNW       | 5.6E-03      | 3.3E-03 | 2.2E-03 | 1.2E-03 | 5.3E-04 | 2.0E-04 |
| NW        | 4.8E-03      | 2.9E-03 | 1.9E-03 | 1.1E-03 | 5.1E-04 | 2.1E-04 |
| WNW       | 4.1E-03      | 2.5E-03 | 1.7E-03 | 9.7E-04 | 4.7E-04 | 2.0E-04 |
| W         | 3.7E-03      | 2.2E-03 | 1.5E-03 | 8.9E-04 | 4.4E-04 | 2.0E-04 |
| WSW       | 3.3E-03      | 2.0E-03 | 1.4E-03 | 8.2E-04 | 4.1E-04 | 1.9E-04 |
| SW        | 3.0E-03      | 1.8E-03 | 1.3E-03 | 7.5E-04 | 3.9E-04 | 1.8E-04 |
| SSW       | 2.7E-03      | 1.7E-03 | 1.2E-03 | 7.0E-04 | 3.6E-04 | 1.7E-04 |
| S         | 2.5E-03      | 1.5E-03 | 1.1E-03 | 6.5E-04 | 3.4E-04 | 1.7E-04 |
| SSE       | 2.3E-03      | 1.4E-03 | 1.0E-03 | 6.1E-04 | 3.2E-04 | 1.6E-04 |
| SSE       | 2.1E-03      | 1.3E-03 | 9.5E-04 | 5.7E-04 | 3.0E-04 | 1.5E-04 |
| ESE       | 2.0E-03      | 1.2E-03 | 8.9E-04 | 5.4E-04 | 2.9E-04 | 1.5E-04 |
| E         | 1.9E-03      | 1.2E-03 | 8.4E-04 | 5.1E-04 | 2.7E-04 | 1.4E-04 |
| ENE       | 1.8E-03      | 1.1E-03 | 7.9E-04 | 4.8E-04 | 2.6E-04 | 1.4E-04 |
| NE        | 1.7E-03      | 1.0E-03 | 7.5E-04 | 4.6E-04 | 2.5E-04 | 1.3E-04 |
| NNE       | 1.6E-03      | 9.9E-04 | 7.1E-04 | 4.4E-04 | 2.4E-04 | 1.3E-04 |





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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 100     | 150     | 200     | 300     | 400     | 500     | 700     |
| N            | 6.0E-07 | 4.0E-07 | 2.9E-07 | 1.8E-07 | 1.2E-07 | 8.9E-08 | 5.2E-08 |
| NNW          | 4.5E-07 | 3.0E-07 | 2.2E-07 | 1.4E-07 | 9.3E-08 | 6.7E-08 | 4.0E-08 |
| NW           | 3.6E-07 | 2.4E-07 | 1.8E-07 | 1.1E-07 | 7.5E-08 | 5.4E-08 | 3.2E-08 |
| WNW          | 3.0E-07 | 2.0E-07 | 1.5E-07 | 9.2E-08 | 6.2E-08 | 4.5E-08 | 2.7E-08 |
| W            | 2.6E-07 | 1.7E-07 | 1.3E-07 | 7.9E-08 | 5.3E-08 | 3.8E-08 | 2.3E-08 |
| WSW          | 2.2E-07 | 1.5E-07 | 1.1E-07 | 6.9E-08 | 4.7E-08 | 3.4E-08 | 2.0E-08 |
| SW           | 2.0E-07 | 1.3E-07 | 9.8E-08 | 6.1E-08 | 4.2E-08 | 3.0E-08 | 1.8E-08 |
| SSW          | 1.8E-07 | 1.2E-07 | 8.8E-08 | 5.5E-08 | 3.7E-08 | 2.7E-08 | 1.6E-08 |
| S            | 1.6E-07 | 1.1E-07 | 8.0E-08 | 5.0E-08 | 3.4E-08 | 2.5E-08 | 1.5E-08 |
| SSE          | 1.5E-07 | 1.0E-07 | 7.3E-08 | 4.6E-08 | 3.1E-08 | 2.2E-08 | 1.3E-08 |
| SSE          | 1.4E-07 | 9.2E-08 | 6.8E-08 | 4.2E-08 | 2.9E-08 | 2.1E-08 | 1.2E-08 |
| ESE          | 1.3E-07 | 8.5E-08 | 6.3E-08 | 3.9E-08 | 2.7E-08 | 1.9E-08 | 1.1E-08 |
| E            | 1.2E-07 | 8.0E-08 | 5.9E-08 | 3.7E-08 | 2.5E-08 | 1.8E-08 | 1.1E-08 |
| ENE          | 1.1E-07 | 7.5E-08 | 5.5E-08 | 3.4E-08 | 2.3E-08 | 1.7E-08 | 1.0E-08 |
| NE           | 1.0E-07 | 7.0E-08 | 5.2E-08 | 3.2E-08 | 2.2E-08 | 1.6E-08 | 9.4E-09 |
| NNE          | 9.9E-08 | 6.6E-08 | 4.9E-08 | 3.1E-08 | 2.1E-08 | 1.5E-08 | 8.9E-09 |

| Distance (m) |         |         |         |         |         |         |         |
|--------------|---------|---------|---------|---------|---------|---------|---------|
| Direction    | 1000    | 1500    | 2000    | 3000    | 4000    | 5000    | 7000    |
| N            | 2.9E-08 | 1.6E-08 | 1.0E-08 | 5.4E-09 | 3.5E-09 | 2.6E-09 | 1.6E-09 |
| NNW          | 2.2E-08 | 1.2E-08 | 7.7E-09 | 4.2E-09 | 2.8E-09 | 2.1E-09 | 1.3E-09 |
| NW           | 1.8E-08 | 9.6E-09 | 6.2E-09 | 3.4E-09 | 2.3E-09 | 1.7E-09 | 1.1E-09 |
| WNW          | 1.5E-08 | 8.1E-09 | 5.2E-09 | 2.9E-09 | 2.0E-09 | 1.5E-09 | 9.2E-10 |
| W            | 1.3E-08 | 6.9E-09 | 4.5E-09 | 2.5E-09 | 1.7E-09 | 1.3E-09 | 8.1E-10 |
| WSW          | 1.1E-08 | 6.1E-09 | 4.0E-09 | 2.2E-09 | 1.5E-09 | 1.1E-09 | 7.2E-10 |
| SW           | 9.9E-09 | 5.4E-09 | 3.5E-09 | 2.0E-09 | 1.3E-09 | 1.0E-09 | 6.4E-10 |
| SSW          | 9.0E-09 | 4.9E-09 | 3.2E-09 | 1.8E-09 | 1.2E-09 | 9.1E-10 | 5.8E-10 |
| S            | 8.1E-09 | 4.4E-09 | 2.9E-09 | 1.6E-09 | 1.1E-09 | 8.3E-10 | 5.3E-10 |
| SSE          | 7.5E-09 | 4.1E-09 | 2.7E-09 | 1.5E-09 | 1.0E-09 | 7.6E-10 | 4.9E-10 |
| SSE          | 6.9E-09 | 3.8E-09 | 2.5E-09 | 1.4E-09 | 9.3E-10 | 7.0E-10 | 4.6E-10 |
| ESE          | 6.4E-09 | 3.5E-09 | 2.3E-09 | 1.3E-09 | 8.7E-10 | 6.5E-10 | 4.2E-10 |
| E            | 6.0E-09 | 3.3E-09 | 2.1E-09 | 1.2E-09 | 8.1E-10 | 6.1E-10 | 4.0E-10 |
| ENE          | 5.6E-09 | 3.1E-09 | 2.0E-09 | 1.1E-09 | 7.6E-10 | 5.7E-10 | 3.7E-10 |
| NE           | 5.3E-09 | 2.9E-09 | 1.9E-09 | 1.0E-09 | 7.2E-10 | 5.4E-10 | 3.5E-10 |
| NNE          | 5.0E-09 | 2.7E-09 | 1.8E-09 | 9.9E-10 | 6.8E-10 | 5.1E-10 | 3.3E-10 |



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SUMMARY  
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INDIVIDUAL LIFETIME RISK (deaths)  
(All Radionuclides and Pathways)

| Direction | Distance (m) |         |         |         |         |         |
|-----------|--------------|---------|---------|---------|---------|---------|
|           | 10000        | 15000   | 20000   | 30000   | 50000   | 80000   |
| N         | 9.1E-10      | 5.2E-10 | 3.3E-10 | 1.6E-10 | 6.5E-11 | 2.2E-11 |
| NNW       | 7.6E-10      | 4.5E-10 | 2.9E-10 | 1.5E-10 | 6.6E-11 | 2.4E-11 |
| NW        | 6.5E-10      | 3.9E-10 | 2.6E-10 | 1.4E-10 | 6.4E-11 | 2.5E-11 |
| WNW       | 5.7E-10      | 3.4E-10 | 2.3E-10 | 1.3E-10 | 6.1E-11 | 2.5E-11 |
| W         | 5.0E-10      | 3.1E-10 | 2.1E-10 | 1.2E-10 | 5.7E-11 | 2.5E-11 |
| WSW       | 4.5E-10      | 2.8E-10 | 1.9E-10 | 1.1E-10 | 5.4E-11 | 2.4E-11 |
| SW        | 4.0E-10      | 2.5E-10 | 1.7E-10 | 1.0E-10 | 5.1E-11 | 2.3E-11 |
| SSW       | 3.7E-10      | 2.3E-10 | 1.6E-10 | 9.4E-11 | 4.8E-11 | 2.2E-11 |
| S         | 3.4E-10      | 2.1E-10 | 1.5E-10 | 8.8E-11 | 4.5E-11 | 2.2E-11 |
| SSE       | 3.1E-10      | 2.0E-10 | 1.4E-10 | 8.3E-11 | 4.3E-11 | 2.1E-11 |
| SSE       | 2.9E-10      | 1.8E-10 | 1.3E-10 | 7.8E-11 | 4.1E-11 | 2.0E-11 |
| ESE       | 2.7E-10      | 1.7E-10 | 1.2E-10 | 7.4E-11 | 3.9E-11 | 1.9E-11 |
| E         | 2.5E-10      | 1.6E-10 | 1.1E-10 | 7.0E-11 | 3.7E-11 | 1.9E-11 |
| ENE       | 2.4E-10      | 1.5E-10 | 1.1E-10 | 6.6E-11 | 3.5E-11 | 1.8E-11 |
| NE        | 2.3E-10      | 1.4E-10 | 1.0E-10 | 6.3E-11 | 3.4E-11 | 1.7E-11 |
| NNE       | 2.1E-10      | 1.4E-10 | 9.7E-11 | 6.0E-11 | 3.2E-11 | 1.7E-11 |



## *F.2.5 Dose and Risk Conversion Factors*

### D O S E   A N D   R I S K   C O N V E R S I O N   F A C T O R S

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY                      Zip: 12179

Source Category:  
Source Type: Area  
Emission Year: 1963  
DOSE Age Group: Infant

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



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FACTOR  
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#### DOSE AND RISK FACTOR UNITS

The units for each type of dose rate conversion factor are shown below, by pathway:

| Pathway    | Units                              |
|------------|------------------------------------|
| Ingestion  | millirem/picoCurie                 |
| Inhalation | millirem/picoCurie                 |
| Immersion  | millirem-cubic cm/microCurie-year  |
| Surface    | millirem-square cm/microCurie-year |

Risks for internal exposures (inhalation and ingestion) are the lifetime risk of premature death in a birth cohort of 100,000 people for a 1 picoCurie intake.

This is simplified to lifetime risk per 100,000 picoCuries.

The units for each type of risk conversion factor are shown below, by pathway:

| Pathway    | Units                                     |
|------------|---|
| Ingestion  | lifetime risk/100,000 picoCuries          |
| Inhalation | lifetime risk/100,000 picoCuries          |
| Immersion  | lifetime risk-cubic cm/100,000 picoCurie  |
| Surface    | lifetime risk-square cm/100,000 picoCurie |



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FACTOR  
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\*\*\*\*\*  
\* NUCLIDE Fe-52 :Particulate \*  
\*\*\*\*\*

DOSE RATE CONVERSION FACTORS FOR: Infant

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 3.596E-06 | 1.445E-06  | 3.285E+09        | 7.130E+05         |
| UB_Wall  | 4.255E-06 | 1.505E-06  | 3.309E+09        | 7.736E+05         |
| Bone_Sur | 1.247E-04 | 1.699E-05  | 7.875E+09        | 1.363E+06         |
| Brain    | 1.998E-06 | 4.899E-07  | 4.194E+09        | 7.549E+05         |
| Breasts  | 1.905E-06 | 1.046E-06  | 4.613E+09        | 8.528E+05         |
| St_Wall  | 5.550E-05 | 1.743E-05  | 3.518E+09        | 7.596E+05         |
| SI_Wall  | 6.216E-05 | 3.050E-05  | 3.111E+09        | 7.340E+05         |
| ULI_Wall | 1.772E-04 | 8.480E-05  | 3.250E+09        | 7.514E+05         |
| LLI_Wall | 1.658E-04 | 7.900E-05  | 3.157E+09        | 7.607E+05         |
| Kidneys  | 3.674E-06 | 1.277E-06  | 3.542E+09        | 7.642E+05         |
| Liver    | 1.051E-05 | 2.482E-06  | 3.565E+09        | 7.619E+05         |
| Muscle   | 2.990E-06 | 1.465E-06  | 3.879E+09        | 8.703E+05         |
| Ovaries  | 9.620E-06 | 4.048E-06  | 2.959E+09        | 7.875E+05         |
| Pancreas | 4.699E-06 | 1.806E-06  | 3.087E+09        | 6.978E+05         |
| R_Marrow | 1.328E-04 | 1.786E-05  | 3.786E+09        | 8.120E+05         |
| Skin     | 2.128E-06 | 7.130E-07  | 6.023E+09        | 2.167E+06         |
| Spleen   | 1.014E-05 | 2.260E-06  | 3.577E+09        | 7.654E+05         |
| Testes   | 2.442E-06 | 7.019E-07  | 4.031E+09        | 8.854E+05         |
| Thymus   | 1.865E-06 | 2.532E-06  | 3.705E+09        | 7.666E+05         |
| Thyroid  | 1.769E-06 | 6.908E-07  | 4.089E+09        | 8.365E+05         |
| GB_Wall  | 6.771E-06 | 2.675E-06  | 3.192E+09        | 7.211E+05         |
| Ht_Wall  | 2.575E-06 | 1.594E-06  | 3.472E+09        | 7.479E+05         |
| Uterus   | 6.623E-06 | 2.663E-06  | 3.029E+09        | 7.363E+05         |
| ET_Reg   | 1.769E-06 | 1.232E-04  | 3.087E+09        | 6.978E+05         |
| Lung_66  | 2.412E-06 | 2.428E-05  | 3.973E+09        | 8.085E+05         |
| Effectiv | 4.810E-05 | 2.156E-05  | 3.821E+09        | 8.272E+05         |

RISK CONVERSION FACTORS FOR: Infant

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 1.091E-10 | 4.096E-11  | 3.705E+00        | 7.829E-04         |
| Stomach  | 2.142E-08 | 1.096E-09  | 1.421E+01        | 3.064E-03         |
| Colon    | 3.552E-07 | 2.866E-08  | 3.309E+01        | 7.805E-03         |
| Liver    | 1.214E-09 | 5.169E-11  | 5.406E+00        | 1.155E-03         |
| LUNG     | 1.669E-09 | 7.996E-09  | 3.879E+01        | 7.910E-03         |
| Bone     | 1.273E-10 | 1.092E-11  | 7.479E-01        | 1.293E-04         |
| Skin     | 1.735E-11 | 1.688E-12  | 6.011E-01        | 2.167E-04         |
| Breast   | 5.550E-10 | 1.710E-10  | 2.225E+01        | 4.124E-03         |
| Ovary    | 3.323E-09 | 1.018E-10  | 4.206E+00        | 1.121E-03         |
| Bladder  | 1.983E-09 | 4.888E-11  | 8.004E+00        | 1.876E-03         |
| Kidneys  | 3.330E-10 | 1.046E-11  | 1.841E+00        | 3.973E-04         |
| Thyroid  | 2.442E-11 | 7.455E-12  | 1.305E+00        | 2.668E-04         |
| Leukemia | 1.313E-08 | 9.616E-10  | 2.120E+01        | 4.555E-03         |
| Residual | 6.956E-09 | 6.405E-10  | 5.091E+01        | 1.131E-02         |
| Total    | 4.070E-07 | 3.981E-08  | 2.062E+02        | 4.474E-02         |



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FACTOR  
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\* NUCLIDE Mn-52m :Particulate \*  
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DOSE RATE CONVERSION FACTORS FOR: Infant

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.199E-07 | 5.235E-08  | 1.148E+10        | 2.283E+06         |
| UB_Wall  | 8.991E-08 | 2.455E-08  | 1.156E+10        | 2.540E+06         |
| Bone_Sur | 5.772E-08 | 3.855E-08  | 2.120E+10        | 3.681E+06         |
| Brain    | 5.920E-09 | 2.014E-08  | 1.468E+10        | 2.435E+06         |
| Breasts  | 6.327E-08 | 4.854E-08  | 1.549E+10        | 2.680E+06         |
| St_Wall  | 2.227E-05 | 4.125E-06  | 1.223E+10        | 2.447E+06         |
| SI_Wall  | 5.624E-06 | 1.044E-06  | 1.118E+10        | 2.423E+06         |
| ULI_Wall | 1.621E-06 | 3.110E-07  | 1.153E+10        | 2.447E+06         |
| LLI_Wall | 2.616E-07 | 5.813E-08  | 1.136E+10        | 2.505E+06         |
| Kidneys  | 1.262E-07 | 4.048E-08  | 1.235E+10        | 2.481E+06         |
| Liver    | 1.691E-07 | 5.813E-08  | 1.247E+10        | 2.458E+06         |
| Muscle   | 8.140E-08 | 5.968E-08  | 1.340E+10        | 2.773E+06         |
| Ovaries  | 2.449E-07 | 5.502E-08  | 1.117E+10        | 2.435E+06         |
| Pancreas | 4.440E-07 | 1.082E-07  | 1.108E+10        | 2.295E+06         |
| R_Marrow | 4.736E-08 | 3.206E-08  | 1.340E+10        | 2.633E+06         |
| Skin     | 3.996E-08 | 2.675E-08  | 2.481E+10        | 1.771E+07         |
| Spleen   | 2.438E-07 | 6.882E-08  | 1.247E+10        | 2.458E+06         |
| Testes   | 3.434E-08 | 1.308E-08  | 1.363E+10        | 2.796E+06         |
| Thymus   | 3.441E-08 | 1.476E-07  | 1.293E+10        | 2.447E+06         |
| Thyroid  | 1.654E-08 | 2.942E-08  | 1.398E+10        | 2.586E+06         |
| GB_Wall  | 3.737E-07 | 8.706E-08  | 1.145E+10        | 2.330E+06         |
| Ht_Wall  | 1.354E-07 | 7.774E-08  | 1.223E+10        | 2.423E+06         |
| Uterus   | 2.224E-07 | 5.047E-08  | 1.093E+10        | 2.388E+06         |
| ET_Reg   | 1.654E-08 | 1.487E-05  | 1.108E+10        | 2.295E+06         |
| Lung_66  | 7.067E-08 | 9.213E-07  | 1.363E+10        | 2.575E+06         |
| Effectiv | 2.890E-06 | 1.035E-06  | 1.316E+10        | 2.749E+06         |

RISK CONVERSION FACTORS FOR: Infant

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 5.772E-12 | 2.309E-12  | 1.340E+01        | 2.563E-03         |
| Stomach  | 8.066E-09 | 2.479E-10  | 4.940E+01        | 9.879E-03         |
| Colon    | 1.339E-09 | 6.945E-11  | 1.188E+02        | 2.551E-02         |
| Liver    | 2.916E-11 | 1.310E-12  | 1.887E+01        | 3.728E-03         |
| LUNG     | 1.047E-10 | 3.040E-10  | 1.328E+02        | 2.516E-02         |
| Bone     | 7.104E-13 | 5.543E-14  | 2.015E+00        | 3.495E-04         |
| Skin     | 5.439E-13 | 6.612E-14  | 2.481E+00        | 1.771E-03         |
| Breast   | 3.437E-11 | 7.877E-12  | 7.491E+01        | 1.293E-02         |
| Ovary    | 5.069E-11 | 1.240E-12  | 1.584E+01        | 3.460E-03         |
| Bladder  | 2.864E-11 | 7.400E-13  | 2.796E+01        | 6.140E-03         |
| Kidneys  | 1.473E-11 | 3.293E-13  | 6.419E+00        | 1.293E-03         |
| Thyroid  | 4.366E-13 | 3.414E-13  | 4.450E+00        | 8.237E-04         |
| Leukemia | 7.807E-11 | 3.471E-12  | 7.526E+01        | 1.480E-02         |
| Residual | 5.883E-10 | 3.035E-11  | 1.782E+02        | 3.646E-02         |
| Total    | 1.032E-08 | 6.693E-10  | 7.211E+02        | 1.445E-01         |



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FACTOR  
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\* NUCLIDE Mn-52 :Particulate \*  
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DOSE RATE CONVERSION FACTORS FOR: Infant

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.510E-05 | 1.362E-05  | 1.643E+10        | 3.309E+06         |
| UB_Wall  | 2.527E-05 | 8.484E-06  | 1.643E+10        | 3.588E+06         |
| Bone_Sur | 1.787E-05 | 1.083E-05  | 2.947E+10        | 5.173E+06         |
| Brain    | 5.180E-06 | 3.280E-06  | 2.109E+10        | 3.495E+06         |
| Breasts  | 6.549E-06 | 9.775E-06  | 2.225E+10        | 3.821E+06         |
| St_Wall  | 3.138E-05 | 1.386E-05  | 1.759E+10        | 3.530E+06         |
| SI_Wall  | 6.438E-05 | 2.075E-05  | 1.608E+10        | 3.495E+06         |
| ULI_Wall | 1.258E-04 | 3.863E-05  | 1.654E+10        | 3.518E+06         |
| LLI_Wall | 2.346E-04 | 6.871E-05  | 1.643E+10        | 3.623E+06         |
| Kidneys  | 1.595E-05 | 9.058E-06  | 1.771E+10        | 3.577E+06         |
| Liver    | 3.459E-05 | 1.927E-05  | 1.782E+10        | 3.542E+06         |
| Muscle   | 1.310E-05 | 9.024E-06  | 1.922E+10        | 3.984E+06         |
| Ovaries  | 6.475E-05 | 2.035E-05  | 1.654E+10        | 3.402E+06         |
| Pancreas | 1.935E-05 | 1.301E-05  | 1.596E+10        | 3.297E+06         |
| R_Marrow | 1.813E-05 | 9.931E-06  | 1.934E+10        | 3.786E+06         |
| Skin     | 7.585E-06 | 4.910E-06  | 2.318E+10        | 4.602E+06         |
| Spleen   | 1.406E-05 | 1.057E-05  | 1.794E+10        | 3.553E+06         |
| Testes   | 1.277E-05 | 4.529E-06  | 1.957E+10        | 4.008E+06         |
| Thymus   | 6.253E-06 | 1.372E-05  | 1.852E+10        | 3.448E+06         |
| Thyroid  | 5.624E-06 | 6.338E-06  | 2.015E+10        | 3.716E+06         |
| GB_Wall  | 3.341E-05 | 1.460E-05  | 1.643E+10        | 3.320E+06         |
| Ht_Wall  | 1.014E-05 | 1.571E-05  | 1.747E+10        | 3.483E+06         |
| Uterus   | 3.596E-05 | 1.198E-05  | 1.573E+10        | 3.448E+06         |
| ET_Reg   | 5.624E-06 | 3.037E-04  | 1.596E+10        | 3.297E+06         |
| Lung_66  | 9.250E-06 | 5.876E-05  | 1.969E+10        | 3.693E+06         |
| Effectiv | 4.551E-05 | 3.099E-05  | 1.887E+10        | 3.740E+06         |

RISK CONVERSION FACTORS FOR: Infant

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 6.549E-10 | 2.584E-10  | 1.934E+01        | 3.681E-03         |
| Stomach  | 1.595E-08 | 1.167E-09  | 7.107E+01        | 1.421E-02         |
| Colon    | 2.771E-07 | 2.022E-08  | 1.701E+02        | 3.681E-02         |
| Liver    | 5.920E-09 | 4.055E-10  | 2.703E+01        | 5.371E-03         |
| LUNG     | 8.547E-09 | 2.013E-08  | 1.922E+02        | 3.611E-02         |
| Bone     | 1.894E-10 | 1.424E-11  | 2.796E+00        | 4.916E-04         |
| Skin     | 8.251E-11 | 1.196E-11  | 2.318E+00        | 4.590E-04         |
| Breast   | 2.571E-09 | 1.755E-09  | 1.075E+02        | 1.841E-02         |
| Ovary    | 1.491E-08 | 4.999E-10  | 2.353E+01        | 4.835E-03         |
| Bladder  | 1.010E-08 | 2.753E-10  | 3.973E+01        | 8.679E-03         |
| Kidneys  | 1.269E-09 | 7.126E-11  | 9.215E+00        | 1.864E-03         |
| Thyroid  | 1.454E-10 | 7.063E-11  | 6.419E+00        | 1.188E-03         |
| Leukemia | 1.806E-08 | 9.457E-10  | 1.086E+02        | 2.120E-02         |
| Residual | 2.805E-08 | 4.917E-09  | 2.563E+02        | 5.254E-02         |
| Total    | 3.848E-07 | 5.076E-08  | 1.036E+03        | 2.062E-01         |



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FACTOR  
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\* NUCLIDE K-40 :Particulate \*  
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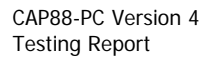
DOSE RATE CONVERSION FACTORS FOR: Infant

| Organ    | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Adrenal  | 1.839E-04 | 7.393E-05  | 7.747E+08        | 1.468E+05         |
| UB_Wall  | 1.917E-04 | 7.267E-05  | 7.875E+08        | 1.654E+05         |
| Bone_Sur | 1.831E-04 | 7.115E-05  | 1.305E+09        | 2.260E+05         |
| Brain    | 1.817E-04 | 6.897E-05  | 9.926E+08        | 1.561E+05         |
| Breasts  | 1.798E-04 | 7.185E-05  | 1.032E+09        | 1.689E+05         |
| St_Wall  | 2.109E-04 | 7.981E-05  | 8.341E+08        | 1.584E+05         |
| SI_Wall  | 1.857E-04 | 7.085E-05  | 7.712E+08        | 1.584E+05         |
| ULI_Wall | 3.689E-04 | 1.399E-04  | 7.899E+08        | 1.584E+05         |
| LLI_Wall | 7.104E-04 | 2.679E-04  | 7.806E+08        | 1.631E+05         |
| Kidneys  | 1.835E-04 | 7.123E-05  | 8.365E+08        | 1.608E+05         |
| Liver    | 1.835E-04 | 7.263E-05  | 8.458E+08        | 1.596E+05         |
| Muscle   | 1.820E-04 | 7.063E-05  | 9.005E+08        | 1.771E+05         |
| Ovaries  | 1.854E-04 | 7.052E-05  | 7.934E+08        | 1.491E+05         |
| Pancreas | 1.846E-04 | 7.326E-05  | 7.631E+08        | 1.503E+05         |
| R_Marrow | 1.813E-04 | 6.986E-05  | 9.169E+08        | 1.701E+05         |
| Skin     | 1.794E-04 | 6.871E-05  | 4.881E+09        | 7.258E+06         |
| Spleen   | 1.835E-04 | 7.248E-05  | 8.470E+08        | 1.584E+05         |
| Testes   | 1.817E-04 | 6.871E-05  | 9.122E+08        | 1.771E+05         |
| Thymus   | 1.828E-04 | 7.300E-05  | 8.854E+08        | 1.561E+05         |
| Thyroid  | 1.839E-04 | 7.163E-05  | 9.413E+08        | 1.596E+05         |
| GB_Wall  | 1.831E-04 | 7.089E-05  | 7.875E+08        | 1.503E+05         |
| Ht_Wall  | 1.835E-04 | 7.589E-05  | 8.306E+08        | 1.561E+05         |
| Uterus   | 1.850E-04 | 7.023E-05  | 7.561E+08        | 1.549E+05         |
| ET_Reg   | 1.839E-04 | 2.318E-04  | 7.631E+08        | 1.503E+05         |
| Lung_66  | 1.820E-04 | 1.452E-03  | 9.238E+08        | 1.654E+05         |
| Effectiv | 2.268E-04 | 2.527E-04  | 9.250E+08        | 2.377E+05         |

RISK CONVERSION FACTORS FOR: Infant

| Cancer   | Ingestion | Inhalation | Air<br>Immersion | Ground<br>Surface |
|----------|-----------|------------|------------------|-------------------|
| Esophagu | 2.301E-08 | 1.236E-09  | 9.204E-01        | 1.654E-04         |
| Stomach  | 8.843E-08 | 6.320E-09  | 3.367E+00        | 6.396E-04         |
| Colon    | 6.068E-07 | 7.060E-08  | 8.108E+00        | 1.654E-03         |
| Liver    | 3.267E-08 | 1.566E-09  | 1.281E+00        | 2.423E-04         |
| LUNG     | 2.057E-07 | 5.261E-07  | 9.029E+00        | 1.619E-03         |
| Bone     | 1.998E-09 | 9.602E-11  | 1.235E-01        | 2.144E-05         |
| Skin     | 2.002E-09 | 1.649E-10  | 4.870E-01        | 7.246E-04         |
| Breast   | 9.139E-08 | 1.047E-08  | 4.986E+00        | 8.167E-04         |
| Ovary    | 2.716E-08 | 1.516E-09  | 1.129E+00        | 2.120E-04         |
| Bladder  | 6.549E-08 | 2.308E-09  | 1.899E+00        | 3.996E-04         |
| Kidneys  | 1.121E-08 | 5.287E-10  | 4.357E-01        | 8.365E-05         |
| Thyroid  | 6.623E-09 | 7.189E-10  | 2.994E-01        | 5.079E-05         |
| Leukemia | 1.228E-07 | 6.682E-09  | 5.149E+00        | 9.553E-04         |
| Residual | 3.030E-07 | 2.776E-08  | 1.212E+01        | 2.353E-03         |
| Total    | 1.591E-06 | 6.560E-07  | 4.928E+01        | 9.937E-03         |





Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY Zip: 12179

```
Source Category:
Source Type: Area
Emission Year: 1963
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



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CONCEN  
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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 100                  | Fe-52   | 1.41E+01                | 2.54E-06                           | 2.96E-07                           | 2.84E-06                              |
| N              | 100                  | Mn-52m  | 7.53E-01                | 1.36E-07                           | 1.58E-08                           | 1.51E-07                              |
| N              | 100                  | Mn-52   | 9.55E-07                | 1.72E-13                           | 2.00E-14                           | 1.92E-13                              |
| N              | 100                  | K-40    | 1.42E-02                | 2.55E-09                           | 2.97E-10                           | 2.84E-09                              |
| N              | 150                  | Fe-52   | 9.39E+00                | 1.69E-06                           | 1.96E-07                           | 1.89E-06                              |
| N              | 150                  | Mn-52m  | 7.42E-01                | 1.34E-07                           | 1.55E-08                           | 1.49E-07                              |
| N              | 150                  | Mn-52   | 1.42E-06                | 2.55E-13                           | 2.96E-14                           | 2.85E-13                              |
| N              | 150                  | K-40    | 9.43E-03                | 1.70E-09                           | 1.97E-10                           | 1.89E-09                              |
| N              | 200                  | Fe-52   | 6.88E+00                | 1.24E-06                           | 1.46E-07                           | 1.39E-06                              |
| N              | 200                  | Mn-52m  | 7.16E-01                | 1.29E-07                           | 1.52E-08                           | 1.44E-07                              |
| N              | 200                  | Mn-52   | 1.83E-06                | 3.30E-13                           | 3.89E-14                           | 3.68E-13                              |
| N              | 200                  | K-40    | 6.91E-03                | 1.24E-09                           | 1.47E-10                           | 1.39E-09                              |
| N              | 300                  | Fe-52   | 4.21E+00                | 7.58E-07                           | 9.65E-08                           | 8.55E-07                              |
| N              | 300                  | Mn-52m  | 6.40E-01                | 1.15E-07                           | 1.47E-08                           | 1.30E-07                              |
| N              | 300                  | Mn-52   | 2.48E-06                | 4.46E-13                           | 5.68E-14                           | 5.03E-13                              |
| N              | 300                  | K-40    | 4.24E-03                | 7.64E-10                           | 9.72E-11                           | 8.61E-10                              |
| N              | 400                  | Fe-52   | 2.79E+00                | 5.03E-07                           | 7.16E-08                           | 5.75E-07                              |
| N              | 400                  | Mn-52m  | 5.52E-01                | 9.94E-08                           | 1.41E-08                           | 1.14E-07                              |
| N              | 400                  | Mn-52   | 2.88E-06                | 5.18E-13                           | 7.37E-14                           | 5.92E-13                              |
| N              | 400                  | K-40    | 2.82E-03                | 5.08E-10                           | 7.23E-11                           | 5.80E-10                              |
| N              | 500                  | Fe-52   | 1.96E+00                | 3.53E-07                           | 5.67E-08                           | 4.10E-07                              |
| N              | 500                  | Mn-52m  | 4.73E-01                | 8.51E-08                           | 1.37E-08                           | 9.87E-08                              |
| N              | 500                  | Mn-52   | 3.11E-06                | 5.59E-13                           | 8.98E-14                           | 6.49E-13                              |
| N              | 500                  | K-40    | 1.99E-03                | 3.57E-10                           | 5.74E-11                           | 4.15E-10                              |
| N              | 700                  | Fe-52   | 1.10E+00                | 1.98E-07                           | 3.98E-08                           | 2.38E-07                              |
| N              | 700                  | Mn-52m  | 3.53E-01                | 6.36E-08                           | 1.28E-08                           | 7.63E-08                              |
| N              | 700                  | Mn-52   | 3.31E-06                | 5.96E-13                           | 1.20E-13                           | 7.15E-13                              |
| N              | 700                  | K-40    | 1.12E-03                | 2.01E-10                           | 4.05E-11                           | 2.42E-10                              |
| N              | 1000                 | Fe-52   | 5.72E-01                | 1.03E-07                           | 2.72E-08                           | 1.30E-07                              |
| N              | 1000                 | Mn-52m  | 2.44E-01                | 4.39E-08                           | 1.16E-08                           | 5.55E-08                              |
| N              | 1000                 | Mn-52   | 3.35E-06                | 6.03E-13                           | 1.60E-13                           | 7.63E-13                              |
| N              | 1000                 | K-40    | 5.85E-04                | 1.05E-10                           | 2.79E-11                           | 1.33E-10                              |
| N              | 1500                 | Fe-52   | 2.82E-01                | 5.08E-08                           | 1.76E-08                           | 6.83E-08                              |
| N              | 1500                 | Mn-52m  | 1.60E-01                | 2.89E-08                           | 9.98E-09                           | 3.89E-08                              |
| N              | 1500                 | Mn-52   | 3.45E-06                | 6.21E-13                           | 2.15E-13                           | 8.36E-13                              |
| N              | 1500                 | K-40    | 2.92E-04                | 5.26E-11                           | 1.82E-11                           | 7.07E-11                              |
| N              | 2000                 | Fe-52   | 1.69E-01                | 3.04E-08                           | 1.28E-08                           | 4.31E-08                              |
| N              | 2000                 | Mn-52m  | 1.14E-01                | 2.06E-08                           | 8.67E-09                           | 2.93E-08                              |
| N              | 2000                 | Mn-52   | 3.42E-06                | 6.15E-13                           | 2.59E-13                           | 8.75E-13                              |
| N              | 2000                 | K-40    | 1.77E-04                | 3.18E-11                           | 1.34E-11                           | 4.52E-11                              |
| N              | 3000                 | Fe-52   | 8.08E-02                | 1.45E-08                           | 8.11E-09                           | 2.26E-08                              |
| N              | 3000                 | Mn-52m  | 6.68E-02                | 1.20E-08                           | 6.71E-09                           | 1.87E-08                              |
| N              | 3000                 | Mn-52   | 3.23E-06                | 5.81E-13                           | 3.24E-13                           | 9.06E-13                              |
| N              | 3000                 | K-40    | 8.66E-05                | 1.56E-11                           | 8.69E-12                           | 2.43E-11                              |
| N              | 4000                 | Fe-52   | 4.93E-02                | 8.87E-09                           | 5.76E-09                           | 1.46E-08                              |
| N              | 4000                 | Mn-52m  | 4.51E-02                | 8.12E-09                           | 5.28E-09                           | 1.34E-08                              |
| N              | 4000                 | Mn-52   | 3.11E-06                | 5.60E-13                           | 3.64E-13                           | 9.23E-13                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 4000                 | K-40    | 5.41E-05                | 9.73E-12                           | 6.33E-12                           | 1.61E-11                              |
| N              | 5000                 | Fe-52   | 3.38E-02                | 6.08E-09                           | 4.41E-09                           | 1.05E-08                              |
| N              | 5000                 | Mn-52m  | 3.27E-02                | 5.88E-09                           | 4.27E-09                           | 1.02E-08                              |
| N              | 5000                 | Mn-52   | 2.99E-06                | 5.38E-13                           | 3.90E-13                           | 9.28E-13                              |
| N              | 5000                 | K-40    | 3.79E-05                | 6.83E-12                           | 4.95E-12                           | 1.18E-11                              |
| N              | 7000                 | Fe-52   | 1.83E-02                | 3.29E-09                           | 2.87E-09                           | 6.16E-09                              |
| N              | 7000                 | Mn-52m  | 1.86E-02                | 3.35E-09                           | 2.92E-09                           | 6.27E-09                              |
| N              | 7000                 | Mn-52   | 2.63E-06                | 4.73E-13                           | 4.11E-13                           | 8.84E-13                              |
| N              | 7000                 | K-40    | 2.15E-05                | 3.88E-12                           | 3.37E-12                           | 7.25E-12                              |
| N              | 10000                | Fe-52   | 9.36E-03                | 1.69E-09                           | 1.76E-09                           | 3.44E-09                              |
| N              | 10000                | Mn-52m  | 9.73E-03                | 1.75E-09                           | 1.83E-09                           | 3.58E-09                              |
| N              | 10000                | Mn-52   | 2.19E-06                | 3.94E-13                           | 4.11E-13                           | 8.05E-13                              |
| N              | 10000                | K-40    | 1.18E-05                | 2.13E-12                           | 2.22E-12                           | 4.35E-12                              |
| N              | 15000                | Fe-52   | 4.65E-03                | 8.36E-10                           | 9.68E-10                           | 1.80E-09                              |
| N              | 15000                | Mn-52m  | 4.85E-03                | 8.73E-10                           | 1.01E-09                           | 1.88E-09                              |
| N              | 15000                | Mn-52   | 1.85E-06                | 3.33E-13                           | 3.86E-13                           | 7.19E-13                              |
| N              | 15000                | K-40    | 6.59E-06                | 1.19E-12                           | 1.37E-12                           | 2.56E-12                              |
| N              | 20000                | Fe-52   | 2.58E-03                | 4.65E-10                           | 5.94E-10                           | 1.06E-09                              |
| N              | 20000                | Mn-52m  | 2.70E-03                | 4.85E-10                           | 6.21E-10                           | 1.11E-09                              |
| N              | 20000                | Mn-52   | 1.51E-06                | 2.71E-13                           | 3.47E-13                           | 6.18E-13                              |
| N              | 20000                | K-40    | 4.11E-06                | 7.40E-13                           | 9.47E-13                           | 1.69E-12                              |
| N              | 30000                | Fe-52   | 9.49E-04                | 1.71E-10                           | 2.64E-10                           | 4.35E-10                              |
| N              | 30000                | Mn-52m  | 9.91E-04                | 1.78E-10                           | 2.76E-10                           | 4.54E-10                              |
| N              | 30000                | Mn-52   | 9.67E-07                | 1.74E-13                           | 2.69E-13                           | 4.43E-13                              |
| N              | 30000                | K-40    | 1.91E-06                | 3.43E-13                           | 5.31E-13                           | 8.74E-13                              |
| N              | 50000                | Fe-52   | 2.35E-04                | 4.23E-11                           | 7.57E-11                           | 1.18E-10                              |
| N              | 50000                | Mn-52m  | 2.45E-04                | 4.42E-11                           | 7.91E-11                           | 1.23E-10                              |
| N              | 50000                | Mn-52   | 5.25E-07                | 9.45E-14                           | 1.69E-13                           | 2.64E-13                              |
| N              | 50000                | K-40    | 7.52E-07                | 1.35E-13                           | 2.42E-13                           | 3.78E-13                              |
| N              | 80000                | Fe-52   | 3.16E-05                | 5.68E-12                           | 1.50E-11                           | 2.07E-11                              |
| N              | 80000                | Mn-52m  | 3.30E-05                | 5.93E-12                           | 1.56E-11                           | 2.16E-11                              |
| N              | 80000                | Mn-52   | 1.71E-07                | 3.07E-14                           | 8.10E-14                           | 1.12E-13                              |
| N              | 80000                | K-40    | 2.03E-07                | 3.65E-14                           | 9.63E-14                           | 1.33E-13                              |
| NNW            | 100                  | Fe-52   | 1.06E+01                | 1.91E-06                           | 2.23E-07                           | 2.13E-06                              |
| NNW            | 100                  | Mn-52m  | 4.28E-01                | 7.70E-08                           | 8.97E-09                           | 8.60E-08                              |
| NNW            | 100                  | Mn-52   | 4.06E-07                | 7.30E-14                           | 8.51E-15                           | 8.15E-14                              |
| NNW            | 100                  | K-40    | 1.06E-02                | 1.91E-09                           | 2.23E-10                           | 2.14E-09                              |
| NNW            | 150                  | Fe-52   | 7.08E+00                | 1.27E-06                           | 1.48E-07                           | 1.42E-06                              |
| NNW            | 150                  | Mn-52m  | 4.23E-01                | 7.62E-08                           | 8.85E-09                           | 8.50E-08                              |
| NNW            | 150                  | Mn-52   | 6.04E-07                | 1.09E-13                           | 1.26E-14                           | 1.21E-13                              |
| NNW            | 150                  | K-40    | 7.09E-03                | 1.28E-09                           | 1.48E-10                           | 1.43E-09                              |
| NNW            | 200                  | Fe-52   | 5.19E+00                | 9.34E-07                           | 1.10E-07                           | 1.04E-06                              |
| NNW            | 200                  | Mn-52m  | 4.10E-01                | 7.38E-08                           | 8.72E-09                           | 8.25E-08                              |
| NNW            | 200                  | Mn-52   | 7.83E-07                | 1.41E-13                           | 1.67E-14                           | 1.58E-13                              |
| NNW            | 200                  | K-40    | 5.21E-03                | 9.38E-10                           | 1.11E-10                           | 1.05E-09                              |
| NNW            | 300                  | Fe-52   | 3.19E+00                | 5.74E-07                           | 7.30E-08                           | 6.47E-07                              |
| NNW            | 300                  | Mn-52m  | 3.70E-01                | 6.67E-08                           | 8.48E-09                           | 7.51E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNW            | 300                  | Mn-52   | 1.07E-06                | 1.92E-13                           | 2.45E-14                           | 2.17E-13                              |
| NNW            | 300                  | K-40    | 3.20E-03                | 5.77E-10                           | 7.34E-11                           | 6.50E-10                              |
| NNW            | 400                  | Fe-52   | 2.12E+00                | 3.82E-07                           | 5.43E-08                           | 4.36E-07                              |
| NNW            | 400                  | Mn-52m  | 3.22E-01                | 5.80E-08                           | 8.25E-09                           | 6.63E-08                              |
| NNW            | 400                  | Mn-52   | 1.25E-06                | 2.25E-13                           | 3.20E-14                           | 2.57E-13                              |
| NNW            | 400                  | K-40    | 2.14E-03                | 3.84E-10                           | 5.47E-11                           | 4.39E-10                              |
| NNW            | 500                  | Fe-52   | 1.49E+00                | 2.69E-07                           | 4.31E-08                           | 3.12E-07                              |
| NNW            | 500                  | Mn-52m  | 2.78E-01                | 5.01E-08                           | 8.04E-09                           | 5.82E-08                              |
| NNW            | 500                  | Mn-52   | 1.36E-06                | 2.44E-13                           | 3.92E-14                           | 2.84E-13                              |
| NNW            | 500                  | K-40    | 1.51E-03                | 2.71E-10                           | 4.35E-11                           | 3.15E-10                              |
| NNW            | 700                  | Fe-52   | 8.43E-01                | 1.52E-07                           | 3.04E-08                           | 1.82E-07                              |
| NNW            | 700                  | Mn-52m  | 2.12E-01                | 3.81E-08                           | 7.64E-09                           | 4.58E-08                              |
| NNW            | 700                  | Mn-52   | 1.47E-06                | 2.64E-13                           | 5.29E-14                           | 3.17E-13                              |
| NNW            | 700                  | K-40    | 8.53E-04                | 1.54E-10                           | 3.08E-11                           | 1.84E-10                              |
| NNW            | 1000                 | Fe-52   | 4.41E-01                | 7.95E-08                           | 2.09E-08                           | 1.00E-07                              |
| NNW            | 1000                 | Mn-52m  | 1.50E-01                | 2.70E-08                           | 7.10E-09                           | 3.41E-08                              |
| NNW            | 1000                 | Mn-52   | 1.51E-06                | 2.72E-13                           | 7.16E-14                           | 3.44E-13                              |
| NNW            | 1000                 | K-40    | 4.49E-04                | 8.09E-11                           | 2.13E-11                           | 1.02E-10                              |
| NNW            | 1500                 | Fe-52   | 2.20E-01                | 3.97E-08                           | 1.36E-08                           | 5.32E-08                              |
| NNW            | 1500                 | Mn-52m  | 1.03E-01                | 1.85E-08                           | 6.33E-09                           | 2.48E-08                              |
| NNW            | 1500                 | Mn-52   | 1.60E-06                | 2.89E-13                           | 9.89E-14                           | 3.88E-13                              |
| NNW            | 1500                 | K-40    | 2.26E-04                | 4.07E-11                           | 1.40E-11                           | 5.47E-11                              |
| NNW            | 2000                 | Fe-52   | 1.33E-01                | 2.40E-08                           | 9.97E-09                           | 3.39E-08                              |
| NNW            | 2000                 | Mn-52m  | 7.57E-02                | 1.36E-08                           | 5.67E-09                           | 1.93E-08                              |
| NNW            | 2000                 | Mn-52   | 1.63E-06                | 2.93E-13                           | 1.22E-13                           | 4.15E-13                              |
| NNW            | 2000                 | K-40    | 1.38E-04                | 2.48E-11                           | 1.03E-11                           | 3.51E-11                              |
| NNW            | 3000                 | Fe-52   | 6.48E-02                | 1.17E-08                           | 6.40E-09                           | 1.81E-08                              |
| NNW            | 3000                 | Mn-52m  | 4.69E-02                | 8.44E-09                           | 4.63E-09                           | 1.31E-08                              |
| NNW            | 3000                 | Mn-52   | 1.61E-06                | 2.89E-13                           | 1.59E-13                           | 4.48E-13                              |
| NNW            | 3000                 | K-40    | 6.83E-05                | 1.23E-11                           | 6.74E-12                           | 1.90E-11                              |
| NNW            | 4000                 | Fe-52   | 4.03E-02                | 7.25E-09                           | 4.61E-09                           | 1.19E-08                              |
| NNW            | 4000                 | Mn-52m  | 3.34E-02                | 6.00E-09                           | 3.82E-09                           | 9.82E-09                              |
| NNW            | 4000                 | Mn-52   | 1.61E-06                | 2.90E-13                           | 1.84E-13                           | 4.75E-13                              |
| NNW            | 4000                 | K-40    | 4.32E-05                | 7.78E-12                           | 4.94E-12                           | 1.27E-11                              |
| NNW            | 5000                 | Fe-52   | 2.80E-02                | 5.04E-09                           | 3.57E-09                           | 8.61E-09                              |
| NNW            | 5000                 | Mn-52m  | 2.52E-02                | 4.53E-09                           | 3.20E-09                           | 7.73E-09                              |
| NNW            | 5000                 | Mn-52   | 1.60E-06                | 2.88E-13                           | 2.04E-13                           | 4.92E-13                              |
| NNW            | 5000                 | K-40    | 3.06E-05                | 5.50E-12                           | 3.89E-12                           | 9.39E-12                              |
| NNW            | 7000                 | Fe-52   | 1.57E-02                | 2.82E-09                           | 2.37E-09                           | 5.19E-09                              |
| NNW            | 7000                 | Mn-52m  | 1.53E-02                | 2.76E-09                           | 2.32E-09                           | 5.08E-09                              |
| NNW            | 7000                 | Mn-52   | 1.49E-06                | 2.69E-13                           | 2.26E-13                           | 4.94E-13                              |
| NNW            | 7000                 | K-40    | 1.77E-05                | 3.19E-12                           | 2.68E-12                           | 5.87E-12                              |
| NNW            | 10000                | Fe-52   | 8.37E-03                | 1.51E-09                           | 1.50E-09                           | 3.01E-09                              |
| NNW            | 10000                | Mn-52m  | 8.57E-03                | 1.54E-09                           | 1.54E-09                           | 3.08E-09                              |
| NNW            | 10000                | Mn-52   | 1.32E-06                | 2.38E-13                           | 2.38E-13                           | 4.76E-13                              |
| NNW            | 10000                | K-40    | 9.96E-06                | 1.79E-12                           | 1.79E-12                           | 3.58E-12                              |
| NNW            | 15000                | Fe-52   | 4.39E-03                | 7.89E-10                           | 8.67E-10                           | 1.66E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNW            | 15000                | Mn-52m  | 4.57E-03                | 8.22E-10                           | 9.03E-10                           | 1.72E-09                              |
| NNW            | 15000                | Mn-52   | 1.20E-06                | 2.16E-13                           | 2.37E-13                           | 4.53E-13                              |
| NNW            | 15000                | K-40    | 5.70E-06                | 1.03E-12                           | 1.13E-12                           | 2.15E-12                              |
| NNW            | 20000                | Fe-52   | 2.59E-03                | 4.66E-10                           | 5.59E-10                           | 1.02E-09                              |
| NNW            | 20000                | Mn-52m  | 2.70E-03                | 4.86E-10                           | 5.83E-10                           | 1.07E-09                              |
| NNW            | 20000                | Mn-52   | 1.03E-06                | 1.86E-13                           | 2.23E-13                           | 4.09E-13                              |
| NNW            | 20000                | K-40    | 3.67E-06                | 6.60E-13                           | 7.92E-13                           | 1.45E-12                              |
| NNW            | 30000                | Fe-52   | 1.08E-03                | 1.94E-10                           | 2.74E-10                           | 4.68E-10                              |
| NNW            | 30000                | Mn-52m  | 1.13E-03                | 2.03E-10                           | 2.86E-10                           | 4.89E-10                              |
| NNW            | 30000                | Mn-52   | 7.38E-07                | 1.33E-13                           | 1.87E-13                           | 3.20E-13                              |
| NNW            | 30000                | K-40    | 1.82E-06                | 3.28E-13                           | 4.62E-13                           | 7.90E-13                              |
| NNW            | 50000                | Fe-52   | 3.26E-04                | 5.87E-11                           | 9.40E-11                           | 1.53E-10                              |
| NNW            | 50000                | Mn-52m  | 3.41E-04                | 6.13E-11                           | 9.82E-11                           | 1.59E-10                              |
| NNW            | 50000                | Mn-52   | 4.61E-07                | 8.30E-14                           | 1.33E-13                           | 2.16E-13                              |
| NNW            | 50000                | K-40    | 7.81E-07                | 1.41E-13                           | 2.25E-13                           | 3.66E-13                              |
| NNW            | 80000                | Fe-52   | 6.04E-05                | 1.09E-11                           | 2.43E-11                           | 3.52E-11                              |
| NNW            | 80000                | Mn-52m  | 6.31E-05                | 1.14E-11                           | 2.54E-11                           | 3.68E-11                              |
| NNW            | 80000                | Mn-52   | 1.86E-07                | 3.34E-14                           | 7.47E-14                           | 1.08E-13                              |
| NNW            | 80000                | K-40    | 2.44E-07                | 4.40E-14                           | 9.83E-14                           | 1.42E-13                              |
| NW             | 100                  | Fe-52   | 8.50E+00                | 1.53E-06                           | 1.78E-07                           | 1.71E-06                              |
| NW             | 100                  | Mn-52m  | 2.75E-01                | 4.95E-08                           | 5.77E-09                           | 5.53E-08                              |
| NW             | 100                  | Mn-52   | 2.08E-07                | 3.75E-14                           | 4.37E-15                           | 4.19E-14                              |
| NW             | 100                  | K-40    | 8.52E-03                | 1.53E-09                           | 1.79E-10                           | 1.71E-09                              |
| NW             | 150                  | Fe-52   | 5.67E+00                | 1.02E-06                           | 1.19E-07                           | 1.14E-06                              |
| NW             | 150                  | Mn-52m  | 2.73E-01                | 4.91E-08                           | 5.70E-09                           | 5.48E-08                              |
| NW             | 150                  | Mn-52   | 3.11E-07                | 5.60E-14                           | 6.50E-15                           | 6.25E-14                              |
| NW             | 150                  | K-40    | 5.68E-03                | 1.02E-09                           | 1.19E-10                           | 1.14E-09                              |
| NW             | 200                  | Fe-52   | 4.16E+00                | 7.50E-07                           | 8.86E-08                           | 8.38E-07                              |
| NW             | 200                  | Mn-52m  | 2.65E-01                | 4.77E-08                           | 5.64E-09                           | 5.34E-08                              |
| NW             | 200                  | Mn-52   | 4.04E-07                | 7.27E-14                           | 8.59E-15                           | 8.13E-14                              |
| NW             | 200                  | K-40    | 4.18E-03                | 7.52E-10                           | 8.88E-11                           | 8.40E-10                              |
| NW             | 300                  | Fe-52   | 2.56E+00                | 4.61E-07                           | 5.86E-08                           | 5.20E-07                              |
| NW             | 300                  | Mn-52m  | 2.41E-01                | 4.33E-08                           | 5.51E-09                           | 4.89E-08                              |
| NW             | 300                  | Mn-52   | 5.53E-07                | 9.96E-14                           | 1.27E-14                           | 1.12E-13                              |
| NW             | 300                  | K-40    | 2.57E-03                | 4.63E-10                           | 5.89E-11                           | 5.22E-10                              |
| NW             | 400                  | Fe-52   | 1.71E+00                | 3.07E-07                           | 4.37E-08                           | 3.51E-07                              |
| NW             | 400                  | Mn-52m  | 2.11E-01                | 3.79E-08                           | 5.39E-09                           | 4.33E-08                              |
| NW             | 400                  | Mn-52   | 6.49E-07                | 1.17E-13                           | 1.66E-14                           | 1.34E-13                              |
| NW             | 400                  | K-40    | 1.72E-03                | 3.09E-10                           | 4.39E-11                           | 3.53E-10                              |
| NW             | 500                  | Fe-52   | 1.21E+00                | 2.17E-07                           | 3.47E-08                           | 2.52E-07                              |
| NW             | 500                  | Mn-52m  | 1.83E-01                | 3.30E-08                           | 5.28E-09                           | 3.82E-08                              |
| NW             | 500                  | Mn-52   | 7.09E-07                | 1.28E-13                           | 2.04E-14                           | 1.48E-13                              |
| NW             | 500                  | K-40    | 1.21E-03                | 2.18E-10                           | 3.50E-11                           | 2.53E-10                              |
| NW             | 700                  | Fe-52   | 6.83E-01                | 1.23E-07                           | 2.46E-08                           | 1.47E-07                              |
| NW             | 700                  | Mn-52m  | 1.41E-01                | 2.54E-08                           | 5.07E-09                           | 3.04E-08                              |
| NW             | 700                  | Mn-52   | 7.72E-07                | 1.39E-13                           | 2.78E-14                           | 1.67E-13                              |
| NW             | 700                  | K-40    | 6.89E-04                | 1.24E-10                           | 2.48E-11                           | 1.49E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 1000                 | Fe-52   | 3.59E-01                | 6.47E-08                           | 1.70E-08                           | 8.16E-08                              |
| NW             | 1000                 | Mn-52m  | 1.01E-01                | 1.82E-08                           | 4.78E-09                           | 2.30E-08                              |
| NW             | 1000                 | Mn-52   | 8.06E-07                | 1.45E-13                           | 3.80E-14                           | 1.83E-13                              |
| NW             | 1000                 | K-40    | 3.64E-04                | 6.56E-11                           | 1.72E-11                           | 8.28E-11                              |
| NW             | 1500                 | Fe-52   | 1.81E-01                | 3.25E-08                           | 1.11E-08                           | 4.36E-08                              |
| NW             | 1500                 | Mn-52m  | 7.09E-02                | 1.28E-08                           | 4.35E-09                           | 1.71E-08                              |
| NW             | 1500                 | Mn-52   | 8.69E-07                | 1.57E-13                           | 5.34E-14                           | 2.10E-13                              |
| NW             | 1500                 | K-40    | 1.84E-04                | 3.32E-11                           | 1.13E-11                           | 4.45E-11                              |
| NW             | 2000                 | Fe-52   | 1.10E-01                | 1.98E-08                           | 8.16E-09                           | 2.79E-08                              |
| NW             | 2000                 | Mn-52m  | 5.35E-02                | 9.63E-09                           | 3.98E-09                           | 1.36E-08                              |
| NW             | 2000                 | Mn-52   | 8.98E-07                | 1.62E-13                           | 6.68E-14                           | 2.28E-13                              |
| NW             | 2000                 | K-40    | 1.13E-04                | 2.03E-11                           | 8.39E-12                           | 2.87E-11                              |
| NW             | 3000                 | Fe-52   | 5.40E-02                | 9.71E-09                           | 5.28E-09                           | 1.50E-08                              |
| NW             | 3000                 | Mn-52m  | 3.44E-02                | 6.20E-09                           | 3.37E-09                           | 9.56E-09                              |
| NW             | 3000                 | Mn-52   | 9.11E-07                | 1.64E-13                           | 8.91E-14                           | 2.53E-13                              |
| NW             | 3000                 | K-40    | 5.63E-05                | 1.01E-11                           | 5.50E-12                           | 1.56E-11                              |
| NW             | 4000                 | Fe-52   | 3.40E-02                | 6.11E-09                           | 3.83E-09                           | 9.94E-09                              |
| NW             | 4000                 | Mn-52m  | 2.54E-02                | 4.57E-09                           | 2.86E-09                           | 7.43E-09                              |
| NW             | 4000                 | Mn-52   | 9.39E-07                | 1.69E-13                           | 1.06E-13                           | 2.75E-13                              |
| NW             | 4000                 | K-40    | 3.59E-05                | 6.46E-12                           | 4.05E-12                           | 1.05E-11                              |
| NW             | 5000                 | Fe-52   | 2.38E-02                | 4.29E-09                           | 2.98E-09                           | 7.27E-09                              |
| NW             | 5000                 | Mn-52m  | 1.97E-02                | 3.55E-09                           | 2.47E-09                           | 6.02E-09                              |
| NW             | 5000                 | Mn-52   | 9.52E-07                | 1.71E-13                           | 1.19E-13                           | 2.91E-13                              |
| NW             | 5000                 | K-40    | 2.55E-05                | 4.59E-12                           | 3.20E-12                           | 7.79E-12                              |
| NW             | 7000                 | Fe-52   | 1.36E-02                | 2.45E-09                           | 2.01E-09                           | 4.46E-09                              |
| NW             | 7000                 | Mn-52m  | 1.26E-02                | 2.27E-09                           | 1.87E-09                           | 4.14E-09                              |
| NW             | 7000                 | Mn-52   | 9.24E-07                | 1.66E-13                           | 1.37E-13                           | 3.03E-13                              |
| NW             | 7000                 | K-40    | 1.50E-05                | 2.70E-12                           | 2.22E-12                           | 4.92E-12                              |
| NW             | 10000                | Fe-52   | 7.44E-03                | 1.34E-09                           | 1.30E-09                           | 2.64E-09                              |
| NW             | 10000                | Mn-52m  | 7.44E-03                | 1.34E-09                           | 1.30E-09                           | 2.64E-09                              |
| NW             | 10000                | Mn-52   | 8.59E-07                | 1.55E-13                           | 1.50E-13                           | 3.05E-13                              |
| NW             | 10000                | K-40    | 8.55E-06                | 1.54E-12                           | 1.50E-12                           | 3.03E-12                              |
| NW             | 15000                | Fe-52   | 4.03E-03                | 7.26E-10                           | 7.72E-10                           | 1.50E-09                              |
| NW             | 15000                | Mn-52m  | 4.17E-03                | 7.51E-10                           | 7.99E-10                           | 1.55E-09                              |
| NW             | 15000                | Mn-52   | 8.17E-07                | 1.47E-13                           | 1.56E-13                           | 3.04E-13                              |
| NW             | 15000                | K-40    | 4.97E-06                | 8.95E-13                           | 9.52E-13                           | 1.85E-12                              |
| NW             | 20000                | Fe-52   | 2.47E-03                | 4.44E-10                           | 5.13E-10                           | 9.57E-10                              |
| NW             | 20000                | Mn-52m  | 2.57E-03                | 4.63E-10                           | 5.34E-10                           | 9.97E-10                              |
| NW             | 20000                | Mn-52   | 7.34E-07                | 1.32E-13                           | 1.52E-13                           | 2.85E-13                              |
| NW             | 20000                | K-40    | 3.26E-06                | 5.87E-13                           | 6.78E-13                           | 1.26E-12                              |
| NW             | 30000                | Fe-52   | 1.11E-03                | 2.00E-10                           | 2.66E-10                           | 4.67E-10                              |
| NW             | 30000                | Mn-52m  | 1.16E-03                | 2.09E-10                           | 2.78E-10                           | 4.87E-10                              |
| NW             | 30000                | Mn-52   | 5.65E-07                | 1.02E-13                           | 1.35E-13                           | 2.37E-13                              |
| NW             | 30000                | K-40    | 1.69E-06                | 3.05E-13                           | 4.05E-13                           | 7.09E-13                              |
| NW             | 50000                | Fe-52   | 3.80E-04                | 6.84E-11                           | 1.02E-10                           | 1.71E-10                              |
| NW             | 50000                | Mn-52m  | 3.97E-04                | 7.14E-11                           | 1.07E-10                           | 1.78E-10                              |
| NW             | 50000                | Mn-52   | 3.87E-07                | 6.96E-14                           | 1.04E-13                           | 1.74E-13                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NW             | 50000                | K-40    | 7.63E-07                | 1.37E-13                           | 2.05E-13                           | 3.43E-13                              |
| NW             | 80000                | Fe-52   | 8.67E-05                | 1.56E-11                           | 3.12E-11                           | 4.68E-11                              |
| NW             | 80000                | Mn-52m  | 9.05E-05                | 1.63E-11                           | 3.26E-11                           | 4.89E-11                              |
| NW             | 80000                | Mn-52   | 1.81E-07                | 3.26E-14                           | 6.51E-14                           | 9.76E-14                              |
| NW             | 80000                | K-40    | 2.65E-07                | 4.77E-14                           | 9.53E-14                           | 1.43E-13                              |
| WNW            | 100                  | Fe-52   | 7.09E+00                | 1.28E-06                           | 1.49E-07                           | 1.43E-06                              |
| WNW            | 100                  | Mn-52m  | 1.92E-01                | 3.45E-08                           | 4.02E-09                           | 3.85E-08                              |
| WNW            | 100                  | Mn-52   | 1.21E-07                | 2.18E-14                           | 2.54E-15                           | 2.43E-14                              |
| WNW            | 100                  | K-40    | 7.10E-03                | 1.28E-09                           | 1.49E-10                           | 1.43E-09                              |
| WNW            | 150                  | Fe-52   | 4.73E+00                | 8.52E-07                           | 9.89E-08                           | 9.51E-07                              |
| WNW            | 150                  | Mn-52m  | 1.91E-01                | 3.43E-08                           | 3.98E-09                           | 3.83E-08                              |
| WNW            | 150                  | Mn-52   | 1.81E-07                | 3.25E-14                           | 3.78E-15                           | 3.63E-14                              |
| WNW            | 150                  | K-40    | 4.74E-03                | 8.54E-10                           | 9.91E-11                           | 9.53E-10                              |
| WNW            | 200                  | Fe-52   | 3.48E+00                | 6.26E-07                           | 7.40E-08                           | 7.00E-07                              |
| WNW            | 200                  | Mn-52m  | 1.86E-01                | 3.34E-08                           | 3.95E-09                           | 3.73E-08                              |
| WNW            | 200                  | Mn-52   | 2.35E-07                | 4.23E-14                           | 5.00E-15                           | 4.73E-14                              |
| WNW            | 200                  | K-40    | 3.49E-03                | 6.28E-10                           | 7.41E-11                           | 7.02E-10                              |
| WNW            | 300                  | Fe-52   | 2.14E+00                | 3.85E-07                           | 4.90E-08                           | 4.34E-07                              |
| WNW            | 300                  | Mn-52m  | 1.69E-01                | 3.04E-08                           | 3.87E-09                           | 3.43E-08                              |
| WNW            | 300                  | Mn-52   | 3.23E-07                | 5.81E-14                           | 7.40E-15                           | 6.55E-14                              |
| WNW            | 300                  | K-40    | 2.15E-03                | 3.87E-10                           | 4.92E-11                           | 4.36E-10                              |
| WNW            | 400                  | Fe-52   | 1.43E+00                | 2.57E-07                           | 3.66E-08                           | 2.94E-07                              |
| WNW            | 400                  | Mn-52m  | 1.49E-01                | 2.68E-08                           | 3.80E-09                           | 3.06E-08                              |
| WNW            | 400                  | Mn-52   | 3.80E-07                | 6.84E-14                           | 9.73E-15                           | 7.82E-14                              |
| WNW            | 400                  | K-40    | 1.44E-03                | 2.59E-10                           | 3.67E-11                           | 2.95E-10                              |
| WNW            | 500                  | Fe-52   | 1.01E+00                | 1.82E-07                           | 2.91E-08                           | 2.11E-07                              |
| WNW            | 500                  | Mn-52m  | 1.30E-01                | 2.33E-08                           | 3.73E-09                           | 2.71E-08                              |
| WNW            | 500                  | Mn-52   | 4.16E-07                | 7.50E-14                           | 1.20E-14                           | 8.70E-14                              |
| WNW            | 500                  | K-40    | 1.02E-03                | 1.83E-10                           | 2.93E-11                           | 2.12E-10                              |
| WNW            | 700                  | Fe-52   | 5.74E-01                | 1.03E-07                           | 2.06E-08                           | 1.24E-07                              |
| WNW            | 700                  | Mn-52m  | 1.00E-01                | 1.81E-08                           | 3.61E-09                           | 2.17E-08                              |
| WNW            | 700                  | Mn-52   | 4.56E-07                | 8.21E-14                           | 1.64E-14                           | 9.85E-14                              |
| WNW            | 700                  | K-40    | 5.78E-04                | 1.04E-10                           | 2.08E-11                           | 1.25E-10                              |
| WNW            | 1000                 | Fe-52   | 3.03E-01                | 5.45E-08                           | 1.43E-08                           | 6.88E-08                              |
| WNW            | 1000                 | Mn-52m  | 7.29E-02                | 1.31E-08                           | 3.43E-09                           | 1.66E-08                              |
| WNW            | 1000                 | Mn-52   | 4.80E-07                | 8.63E-14                           | 2.26E-14                           | 1.09E-13                              |
| WNW            | 1000                 | K-40    | 3.06E-04                | 5.52E-11                           | 1.44E-11                           | 6.96E-11                              |
| WNW            | 1500                 | Fe-52   | 1.53E-01                | 2.75E-08                           | 9.35E-09                           | 3.69E-08                              |
| WNW            | 1500                 | Mn-52m  | 5.19E-02                | 9.34E-09                           | 3.17E-09                           | 1.25E-08                              |
| WNW            | 1500                 | Mn-52   | 5.24E-07                | 9.43E-14                           | 3.20E-14                           | 1.26E-13                              |
| WNW            | 1500                 | K-40    | 1.56E-04                | 2.80E-11                           | 9.51E-12                           | 3.75E-11                              |
| WNW            | 2000                 | Fe-52   | 9.33E-02                | 1.68E-08                           | 6.91E-09                           | 2.37E-08                              |
| WNW            | 2000                 | Mn-52m  | 3.98E-02                | 7.16E-09                           | 2.94E-09                           | 1.01E-08                              |
| WNW            | 2000                 | Mn-52   | 5.47E-07                | 9.84E-14                           | 4.05E-14                           | 1.39E-13                              |
| WNW            | 2000                 | K-40    | 9.55E-05                | 1.72E-11                           | 7.07E-12                           | 2.43E-11                              |
| WNW            | 3000                 | Fe-52   | 4.62E-02                | 8.32E-09                           | 4.49E-09                           | 1.28E-08                              |
| WNW            | 3000                 | Mn-52m  | 2.63E-02                | 4.73E-09                           | 2.55E-09                           | 7.28E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WNW            | 3000                 | Mn-52   | 5.66E-07                | 1.02E-13                           | 5.50E-14                           | 1.57E-13                              |
| WNW            | 3000                 | K-40    | 4.79E-05                | 8.61E-12                           | 4.65E-12                           | 1.33E-11                              |
| WNW            | 4000                 | Fe-52   | 2.93E-02                | 5.27E-09                           | 3.28E-09                           | 8.55E-09                              |
| WNW            | 4000                 | Mn-52m  | 1.99E-02                | 3.58E-09                           | 2.22E-09                           | 5.80E-09                              |
| WNW            | 4000                 | Mn-52   | 5.94E-07                | 1.07E-13                           | 6.65E-14                           | 1.73E-13                              |
| WNW            | 4000                 | K-40    | 3.07E-05                | 5.53E-12                           | 3.43E-12                           | 8.96E-12                              |
| WNW            | 5000                 | Fe-52   | 2.07E-02                | 3.72E-09                           | 2.56E-09                           | 6.28E-09                              |
| WNW            | 5000                 | Mn-52m  | 1.58E-02                | 2.84E-09                           | 1.96E-09                           | 4.79E-09                              |
| WNW            | 5000                 | Mn-52   | 6.12E-07                | 1.10E-13                           | 7.59E-14                           | 1.86E-13                              |
| WNW            | 5000                 | K-40    | 2.19E-05                | 3.94E-12                           | 2.72E-12                           | 6.66E-12                              |
| WNW            | 7000                 | Fe-52   | 1.20E-02                | 2.15E-09                           | 1.75E-09                           | 3.90E-09                              |
| WNW            | 7000                 | Mn-52m  | 1.05E-02                | 1.89E-09                           | 1.53E-09                           | 3.42E-09                              |
| WNW            | 7000                 | Mn-52   | 6.12E-07                | 1.10E-13                           | 8.94E-14                           | 2.00E-13                              |
| WNW            | 7000                 | K-40    | 1.30E-05                | 2.33E-12                           | 1.89E-12                           | 4.23E-12                              |
| WNW            | 10000                | Fe-52   | 6.66E-03                | 1.20E-09                           | 1.14E-09                           | 2.34E-09                              |
| WNW            | 10000                | Mn-52m  | 6.45E-03                | 1.16E-09                           | 1.11E-09                           | 2.27E-09                              |
| WNW            | 10000                | Mn-52   | 5.89E-07                | 1.06E-13                           | 1.01E-13                           | 2.07E-13                              |
| WNW            | 10000                | K-40    | 7.48E-06                | 1.35E-12                           | 1.28E-12                           | 2.63E-12                              |
| WNW            | 15000                | Fe-52   | 3.69E-03                | 6.64E-10                           | 6.91E-10                           | 1.36E-09                              |
| WNW            | 15000                | Mn-52m  | 3.78E-03                | 6.80E-10                           | 7.08E-10                           | 1.39E-09                              |
| WNW            | 15000                | Mn-52   | 5.83E-07                | 1.05E-13                           | 1.09E-13                           | 2.14E-13                              |
| WNW            | 15000                | K-40    | 4.39E-06                | 7.90E-13                           | 8.23E-13                           | 1.61E-12                              |
| WNW            | 20000                | Fe-52   | 2.31E-03                | 4.16E-10                           | 4.68E-10                           | 8.85E-10                              |
| WNW            | 20000                | Mn-52m  | 2.40E-03                | 4.33E-10                           | 4.87E-10                           | 9.19E-10                              |
| WNW            | 20000                | Mn-52   | 5.40E-07                | 9.73E-14                           | 1.09E-13                           | 2.07E-13                              |
| WNW            | 20000                | K-40    | 2.92E-06                | 5.26E-13                           | 5.91E-13                           | 1.12E-12                              |
| WNW            | 30000                | Fe-52   | 1.10E-03                | 1.98E-10                           | 2.53E-10                           | 4.51E-10                              |
| WNW            | 30000                | Mn-52m  | 1.15E-03                | 2.07E-10                           | 2.64E-10                           | 4.71E-10                              |
| WNW            | 30000                | Mn-52   | 4.39E-07                | 7.90E-14                           | 1.01E-13                           | 1.80E-13                              |
| WNW            | 30000                | K-40    | 1.56E-06                | 2.81E-13                           | 3.59E-13                           | 6.40E-13                              |
| WNW            | 50000                | Fe-52   | 4.07E-04                | 7.33E-11                           | 1.05E-10                           | 1.78E-10                              |
| WNW            | 50000                | Mn-52m  | 4.25E-04                | 7.66E-11                           | 1.09E-10                           | 1.86E-10                              |
| WNW            | 50000                | Mn-52   | 3.21E-07                | 5.79E-14                           | 8.25E-14                           | 1.40E-13                              |
| WNW            | 50000                | K-40    | 7.29E-07                | 1.31E-13                           | 1.87E-13                           | 3.18E-13                              |
| WNW            | 80000                | Fe-52   | 1.07E-04                | 1.93E-11                           | 3.57E-11                           | 5.51E-11                              |
| WNW            | 80000                | Mn-52m  | 1.12E-04                | 2.02E-11                           | 3.73E-11                           | 5.75E-11                              |
| WNW            | 80000                | Mn-52   | 1.68E-07                | 3.02E-14                           | 5.57E-14                           | 8.59E-14                              |
| WNW            | 80000                | K-40    | 2.73E-07                | 4.91E-14                           | 9.06E-14                           | 1.40E-13                              |
| W              | 100                  | Fe-52   | 6.09E+00                | 1.10E-06                           | 1.28E-07                           | 1.22E-06                              |
| W              | 100                  | Mn-52m  | 1.41E-01                | 2.54E-08                           | 2.96E-09                           | 2.84E-08                              |
| W              | 100                  | Mn-52   | 7.63E-08                | 1.37E-14                           | 1.60E-15                           | 1.53E-14                              |
| W              | 100                  | K-40    | 6.09E-03                | 1.10E-09                           | 1.28E-10                           | 1.22E-09                              |
| W              | 150                  | Fe-52   | 4.06E+00                | 7.31E-07                           | 8.49E-08                           | 8.16E-07                              |
| W              | 150                  | Mn-52m  | 1.41E-01                | 2.53E-08                           | 2.94E-09                           | 2.83E-08                              |
| W              | 150                  | Mn-52   | 1.14E-07                | 2.06E-14                           | 2.39E-15                           | 2.29E-14                              |
| W              | 150                  | K-40    | 4.07E-03                | 7.32E-10                           | 8.50E-11                           | 8.17E-10                              |
| W              | 200                  | Fe-52   | 2.99E+00                | 5.38E-07                           | 6.35E-08                           | 6.01E-07                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 200                  | Mn-52m  | 1.37E-01                | 2.47E-08                           | 2.91E-09                           | 2.76E-08                              |
| W              | 200                  | Mn-52   | 1.49E-07                | 2.68E-14                           | 3.16E-15                           | 2.99E-14                              |
| W              | 200                  | K-40    | 2.99E-03                | 5.39E-10                           | 6.36E-11                           | 6.02E-10                              |
| W              | 300                  | Fe-52   | 1.84E+00                | 3.31E-07                           | 4.21E-08                           | 3.73E-07                              |
| W              | 300                  | Mn-52m  | 1.25E-01                | 2.25E-08                           | 2.87E-09                           | 2.54E-08                              |
| W              | 300                  | Mn-52   | 2.05E-07                | 3.68E-14                           | 4.69E-15                           | 4.15E-14                              |
| W              | 300                  | K-40    | 1.85E-03                | 3.32E-10                           | 4.23E-11                           | 3.74E-10                              |
| W              | 400                  | Fe-52   | 1.23E+00                | 2.21E-07                           | 3.15E-08                           | 2.53E-07                              |
| W              | 400                  | Mn-52m  | 1.10E-01                | 1.99E-08                           | 2.82E-09                           | 2.27E-08                              |
| W              | 400                  | Mn-52   | 2.41E-07                | 4.35E-14                           | 6.18E-15                           | 4.96E-14                              |
| W              | 400                  | K-40    | 1.23E-03                | 2.22E-10                           | 3.16E-11                           | 2.54E-10                              |
| W              | 500                  | Fe-52   | 8.70E-01                | 1.57E-07                           | 2.51E-08                           | 1.82E-07                              |
| W              | 500                  | Mn-52m  | 9.65E-02                | 1.74E-08                           | 2.78E-09                           | 2.02E-08                              |
| W              | 500                  | Mn-52   | 2.65E-07                | 4.77E-14                           | 7.63E-15                           | 5.53E-14                              |
| W              | 500                  | K-40    | 8.74E-04                | 1.57E-10                           | 2.52E-11                           | 1.83E-10                              |
| W              | 700                  | Fe-52   | 4.95E-01                | 8.91E-08                           | 1.78E-08                           | 1.07E-07                              |
| W              | 700                  | Mn-52m  | 7.52E-02                | 1.35E-08                           | 2.70E-09                           | 1.62E-08                              |
| W              | 700                  | Mn-52   | 2.91E-07                | 5.24E-14                           | 1.05E-14                           | 6.29E-14                              |
| W              | 700                  | K-40    | 4.98E-04                | 8.97E-11                           | 1.79E-11                           | 1.08E-10                              |
| W              | 1000                 | Fe-52   | 2.62E-01                | 4.71E-08                           | 1.23E-08                           | 5.94E-08                              |
| W              | 1000                 | Mn-52m  | 5.50E-02                | 9.90E-09                           | 2.59E-09                           | 1.25E-08                              |
| W              | 1000                 | Mn-52   | 3.08E-07                | 5.55E-14                           | 1.45E-14                           | 7.00E-14                              |
| W              | 1000                 | K-40    | 2.64E-04                | 4.76E-11                           | 1.24E-11                           | 6.00E-11                              |
| W              | 1500                 | Fe-52   | 1.33E-01                | 2.39E-08                           | 8.09E-09                           | 3.20E-08                              |
| W              | 1500                 | Mn-52m  | 3.96E-02                | 7.13E-09                           | 2.42E-09                           | 9.55E-09                              |
| W              | 1500                 | Mn-52   | 3.39E-07                | 6.11E-14                           | 2.07E-14                           | 8.18E-14                              |
| W              | 1500                 | K-40    | 1.35E-04                | 2.42E-11                           | 8.21E-12                           | 3.24E-11                              |
| W              | 2000                 | Fe-52   | 8.12E-02                | 1.46E-08                           | 5.99E-09                           | 2.06E-08                              |
| W              | 2000                 | Mn-52m  | 3.07E-02                | 5.53E-09                           | 2.26E-09                           | 7.79E-09                              |
| W              | 2000                 | Mn-52   | 3.57E-07                | 6.43E-14                           | 2.64E-14                           | 9.07E-14                              |
| W              | 2000                 | K-40    | 8.28E-05                | 1.49E-11                           | 6.11E-12                           | 2.10E-11                              |
| W              | 3000                 | Fe-52   | 4.04E-02                | 7.27E-09                           | 3.91E-09                           | 1.12E-08                              |
| W              | 3000                 | Mn-52m  | 2.07E-02                | 3.72E-09                           | 2.00E-09                           | 5.72E-09                              |
| W              | 3000                 | Mn-52   | 3.75E-07                | 6.75E-14                           | 3.63E-14                           | 1.04E-13                              |
| W              | 3000                 | K-40    | 4.16E-05                | 7.49E-12                           | 4.03E-12                           | 1.15E-11                              |
| W              | 4000                 | Fe-52   | 2.58E-02                | 4.64E-09                           | 2.86E-09                           | 7.50E-09                              |
| W              | 4000                 | Mn-52m  | 1.59E-02                | 2.87E-09                           | 1.77E-09                           | 4.64E-09                              |
| W              | 4000                 | Mn-52   | 3.99E-07                | 7.19E-14                           | 4.44E-14                           | 1.16E-13                              |
| W              | 4000                 | K-40    | 2.68E-05                | 4.82E-12                           | 2.98E-12                           | 7.80E-12                              |
| W              | 5000                 | Fe-52   | 1.82E-02                | 3.28E-09                           | 2.25E-09                           | 5.53E-09                              |
| W              | 5000                 | Mn-52m  | 1.29E-02                | 2.31E-09                           | 1.58E-09                           | 3.90E-09                              |
| W              | 5000                 | Mn-52   | 4.16E-07                | 7.49E-14                           | 5.13E-14                           | 1.26E-13                              |
| W              | 5000                 | K-40    | 1.92E-05                | 3.45E-12                           | 2.36E-12                           | 5.81E-12                              |
| W              | 7000                 | Fe-52   | 1.07E-02                | 1.92E-09                           | 1.54E-09                           | 3.46E-09                              |
| W              | 7000                 | Mn-52m  | 8.82E-03                | 1.59E-09                           | 1.27E-09                           | 2.86E-09                              |
| W              | 7000                 | Mn-52   | 4.26E-07                | 7.67E-14                           | 6.16E-14                           | 1.38E-13                              |
| W              | 7000                 | K-40    | 1.14E-05                | 2.06E-12                           | 1.65E-12                           | 3.71E-12                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| W              | 10000                | Fe-52   | 6.00E-03                | 1.08E-09                           | 1.02E-09                           | 2.10E-09                              |
| W              | 10000                | Mn-52m  | 5.61E-03                | 1.01E-09                           | 9.50E-10                           | 1.96E-09                              |
| W              | 10000                | Mn-52   | 4.21E-07                | 7.58E-14                           | 7.14E-14                           | 1.47E-13                              |
| W              | 10000                | K-40    | 6.63E-06                | 1.19E-12                           | 1.12E-12                           | 2.32E-12                              |
| W              | 15000                | Fe-52   | 3.38E-03                | 6.08E-10                           | 6.24E-10                           | 1.23E-09                              |
| W              | 15000                | Mn-52m  | 3.41E-03                | 6.13E-10                           | 6.29E-10                           | 1.24E-09                              |
| W              | 15000                | Mn-52   | 4.31E-07                | 7.75E-14                           | 7.95E-14                           | 1.57E-13                              |
| W              | 15000                | K-40    | 3.92E-06                | 7.06E-13                           | 7.25E-13                           | 1.43E-12                              |
| W              | 20000                | Fe-52   | 2.16E-03                | 3.88E-10                           | 4.29E-10                           | 8.17E-10                              |
| W              | 20000                | Mn-52m  | 2.23E-03                | 4.01E-10                           | 4.43E-10                           | 8.44E-10                              |
| W              | 20000                | Mn-52   | 4.10E-07                | 7.38E-14                           | 8.14E-14                           | 1.55E-13                              |
| W              | 20000                | K-40    | 2.63E-06                | 4.74E-13                           | 5.24E-13                           | 9.98E-13                              |
| W              | 30000                | Fe-52   | 1.07E-03                | 1.92E-10                           | 2.39E-10                           | 4.31E-10                              |
| W              | 30000                | Mn-52m  | 1.11E-03                | 2.00E-10                           | 2.49E-10                           | 4.49E-10                              |
| W              | 30000                | Mn-52   | 3.48E-07                | 6.26E-14                           | 7.78E-14                           | 1.40E-13                              |
| W              | 30000                | K-40    | 1.44E-06                | 2.59E-13                           | 3.22E-13                           | 5.81E-13                              |
| W              | 50000                | Fe-52   | 4.18E-04                | 7.53E-11                           | 1.04E-10                           | 1.79E-10                              |
| W              | 50000                | Mn-52m  | 4.37E-04                | 7.87E-11                           | 1.08E-10                           | 1.87E-10                              |
| W              | 50000                | Mn-52   | 2.68E-07                | 4.82E-14                           | 6.65E-14                           | 1.15E-13                              |
| W              | 50000                | K-40    | 6.89E-07                | 1.24E-13                           | 1.71E-13                           | 2.95E-13                              |
| W              | 80000                | Fe-52   | 1.23E-04                | 2.21E-11                           | 3.85E-11                           | 6.06E-11                              |
| W              | 80000                | Mn-52m  | 1.28E-04                | 2.31E-11                           | 4.02E-11                           | 6.33E-11                              |
| W              | 80000                | Mn-52   | 1.52E-07                | 2.73E-14                           | 4.76E-14                           | 7.50E-14                              |
| W              | 80000                | K-40    | 2.73E-07                | 4.91E-14                           | 8.55E-14                           | 1.35E-13                              |
| WSW            | 100                  | Fe-52   | 5.33E+00                | 9.59E-07                           | 1.12E-07                           | 1.07E-06                              |
| WSW            | 100                  | Mn-52m  | 1.08E-01                | 1.95E-08                           | 2.27E-09                           | 2.18E-08                              |
| WSW            | 100                  | Mn-52   | 5.12E-08                | 9.21E-15                           | 1.07E-15                           | 1.03E-14                              |
| WSW            | 100                  | K-40    | 5.33E-03                | 9.60E-10                           | 1.12E-10                           | 1.07E-09                              |
| WSW            | 150                  | Fe-52   | 3.56E+00                | 6.40E-07                           | 7.43E-08                           | 7.15E-07                              |
| WSW            | 150                  | Mn-52m  | 1.08E-01                | 1.94E-08                           | 2.25E-09                           | 2.17E-08                              |
| WSW            | 150                  | Mn-52   | 7.66E-08                | 1.38E-14                           | 1.60E-15                           | 1.54E-14                              |
| WSW            | 150                  | K-40    | 3.56E-03                | 6.41E-10                           | 7.44E-11                           | 7.16E-10                              |
| WSW            | 200                  | Fe-52   | 2.62E+00                | 4.71E-07                           | 5.56E-08                           | 5.26E-07                              |
| WSW            | 200                  | Mn-52m  | 1.05E-01                | 1.90E-08                           | 2.24E-09                           | 2.12E-08                              |
| WSW            | 200                  | Mn-52   | 9.98E-08                | 1.80E-14                           | 2.12E-15                           | 2.01E-14                              |
| WSW            | 200                  | K-40    | 2.62E-03                | 4.72E-10                           | 5.57E-11                           | 5.27E-10                              |
| WSW            | 300                  | Fe-52   | 1.61E+00                | 2.90E-07                           | 3.69E-08                           | 3.27E-07                              |
| WSW            | 300                  | Mn-52m  | 9.64E-02                | 1.74E-08                           | 2.21E-09                           | 1.96E-08                              |
| WSW            | 300                  | Mn-52   | 1.38E-07                | 2.48E-14                           | 3.15E-15                           | 2.79E-14                              |
| WSW            | 300                  | K-40    | 1.62E-03                | 2.91E-10                           | 3.70E-11                           | 3.28E-10                              |
| WSW            | 400                  | Fe-52   | 1.08E+00                | 1.94E-07                           | 2.76E-08                           | 2.22E-07                              |
| WSW            | 400                  | Mn-52m  | 8.51E-02                | 1.53E-08                           | 2.18E-09                           | 1.75E-08                              |
| WSW            | 400                  | Mn-52   | 1.63E-07                | 2.93E-14                           | 4.16E-15                           | 3.34E-14                              |
| WSW            | 400                  | K-40    | 1.08E-03                | 1.95E-10                           | 2.77E-11                           | 2.22E-10                              |
| WSW            | 500                  | Fe-52   | 7.63E-01                | 1.37E-07                           | 2.20E-08                           | 1.59E-07                              |
| WSW            | 500                  | Mn-52m  | 7.46E-02                | 1.34E-08                           | 2.15E-09                           | 1.56E-08                              |
| WSW            | 500                  | Mn-52   | 1.79E-07                | 3.22E-14                           | 5.15E-15                           | 3.73E-14                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WSW            | 500                  | K-40    | 7.67E-04                | 1.38E-10                           | 2.21E-11                           | 1.60E-10                              |
| WSW            | 700                  | Fe-52   | 4.35E-01                | 7.82E-08                           | 1.56E-08                           | 9.38E-08                              |
| WSW            | 700                  | Mn-52m  | 5.84E-02                | 1.05E-08                           | 2.09E-09                           | 1.26E-08                              |
| WSW            | 700                  | Mn-52   | 1.97E-07                | 3.55E-14                           | 7.07E-15                           | 4.25E-14                              |
| WSW            | 700                  | K-40    | 4.37E-04                | 7.87E-11                           | 1.57E-11                           | 9.44E-11                              |
| WSW            | 1000                 | Fe-52   | 2.30E-01                | 4.15E-08                           | 1.08E-08                           | 5.23E-08                              |
| WSW            | 1000                 | Mn-52m  | 4.29E-02                | 7.73E-09                           | 2.02E-09                           | 9.75E-09                              |
| WSW            | 1000                 | Mn-52   | 2.09E-07                | 3.77E-14                           | 9.83E-15                           | 4.75E-14                              |
| WSW            | 1000                 | K-40    | 2.32E-04                | 4.18E-11                           | 1.09E-11                           | 5.28E-11                              |
| WSW            | 1500                 | Fe-52   | 1.17E-01                | 2.11E-08                           | 7.12E-09                           | 2.82E-08                              |
| WSW            | 1500                 | Mn-52m  | 3.12E-02                | 5.62E-09                           | 1.90E-09                           | 7.52E-09                              |
| WSW            | 1500                 | Mn-52   | 2.32E-07                | 4.18E-14                           | 1.41E-14                           | 5.59E-14                              |
| WSW            | 1500                 | K-40    | 1.19E-04                | 2.13E-11                           | 7.22E-12                           | 2.86E-11                              |
| WSW            | 2000                 | Fe-52   | 7.18E-02                | 1.29E-08                           | 5.28E-09                           | 1.82E-08                              |
| WSW            | 2000                 | Mn-52m  | 2.44E-02                | 4.39E-09                           | 1.79E-09                           | 6.18E-09                              |
| WSW            | 2000                 | Mn-52   | 2.46E-07                | 4.43E-14                           | 1.81E-14                           | 6.24E-14                              |
| WSW            | 2000                 | K-40    | 7.31E-05                | 1.32E-11                           | 5.38E-12                           | 1.85E-11                              |
| WSW            | 3000                 | Fe-52   | 3.59E-02                | 6.45E-09                           | 3.46E-09                           | 9.91E-09                              |
| WSW            | 3000                 | Mn-52m  | 1.67E-02                | 3.00E-09                           | 1.61E-09                           | 4.61E-09                              |
| WSW            | 3000                 | Mn-52   | 2.61E-07                | 4.69E-14                           | 2.51E-14                           | 7.21E-14                              |
| WSW            | 3000                 | K-40    | 3.68E-05                | 6.62E-12                           | 3.55E-12                           | 1.02E-11                              |
| WSW            | 4000                 | Fe-52   | 2.30E-02                | 4.13E-09                           | 2.54E-09                           | 6.67E-09                              |
| WSW            | 4000                 | Mn-52m  | 1.31E-02                | 2.35E-09                           | 1.44E-09                           | 3.79E-09                              |
| WSW            | 4000                 | Mn-52   | 2.81E-07                | 5.06E-14                           | 3.11E-14                           | 8.16E-14                              |
| WSW            | 4000                 | K-40    | 2.38E-05                | 4.28E-12                           | 2.63E-12                           | 6.91E-12                              |
| WSW            | 5000                 | Fe-52   | 1.63E-02                | 2.94E-09                           | 2.00E-09                           | 4.93E-09                              |
| WSW            | 5000                 | Mn-52m  | 1.07E-02                | 1.92E-09                           | 1.31E-09                           | 3.22E-09                              |
| WSW            | 5000                 | Mn-52   | 2.96E-07                | 5.32E-14                           | 3.62E-14                           | 8.94E-14                              |
| WSW            | 5000                 | K-40    | 1.70E-05                | 3.07E-12                           | 2.09E-12                           | 5.15E-12                              |
| WSW            | 7000                 | Fe-52   | 9.59E-03                | 1.73E-09                           | 1.38E-09                           | 3.10E-09                              |
| WSW            | 7000                 | Mn-52m  | 7.49E-03                | 1.35E-09                           | 1.07E-09                           | 2.42E-09                              |
| WSW            | 7000                 | Mn-52   | 3.08E-07                | 5.54E-14                           | 4.42E-14                           | 9.96E-14                              |
| WSW            | 7000                 | K-40    | 1.02E-05                | 1.84E-12                           | 1.46E-12                           | 3.30E-12                              |
| WSW            | 10000                | Fe-52   | 5.46E-03                | 9.82E-10                           | 9.16E-10                           | 1.90E-09                              |
| WSW            | 10000                | Mn-52m  | 4.90E-03                | 8.82E-10                           | 8.22E-10                           | 1.70E-09                              |
| WSW            | 10000                | Mn-52   | 3.11E-07                | 5.61E-14                           | 5.23E-14                           | 1.08E-13                              |
| WSW            | 10000                | K-40    | 5.96E-06                | 1.07E-12                           | 9.99E-13                           | 2.07E-12                              |
| WSW            | 15000                | Fe-52   | 3.11E-03                | 5.59E-10                           | 5.68E-10                           | 1.13E-09                              |
| WSW            | 15000                | Mn-52m  | 3.08E-03                | 5.54E-10                           | 5.62E-10                           | 1.12E-09                              |
| WSW            | 15000                | Mn-52   | 3.27E-07                | 5.88E-14                           | 5.97E-14                           | 1.19E-13                              |
| WSW            | 15000                | K-40    | 3.54E-06                | 6.38E-13                           | 6.47E-13                           | 1.28E-12                              |
| WSW            | 20000                | Fe-52   | 2.01E-03                | 3.62E-10                           | 3.94E-10                           | 7.56E-10                              |
| WSW            | 20000                | Mn-52m  | 2.06E-03                | 3.71E-10                           | 4.04E-10                           | 7.74E-10                              |
| WSW            | 20000                | Mn-52   | 3.18E-07                | 5.72E-14                           | 6.23E-14                           | 1.20E-13                              |
| WSW            | 20000                | K-40    | 2.40E-06                | 4.31E-13                           | 4.69E-13                           | 9.01E-13                              |
| WSW            | 30000                | Fe-52   | 1.02E-03                | 1.84E-10                           | 2.24E-10                           | 4.09E-10                              |
| WSW            | 30000                | Mn-52m  | 1.07E-03                | 1.92E-10                           | 2.34E-10                           | 4.26E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| WSW            | 30000                | Mn-52   | 2.80E-07                | 5.04E-14                           | 6.13E-14                           | 1.12E-13                              |
| WSW            | 30000                | K-40    | 1.33E-06                | 2.40E-13                           | 2.91E-13                           | 5.31E-13                              |
| WSW            | 50000                | Fe-52   | 4.20E-04                | 7.56E-11                           | 1.02E-10                           | 1.77E-10                              |
| WSW            | 50000                | Mn-52m  | 4.38E-04                | 7.89E-11                           | 1.06E-10                           | 1.85E-10                              |
| WSW            | 50000                | Mn-52   | 2.25E-07                | 4.04E-14                           | 5.44E-14                           | 9.48E-14                              |
| WSW            | 50000                | K-40    | 6.49E-07                | 1.17E-13                           | 1.57E-13                           | 2.74E-13                              |
| WSW            | 80000                | Fe-52   | 1.34E-04                | 2.41E-11                           | 4.01E-11                           | 6.42E-11                              |
| WSW            | 80000                | Mn-52m  | 1.40E-04                | 2.51E-11                           | 4.19E-11                           | 6.70E-11                              |
| WSW            | 80000                | Mn-52   | 1.36E-07                | 2.45E-14                           | 4.08E-14                           | 6.54E-14                              |
| WSW            | 80000                | K-40    | 2.69E-07                | 4.84E-14                           | 8.06E-14                           | 1.29E-13                              |
| SW             | 100                  | Fe-52   | 4.74E+00                | 8.53E-07                           | 9.93E-08                           | 9.52E-07                              |
| SW             | 100                  | Mn-52m  | 8.57E-02                | 1.54E-08                           | 1.80E-09                           | 1.72E-08                              |
| SW             | 100                  | Mn-52   | 3.60E-08                | 6.48E-15                           | 7.55E-16                           | 7.23E-15                              |
| SW             | 100                  | K-40    | 4.74E-03                | 8.53E-10                           | 9.94E-11                           | 9.53E-10                              |
| SW             | 150                  | Fe-52   | 3.16E+00                | 5.70E-07                           | 6.61E-08                           | 6.36E-07                              |
| SW             | 150                  | Mn-52m  | 8.55E-02                | 1.54E-08                           | 1.79E-09                           | 1.72E-08                              |
| SW             | 150                  | Mn-52   | 5.39E-08                | 9.71E-15                           | 1.13E-15                           | 1.08E-14                              |
| SW             | 150                  | K-40    | 3.17E-03                | 5.70E-10                           | 6.62E-11                           | 6.36E-10                              |
| SW             | 200                  | Fe-52   | 2.33E+00                | 4.19E-07                           | 4.95E-08                           | 4.68E-07                              |
| SW             | 200                  | Mn-52m  | 8.35E-02                | 1.50E-08                           | 1.77E-09                           | 1.68E-08                              |
| SW             | 200                  | Mn-52   | 7.03E-08                | 1.27E-14                           | 1.49E-15                           | 1.41E-14                              |
| SW             | 200                  | K-40    | 2.33E-03                | 4.19E-10                           | 4.96E-11                           | 4.69E-10                              |
| SW             | 300                  | Fe-52   | 1.44E+00                | 2.58E-07                           | 3.29E-08                           | 2.91E-07                              |
| SW             | 300                  | Mn-52m  | 7.66E-02                | 1.38E-08                           | 1.75E-09                           | 1.55E-08                              |
| SW             | 300                  | Mn-52   | 9.70E-08                | 1.75E-14                           | 2.22E-15                           | 1.97E-14                              |
| SW             | 300                  | K-40    | 1.44E-03                | 2.59E-10                           | 3.29E-11                           | 2.92E-10                              |
| SW             | 400                  | Fe-52   | 9.60E-01                | 1.73E-07                           | 2.46E-08                           | 1.97E-07                              |
| SW             | 400                  | Mn-52m  | 6.77E-02                | 1.22E-08                           | 1.73E-09                           | 1.39E-08                              |
| SW             | 400                  | Mn-52   | 1.15E-07                | 2.07E-14                           | 2.94E-15                           | 2.36E-14                              |
| SW             | 400                  | K-40    | 9.63E-04                | 1.73E-10                           | 2.46E-11                           | 1.98E-10                              |
| SW             | 500                  | Fe-52   | 6.80E-01                | 1.22E-07                           | 1.96E-08                           | 1.42E-07                              |
| SW             | 500                  | Mn-52m  | 5.94E-02                | 1.07E-08                           | 1.71E-09                           | 1.24E-08                              |
| SW             | 500                  | Mn-52   | 1.26E-07                | 2.27E-14                           | 3.64E-15                           | 2.64E-14                              |
| SW             | 500                  | K-40    | 6.83E-04                | 1.23E-10                           | 1.97E-11                           | 1.43E-10                              |
| SW             | 700                  | Fe-52   | 3.88E-01                | 6.98E-08                           | 1.39E-08                           | 8.37E-08                              |
| SW             | 700                  | Mn-52m  | 4.66E-02                | 8.39E-09                           | 1.67E-09                           | 1.01E-08                              |
| SW             | 700                  | Mn-52   | 1.40E-07                | 2.51E-14                           | 5.01E-15                           | 3.01E-14                              |
| SW             | 700                  | K-40    | 3.90E-04                | 7.02E-11                           | 1.40E-11                           | 8.42E-11                              |
| SW             | 1000                 | Fe-52   | 2.06E-01                | 3.71E-08                           | 9.66E-09                           | 4.67E-08                              |
| SW             | 1000                 | Mn-52m  | 3.45E-02                | 6.20E-09                           | 1.62E-09                           | 7.82E-09                              |
| SW             | 1000                 | Mn-52   | 1.49E-07                | 2.68E-14                           | 6.98E-15                           | 3.38E-14                              |
| SW             | 1000                 | K-40    | 2.07E-04                | 3.73E-11                           | 9.73E-12                           | 4.71E-11                              |
| SW             | 1500                 | Fe-52   | 1.05E-01                | 1.89E-08                           | 6.37E-09                           | 2.52E-08                              |
| SW             | 1500                 | Mn-52m  | 2.52E-02                | 4.54E-09                           | 1.53E-09                           | 6.07E-09                              |
| SW             | 1500                 | Mn-52   | 1.66E-07                | 2.99E-14                           | 1.01E-14                           | 3.99E-14                              |
| SW             | 1500                 | K-40    | 1.06E-04                | 1.91E-11                           | 6.44E-12                           | 2.55E-11                              |
| SW             | 2000                 | Fe-52   | 6.44E-02                | 1.16E-08                           | 4.73E-09                           | 1.63E-08                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SW             | 2000                 | Mn-52m  | 1.98E-02                | 3.57E-09                           | 1.46E-09                           | 5.03E-09                              |
| SW             | 2000                 | Mn-52   | 1.77E-07                | 3.18E-14                           | 1.30E-14                           | 4.47E-14                              |
| SW             | 2000                 | K-40    | 6.54E-05                | 1.18E-11                           | 4.80E-12                           | 1.66E-11                              |
| SW             | 3000                 | Fe-52   | 3.22E-02                | 5.80E-09                           | 3.10E-09                           | 8.90E-09                              |
| SW             | 3000                 | Mn-52m  | 1.37E-02                | 2.47E-09                           | 1.32E-09                           | 3.79E-09                              |
| SW             | 3000                 | Mn-52   | 1.89E-07                | 3.40E-14                           | 1.82E-14                           | 5.22E-14                              |
| SW             | 3000                 | K-40    | 3.30E-05                | 5.94E-12                           | 3.17E-12                           | 9.11E-12                              |
| SW             | 4000                 | Fe-52   | 2.07E-02                | 3.73E-09                           | 2.28E-09                           | 6.01E-09                              |
| SW             | 4000                 | Mn-52m  | 1.09E-02                | 1.96E-09                           | 1.20E-09                           | 3.16E-09                              |
| SW             | 4000                 | Mn-52   | 2.05E-07                | 3.69E-14                           | 2.26E-14                           | 5.95E-14                              |
| SW             | 4000                 | K-40    | 2.14E-05                | 3.84E-12                           | 2.35E-12                           | 6.20E-12                              |
| SW             | 5000                 | Fe-52   | 1.47E-02                | 2.65E-09                           | 1.80E-09                           | 4.45E-09                              |
| SW             | 5000                 | Mn-52m  | 8.97E-03                | 1.62E-09                           | 1.09E-09                           | 2.71E-09                              |
| SW             | 5000                 | Mn-52   | 2.18E-07                | 3.92E-14                           | 2.65E-14                           | 6.57E-14                              |
| SW             | 5000                 | K-40    | 1.53E-05                | 2.76E-12                           | 1.87E-12                           | 4.63E-12                              |
| SW             | 7000                 | Fe-52   | 8.72E-03                | 1.57E-09                           | 1.24E-09                           | 2.81E-09                              |
| SW             | 7000                 | Mn-52m  | 6.43E-03                | 1.16E-09                           | 9.17E-10                           | 2.07E-09                              |
| SW             | 7000                 | Mn-52   | 2.30E-07                | 4.14E-14                           | 3.28E-14                           | 7.42E-14                              |
| SW             | 7000                 | K-40    | 9.21E-06                | 1.66E-12                           | 1.31E-12                           | 2.97E-12                              |
| SW             | 10000                | Fe-52   | 5.00E-03                | 9.00E-10                           | 8.32E-10                           | 1.73E-09                              |
| SW             | 10000                | Mn-52m  | 4.31E-03                | 7.76E-10                           | 7.18E-10                           | 1.49E-09                              |
| SW             | 10000                | Mn-52   | 2.37E-07                | 4.26E-14                           | 3.94E-14                           | 8.21E-14                              |
| SW             | 10000                | K-40    | 5.40E-06                | 9.72E-13                           | 8.99E-13                           | 1.87E-12                              |
| SW             | 15000                | Fe-52   | 2.87E-03                | 5.17E-10                           | 5.20E-10                           | 1.04E-09                              |
| SW             | 15000                | Mn-52m  | 2.78E-03                | 5.01E-10                           | 5.04E-10                           | 1.00E-09                              |
| SW             | 15000                | Mn-52   | 2.54E-07                | 4.58E-14                           | 4.60E-14                           | 9.18E-14                              |
| SW             | 15000                | K-40    | 3.23E-06                | 5.81E-13                           | 5.84E-13                           | 1.17E-12                              |
| SW             | 20000                | Fe-52   | 1.88E-03                | 3.38E-10                           | 3.64E-10                           | 7.03E-10                              |
| SW             | 20000                | Mn-52m  | 1.90E-03                | 3.43E-10                           | 3.69E-10                           | 7.11E-10                              |
| SW             | 20000                | Mn-52   | 2.52E-07                | 4.54E-14                           | 4.89E-14                           | 9.42E-14                              |
| SW             | 20000                | K-40    | 2.19E-06                | 3.95E-13                           | 4.25E-13                           | 8.20E-13                              |
| SW             | 30000                | Fe-52   | 9.79E-04                | 1.76E-10                           | 2.11E-10                           | 3.87E-10                              |
| SW             | 30000                | Mn-52m  | 1.02E-03                | 1.83E-10                           | 2.19E-10                           | 4.02E-10                              |
| SW             | 30000                | Mn-52   | 2.29E-07                | 4.12E-14                           | 4.93E-14                           | 9.04E-14                              |
| SW             | 30000                | K-40    | 1.24E-06                | 2.22E-13                           | 2.66E-13                           | 4.89E-13                              |
| SW             | 50000                | Fe-52   | 4.15E-04                | 7.47E-11                           | 9.85E-11                           | 1.73E-10                              |
| SW             | 50000                | Mn-52m  | 4.33E-04                | 7.80E-11                           | 1.03E-10                           | 1.81E-10                              |
| SW             | 50000                | Mn-52   | 1.90E-07                | 3.42E-14                           | 4.51E-14                           | 7.93E-14                              |
| SW             | 50000                | K-40    | 6.12E-07                | 1.10E-13                           | 1.45E-13                           | 2.55E-13                              |
| SW             | 80000                | Fe-52   | 1.41E-04                | 2.54E-11                           | 4.08E-11                           | 6.62E-11                              |
| SW             | 80000                | Mn-52m  | 1.47E-04                | 2.65E-11                           | 4.26E-11                           | 6.92E-11                              |
| SW             | 80000                | Mn-52   | 1.22E-07                | 2.19E-14                           | 3.52E-14                           | 5.71E-14                              |
| SW             | 80000                | K-40    | 2.62E-07                | 4.72E-14                           | 7.59E-14                           | 1.23E-13                              |
| SSW            | 100                  | Fe-52   | 4.27E+00                | 7.68E-07                           | 8.94E-08                           | 8.57E-07                              |
| SSW            | 100                  | Mn-52m  | 6.95E-02                | 1.25E-08                           | 1.46E-09                           | 1.40E-08                              |
| SSW            | 100                  | Mn-52   | 2.63E-08                | 4.73E-15                           | 5.51E-16                           | 5.28E-15                              |
| SSW            | 100                  | K-40    | 4.27E-03                | 7.68E-10                           | 8.95E-11                           | 8.58E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 150                  | Fe-52   | 2.85E+00                | 5.13E-07                           | 5.95E-08                           | 5.72E-07                              |
| SSW            | 150                  | Mn-52m  | 6.94E-02                | 1.25E-08                           | 1.45E-09                           | 1.39E-08                              |
| SSW            | 150                  | Mn-52   | 3.94E-08                | 7.09E-15                           | 8.23E-16                           | 7.91E-15                              |
| SSW            | 150                  | K-40    | 2.85E-03                | 5.13E-10                           | 5.96E-11                           | 5.73E-10                              |
| SSW            | 200                  | Fe-52   | 2.10E+00                | 3.77E-07                           | 4.46E-08                           | 4.22E-07                              |
| SSW            | 200                  | Mn-52m  | 6.78E-02                | 1.22E-08                           | 1.44E-09                           | 1.36E-08                              |
| SSW            | 200                  | Mn-52   | 5.14E-08                | 9.24E-15                           | 1.09E-15                           | 1.03E-14                              |
| SSW            | 200                  | K-40    | 2.10E-03                | 3.78E-10                           | 4.46E-11                           | 4.22E-10                              |
| SSW            | 300                  | Fe-52   | 1.29E+00                | 2.33E-07                           | 2.96E-08                           | 2.62E-07                              |
| SSW            | 300                  | Mn-52m  | 6.23E-02                | 1.12E-08                           | 1.43E-09                           | 1.26E-08                              |
| SSW            | 300                  | Mn-52   | 7.10E-08                | 1.28E-14                           | 1.62E-15                           | 1.44E-14                              |
| SSW            | 300                  | K-40    | 1.30E-03                | 2.33E-10                           | 2.97E-11                           | 2.63E-10                              |
| SSW            | 400                  | Fe-52   | 8.66E-01                | 1.56E-07                           | 2.21E-08                           | 1.78E-07                              |
| SSW            | 400                  | Mn-52m  | 5.51E-02                | 9.92E-09                           | 1.41E-09                           | 1.13E-08                              |
| SSW            | 400                  | Mn-52   | 8.40E-08                | 1.51E-14                           | 2.15E-15                           | 1.73E-14                              |
| SSW            | 400                  | K-40    | 8.68E-04                | 1.56E-10                           | 2.22E-11                           | 1.78E-10                              |
| SSW            | 500                  | Fe-52   | 6.13E-01                | 1.10E-07                           | 1.77E-08                           | 1.28E-07                              |
| SSW            | 500                  | Mn-52m  | 4.85E-02                | 8.72E-09                           | 1.39E-09                           | 1.01E-08                              |
| SSW            | 500                  | Mn-52   | 9.25E-08                | 1.67E-14                           | 2.66E-15                           | 1.93E-14                              |
| SSW            | 500                  | K-40    | 6.16E-04                | 1.11E-10                           | 1.77E-11                           | 1.29E-10                              |
| SSW            | 700                  | Fe-52   | 3.50E-01                | 6.30E-08                           | 1.25E-08                           | 7.55E-08                              |
| SSW            | 700                  | Mn-52m  | 3.81E-02                | 6.86E-09                           | 1.37E-09                           | 8.23E-09                              |
| SSW            | 700                  | Mn-52   | 1.02E-07                | 1.84E-14                           | 3.67E-15                           | 2.21E-14                              |
| SSW            | 700                  | K-40    | 3.52E-04                | 6.33E-11                           | 1.26E-11                           | 7.59E-11                              |
| SSW            | 1000                 | Fe-52   | 1.86E-01                | 3.35E-08                           | 8.72E-09                           | 4.22E-08                              |
| SSW            | 1000                 | Mn-52m  | 2.83E-02                | 5.09E-09                           | 1.33E-09                           | 6.41E-09                              |
| SSW            | 1000                 | Mn-52   | 1.10E-07                | 1.97E-14                           | 5.13E-15                           | 2.48E-14                              |
| SSW            | 1000                 | K-40    | 1.87E-04                | 3.37E-11                           | 8.78E-12                           | 4.25E-11                              |
| SSW            | 1500                 | Fe-52   | 9.48E-02                | 1.71E-08                           | 5.75E-09                           | 2.28E-08                              |
| SSW            | 1500                 | Mn-52m  | 2.08E-02                | 3.74E-09                           | 1.26E-09                           | 5.01E-09                              |
| SSW            | 1500                 | Mn-52   | 1.23E-07                | 2.21E-14                           | 7.44E-15                           | 2.95E-14                              |
| SSW            | 1500                 | K-40    | 9.58E-05                | 1.72E-11                           | 5.82E-12                           | 2.31E-11                              |
| SSW            | 2000                 | Fe-52   | 5.84E-02                | 1.05E-08                           | 4.28E-09                           | 1.48E-08                              |
| SSW            | 2000                 | Mn-52m  | 1.64E-02                | 2.96E-09                           | 1.21E-09                           | 4.17E-09                              |
| SSW            | 2000                 | Mn-52   | 1.31E-07                | 2.36E-14                           | 9.60E-15                           | 3.32E-14                              |
| SSW            | 2000                 | K-40    | 5.92E-05                | 1.07E-11                           | 4.34E-12                           | 1.50E-11                              |
| SSW            | 3000                 | Fe-52   | 2.93E-02                | 5.27E-09                           | 2.81E-09                           | 8.08E-09                              |
| SSW            | 3000                 | Mn-52m  | 1.15E-02                | 2.07E-09                           | 1.10E-09                           | 3.17E-09                              |
| SSW            | 3000                 | Mn-52   | 1.41E-07                | 2.54E-14                           | 1.35E-14                           | 3.89E-14                              |
| SSW            | 3000                 | K-40    | 2.99E-05                | 5.38E-12                           | 2.87E-12                           | 8.25E-12                              |
| SSW            | 4000                 | Fe-52   | 1.89E-02                | 3.39E-09                           | 2.07E-09                           | 5.47E-09                              |
| SSW            | 4000                 | Mn-52m  | 9.20E-03                | 1.66E-09                           | 1.01E-09                           | 2.67E-09                              |
| SSW            | 4000                 | Mn-52   | 1.54E-07                | 2.78E-14                           | 1.70E-14                           | 4.48E-14                              |
| SSW            | 4000                 | K-40    | 1.94E-05                | 3.49E-12                           | 2.13E-12                           | 5.62E-12                              |
| SSW            | 5000                 | Fe-52   | 1.35E-02                | 2.42E-09                           | 1.64E-09                           | 4.06E-09                              |
| SSW            | 5000                 | Mn-52m  | 7.65E-03                | 1.38E-09                           | 9.30E-10                           | 2.31E-09                              |
| SSW            | 5000                 | Mn-52   | 1.65E-07                | 2.96E-14                           | 2.00E-14                           | 4.97E-14                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSW            | 5000                 | K-40    | 1.39E-05                | 2.51E-12                           | 1.69E-12                           | 4.20E-12                              |
| SSW            | 7000                 | Fe-52   | 7.99E-03                | 1.44E-09                           | 1.13E-09                           | 2.57E-09                              |
| SSW            | 7000                 | Mn-52m  | 5.57E-03                | 1.00E-09                           | 7.91E-10                           | 1.79E-09                              |
| SSW            | 7000                 | Mn-52   | 1.76E-07                | 3.17E-14                           | 2.50E-14                           | 5.67E-14                              |
| SSW            | 7000                 | K-40    | 8.39E-06                | 1.51E-12                           | 1.19E-12                           | 2.70E-12                              |
| SSW            | 10000                | Fe-52   | 4.61E-03                | 8.29E-10                           | 7.63E-10                           | 1.59E-09                              |
| SSW            | 10000                | Mn-52m  | 3.81E-03                | 6.86E-10                           | 6.31E-10                           | 1.32E-09                              |
| SSW            | 10000                | Mn-52   | 1.84E-07                | 3.32E-14                           | 3.05E-14                           | 6.37E-14                              |
| SSW            | 10000                | K-40    | 4.94E-06                | 8.89E-13                           | 8.18E-13                           | 1.71E-12                              |
| SSW            | 15000                | Fe-52   | 2.67E-03                | 4.80E-10                           | 4.80E-10                           | 9.60E-10                              |
| SSW            | 15000                | Mn-52m  | 2.52E-03                | 4.54E-10                           | 4.54E-10                           | 9.08E-10                              |
| SSW            | 15000                | Mn-52   | 2.02E-07                | 3.63E-14                           | 3.62E-14                           | 7.25E-14                              |
| SSW            | 15000                | K-40    | 2.96E-06                | 5.33E-13                           | 5.33E-13                           | 1.07E-12                              |
| SSW            | 20000                | Fe-52   | 1.76E-03                | 3.17E-10                           | 3.38E-10                           | 6.55E-10                              |
| SSW            | 20000                | Mn-52m  | 1.76E-03                | 3.17E-10                           | 3.38E-10                           | 6.55E-10                              |
| SSW            | 20000                | Mn-52   | 2.03E-07                | 3.66E-14                           | 3.91E-14                           | 7.56E-14                              |
| SSW            | 20000                | K-40    | 2.02E-06                | 3.64E-13                           | 3.89E-13                           | 7.53E-13                              |
| SSW            | 30000                | Fe-52   | 9.34E-04                | 1.68E-10                           | 1.99E-10                           | 3.67E-10                              |
| SSW            | 30000                | Mn-52m  | 9.66E-04                | 1.74E-10                           | 2.05E-10                           | 3.79E-10                              |
| SSW            | 30000                | Mn-52   | 1.89E-07                | 3.41E-14                           | 4.03E-14                           | 7.43E-14                              |
| SSW            | 30000                | K-40    | 1.15E-06                | 2.07E-13                           | 2.45E-13                           | 4.52E-13                              |
| SSW            | 50000                | Fe-52   | 4.07E-04                | 7.32E-11                           | 9.51E-11                           | 1.68E-10                              |
| SSW            | 50000                | Mn-52m  | 4.25E-04                | 7.64E-11                           | 9.92E-11                           | 1.76E-10                              |
| SSW            | 50000                | Mn-52   | 1.62E-07                | 2.92E-14                           | 3.79E-14                           | 6.71E-14                              |
| SSW            | 50000                | K-40    | 5.77E-07                | 1.04E-13                           | 1.35E-13                           | 2.39E-13                              |
| SSW            | 80000                | Fe-52   | 1.46E-04                | 2.62E-11                           | 4.10E-11                           | 6.72E-11                              |
| SSW            | 80000                | Mn-52m  | 1.52E-04                | 2.74E-11                           | 4.28E-11                           | 7.02E-11                              |
| SSW            | 80000                | Mn-52   | 1.09E-07                | 1.96E-14                           | 3.06E-14                           | 5.01E-14                              |
| SSW            | 80000                | K-40    | 2.55E-07                | 4.58E-14                           | 7.16E-14                           | 1.17E-13                              |
| S              | 100                  | Fe-52   | 3.88E+00                | 6.98E-07                           | 8.13E-08                           | 7.79E-07                              |
| S              | 100                  | Mn-52m  | 5.75E-02                | 1.03E-08                           | 1.21E-09                           | 1.16E-08                              |
| S              | 100                  | Mn-52   | 1.97E-08                | 3.55E-15                           | 4.14E-16                           | 3.97E-15                              |
| S              | 100                  | K-40    | 3.88E-03                | 6.98E-10                           | 8.14E-11                           | 7.80E-10                              |
| S              | 150                  | Fe-52   | 2.59E+00                | 4.66E-07                           | 5.41E-08                           | 5.21E-07                              |
| S              | 150                  | Mn-52m  | 5.74E-02                | 1.03E-08                           | 1.20E-09                           | 1.15E-08                              |
| S              | 150                  | Mn-52   | 2.96E-08                | 5.33E-15                           | 6.18E-16                           | 5.95E-15                              |
| S              | 150                  | K-40    | 2.59E-03                | 4.67E-10                           | 5.42E-11                           | 5.21E-10                              |
| S              | 200                  | Fe-52   | 1.91E+00                | 3.43E-07                           | 4.05E-08                           | 3.84E-07                              |
| S              | 200                  | Mn-52m  | 5.61E-02                | 1.01E-08                           | 1.19E-09                           | 1.13E-08                              |
| S              | 200                  | Mn-52   | 3.86E-08                | 6.95E-15                           | 8.21E-16                           | 7.77E-15                              |
| S              | 200                  | K-40    | 1.91E-03                | 3.44E-10                           | 4.06E-11                           | 3.84E-10                              |
| S              | 300                  | Fe-52   | 1.18E+00                | 2.12E-07                           | 2.69E-08                           | 2.39E-07                              |
| S              | 300                  | Mn-52m  | 5.16E-02                | 9.29E-09                           | 1.18E-09                           | 1.05E-08                              |
| S              | 300                  | Mn-52   | 5.34E-08                | 9.61E-15                           | 1.22E-15                           | 1.08E-14                              |
| S              | 300                  | K-40    | 1.18E-03                | 2.12E-10                           | 2.70E-11                           | 2.39E-10                              |
| S              | 400                  | Fe-52   | 7.88E-01                | 1.42E-07                           | 2.01E-08                           | 1.62E-07                              |
| S              | 400                  | Mn-52m  | 4.57E-02                | 8.23E-09                           | 1.17E-09                           | 9.40E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| S              | 400                  | Mn-52   | 6.33E-08                | 1.14E-14                           | 1.62E-15                           | 1.30E-14                              |
| S              | 400                  | K-40    | 7.90E-04                | 1.42E-10                           | 2.02E-11                           | 1.62E-10                              |
| S              | 500                  | Fe-52   | 5.58E-01                | 1.01E-07                           | 1.61E-08                           | 1.17E-07                              |
| S              | 500                  | Mn-52m  | 4.02E-02                | 7.24E-09                           | 1.16E-09                           | 8.40E-09                              |
| S              | 500                  | Mn-52   | 6.98E-08                | 1.26E-14                           | 2.01E-15                           | 1.46E-14                              |
| S              | 500                  | K-40    | 5.60E-04                | 1.01E-10                           | 1.61E-11                           | 1.17E-10                              |
| S              | 700                  | Fe-52   | 3.19E-01                | 5.74E-08                           | 1.14E-08                           | 6.88E-08                              |
| S              | 700                  | Mn-52m  | 3.17E-02                | 5.71E-09                           | 1.14E-09                           | 6.84E-09                              |
| S              | 700                  | Mn-52   | 7.74E-08                | 1.39E-14                           | 2.77E-15                           | 1.67E-14                              |
| S              | 700                  | K-40    | 3.20E-04                | 5.76E-11                           | 1.15E-11                           | 6.91E-11                              |
| S              | 1000                 | Fe-52   | 1.70E-01                | 3.05E-08                           | 7.95E-09                           | 3.85E-08                              |
| S              | 1000                 | Mn-52m  | 2.36E-02                | 4.25E-09                           | 1.11E-09                           | 5.35E-09                              |
| S              | 1000                 | Mn-52   | 8.29E-08                | 1.49E-14                           | 3.88E-15                           | 1.88E-14                              |
| S              | 1000                 | K-40    | 1.71E-04                | 3.07E-11                           | 8.00E-12                           | 3.87E-11                              |
| S              | 1500                 | Fe-52   | 8.65E-02                | 1.56E-08                           | 5.25E-09                           | 2.08E-08                              |
| S              | 1500                 | Mn-52m  | 1.74E-02                | 3.14E-09                           | 1.06E-09                           | 4.20E-09                              |
| S              | 1500                 | Mn-52   | 9.31E-08                | 1.68E-14                           | 5.64E-15                           | 2.24E-14                              |
| S              | 1500                 | K-40    | 8.74E-05                | 1.57E-11                           | 5.30E-12                           | 2.10E-11                              |
| S              | 2000                 | Fe-52   | 5.33E-02                | 9.60E-09                           | 3.90E-09                           | 1.35E-08                              |
| S              | 2000                 | Mn-52m  | 1.39E-02                | 2.49E-09                           | 1.01E-09                           | 3.51E-09                              |
| S              | 2000                 | Mn-52   | 9.98E-08                | 1.80E-14                           | 7.30E-15                           | 2.53E-14                              |
| S              | 2000                 | K-40    | 5.40E-05                | 9.72E-12                           | 3.95E-12                           | 1.37E-11                              |
| S              | 3000                 | Fe-52   | 2.68E-02                | 4.83E-09                           | 2.57E-09                           | 7.39E-09                              |
| S              | 3000                 | Mn-52m  | 9.77E-03                | 1.76E-09                           | 9.35E-10                           | 2.69E-09                              |
| S              | 3000                 | Mn-52   | 1.08E-07                | 1.95E-14                           | 1.04E-14                           | 2.98E-14                              |
| S              | 3000                 | K-40    | 2.73E-05                | 4.92E-12                           | 2.62E-12                           | 7.54E-12                              |
| S              | 4000                 | Fe-52   | 1.73E-02                | 3.11E-09                           | 1.90E-09                           | 5.01E-09                              |
| S              | 4000                 | Mn-52m  | 7.87E-03                | 1.42E-09                           | 8.63E-10                           | 2.28E-09                              |
| S              | 4000                 | Mn-52   | 1.19E-07                | 2.14E-14                           | 1.30E-14                           | 3.45E-14                              |
| S              | 4000                 | K-40    | 1.77E-05                | 3.19E-12                           | 1.95E-12                           | 5.14E-12                              |
| S              | 5000                 | Fe-52   | 1.24E-02                | 2.23E-09                           | 1.50E-09                           | 3.72E-09                              |
| S              | 5000                 | Mn-52m  | 6.60E-03                | 1.19E-09                           | 7.99E-10                           | 1.99E-09                              |
| S              | 5000                 | Mn-52   | 1.28E-07                | 2.30E-14                           | 1.55E-14                           | 3.84E-14                              |
| S              | 5000                 | K-40    | 1.28E-05                | 2.30E-12                           | 1.55E-12                           | 3.84E-12                              |
| S              | 7000                 | Fe-52   | 7.37E-03                | 1.33E-09                           | 1.04E-09                           | 2.37E-09                              |
| S              | 7000                 | Mn-52m  | 4.87E-03                | 8.77E-10                           | 6.89E-10                           | 1.57E-09                              |
| S              | 7000                 | Mn-52   | 1.38E-07                | 2.48E-14                           | 1.95E-14                           | 4.43E-14                              |
| S              | 7000                 | K-40    | 7.71E-06                | 1.39E-12                           | 1.09E-12                           | 2.48E-12                              |
| S              | 10000                | Fe-52   | 4.27E-03                | 7.69E-10                           | 7.03E-10                           | 1.47E-09                              |
| S              | 10000                | Mn-52m  | 3.39E-03                | 6.11E-10                           | 5.59E-10                           | 1.17E-09                              |
| S              | 10000                | Mn-52   | 1.46E-07                | 2.63E-14                           | 2.41E-14                           | 5.04E-14                              |
| S              | 10000                | K-40    | 4.55E-06                | 8.19E-13                           | 7.50E-13                           | 1.57E-12                              |
| S              | 15000                | Fe-52   | 2.49E-03                | 4.48E-10                           | 4.45E-10                           | 8.93E-10                              |
| S              | 15000                | Mn-52m  | 2.29E-03                | 4.13E-10                           | 4.10E-10                           | 8.23E-10                              |
| S              | 15000                | Mn-52   | 1.63E-07                | 2.93E-14                           | 2.90E-14                           | 5.83E-14                              |
| S              | 15000                | K-40    | 2.74E-06                | 4.93E-13                           | 4.89E-13                           | 9.82E-13                              |
| S              | 20000                | Fe-52   | 1.65E-03                | 2.97E-10                           | 3.15E-10                           | 6.13E-10                              |





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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| S              | 20000                | Mn-52m  | 1.63E-03                | 2.93E-10                           | 3.10E-10                           | 6.03E-10                              |
| S              | 20000                | Mn-52   | 1.66E-07                | 2.99E-14                           | 3.17E-14                           | 6.16E-14                              |
| S              | 20000                | K-40    | 1.88E-06                | 3.38E-13                           | 3.58E-13                           | 6.96E-13                              |
| S              | 30000                | Fe-52   | 8.90E-04                | 1.60E-10                           | 1.87E-10                           | 3.47E-10                              |
| S              | 30000                | Mn-52m  | 9.17E-04                | 1.65E-10                           | 1.93E-10                           | 3.58E-10                              |
| S              | 30000                | Mn-52   | 1.59E-07                | 2.85E-14                           | 3.33E-14                           | 6.19E-14                              |
| S              | 30000                | K-40    | 1.08E-06                | 1.94E-13                           | 2.26E-13                           | 4.20E-13                              |
| S              | 50000                | Fe-52   | 3.97E-04                | 7.14E-11                           | 9.15E-11                           | 1.63E-10                              |
| S              | 50000                | Mn-52m  | 4.14E-04                | 7.45E-11                           | 9.55E-11                           | 1.70E-10                              |
| S              | 50000                | Mn-52   | 1.40E-07                | 2.51E-14                           | 3.22E-14                           | 5.73E-14                              |
| S              | 50000                | K-40    | 5.45E-07                | 9.81E-14                           | 1.26E-13                           | 2.24E-13                              |
| S              | 80000                | Fe-52   | 1.48E-04                | 2.67E-11                           | 4.07E-11                           | 6.74E-11                              |
| S              | 80000                | Mn-52m  | 1.55E-04                | 2.79E-11                           | 4.25E-11                           | 7.04E-11                              |
| S              | 80000                | Mn-52   | 9.73E-08                | 1.75E-14                           | 2.67E-14                           | 4.42E-14                              |
| S              | 80000                | K-40    | 2.46E-07                | 4.44E-14                           | 6.77E-14                           | 1.12E-13                              |
| SSE            | 100                  | Fe-52   | 3.56E+00                | 6.40E-07                           | 7.46E-08                           | 7.15E-07                              |
| SSE            | 100                  | Mn-52m  | 4.84E-02                | 8.70E-09                           | 1.01E-09                           | 9.72E-09                              |
| SSE            | 100                  | Mn-52   | 1.52E-08                | 2.74E-15                           | 3.19E-16                           | 3.06E-15                              |
| SSE            | 100                  | K-40    | 3.56E-03                | 6.40E-10                           | 7.46E-11                           | 7.15E-10                              |
| SSE            | 150                  | Fe-52   | 2.38E+00                | 4.28E-07                           | 4.96E-08                           | 4.77E-07                              |
| SSE            | 150                  | Mn-52m  | 4.83E-02                | 8.70E-09                           | 1.01E-09                           | 9.71E-09                              |
| SSE            | 150                  | Mn-52   | 2.28E-08                | 4.11E-15                           | 4.77E-16                           | 4.59E-15                              |
| SSE            | 150                  | K-40    | 2.38E-03                | 4.28E-10                           | 4.97E-11                           | 4.78E-10                              |
| SSE            | 200                  | Fe-52   | 1.75E+00                | 3.15E-07                           | 3.72E-08                           | 3.52E-07                              |
| SSE            | 200                  | Mn-52m  | 4.72E-02                | 8.50E-09                           | 1.00E-09                           | 9.51E-09                              |
| SSE            | 200                  | Mn-52   | 2.98E-08                | 5.36E-15                           | 6.33E-16                           | 6.00E-15                              |
| SSE            | 200                  | K-40    | 1.75E-03                | 3.15E-10                           | 3.72E-11                           | 3.52E-10                              |
| SSE            | 300                  | Fe-52   | 1.08E+00                | 1.94E-07                           | 2.47E-08                           | 2.19E-07                              |
| SSE            | 300                  | Mn-52m  | 4.35E-02                | 7.82E-09                           | 9.95E-10                           | 8.82E-09                              |
| SSE            | 300                  | Mn-52   | 4.12E-08                | 7.42E-15                           | 9.44E-16                           | 8.36E-15                              |
| SSE            | 300                  | K-40    | 1.08E-03                | 1.95E-10                           | 2.48E-11                           | 2.19E-10                              |
| SSE            | 400                  | Fe-52   | 7.23E-01                | 1.30E-07                           | 1.85E-08                           | 1.49E-07                              |
| SSE            | 400                  | Mn-52m  | 3.86E-02                | 6.94E-09                           | 9.86E-10                           | 7.93E-09                              |
| SSE            | 400                  | Mn-52   | 4.89E-08                | 8.80E-15                           | 1.25E-15                           | 1.00E-14                              |
| SSE            | 400                  | K-40    | 7.25E-04                | 1.30E-10                           | 1.85E-11                           | 1.49E-10                              |
| SSE            | 500                  | Fe-52   | 5.13E-01                | 9.23E-08                           | 1.47E-08                           | 1.07E-07                              |
| SSE            | 500                  | Mn-52m  | 3.40E-02                | 6.11E-09                           | 9.77E-10                           | 7.09E-09                              |
| SSE            | 500                  | Mn-52   | 5.39E-08                | 9.71E-15                           | 1.55E-15                           | 1.13E-14                              |
| SSE            | 500                  | K-40    | 5.14E-04                | 9.25E-11                           | 1.48E-11                           | 1.07E-10                              |
| SSE            | 700                  | Fe-52   | 2.93E-01                | 5.27E-08                           | 1.05E-08                           | 6.32E-08                              |
| SSE            | 700                  | Mn-52m  | 2.68E-02                | 4.83E-09                           | 9.60E-10                           | 5.79E-09                              |
| SSE            | 700                  | Mn-52   | 5.99E-08                | 1.08E-14                           | 2.14E-15                           | 1.29E-14                              |
| SSE            | 700                  | K-40    | 2.94E-04                | 5.29E-11                           | 1.05E-11                           | 6.35E-11                              |
| SSE            | 1000                 | Fe-52   | 1.56E-01                | 2.81E-08                           | 7.30E-09                           | 3.54E-08                              |
| SSE            | 1000                 | Mn-52m  | 2.00E-02                | 3.60E-09                           | 9.36E-10                           | 4.54E-09                              |
| SSE            | 1000                 | Mn-52   | 6.43E-08                | 1.16E-14                           | 3.01E-15                           | 1.46E-14                              |
| SSE            | 1000                 | K-40    | 1.57E-04                | 2.82E-11                           | 7.34E-12                           | 3.56E-11                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSE            | 1500                 | Fe-52   | 7.96E-02                | 1.43E-08                           | 4.83E-09                           | 1.92E-08                              |
| SSE            | 1500                 | Mn-52m  | 1.48E-02                | 2.67E-09                           | 8.99E-10                           | 3.57E-09                              |
| SSE            | 1500                 | Mn-52   | 7.24E-08                | 1.30E-14                           | 4.39E-15                           | 1.74E-14                              |
| SSE            | 1500                 | K-40    | 8.03E-05                | 1.45E-11                           | 4.87E-12                           | 1.93E-11                              |
| SSE            | 2000                 | Fe-52   | 4.91E-02                | 8.84E-09                           | 3.59E-09                           | 1.24E-08                              |
| SSE            | 2000                 | Mn-52m  | 1.18E-02                | 2.13E-09                           | 8.65E-10                           | 2.99E-09                              |
| SSE            | 2000                 | Mn-52   | 7.78E-08                | 1.40E-14                           | 5.69E-15                           | 1.97E-14                              |
| SSE            | 2000                 | K-40    | 4.97E-05                | 8.95E-12                           | 3.63E-12                           | 1.26E-11                              |
| SSE            | 3000                 | Fe-52   | 2.47E-02                | 4.45E-09                           | 2.36E-09                           | 6.82E-09                              |
| SSE            | 3000                 | Mn-52m  | 8.40E-03                | 1.51E-09                           | 8.03E-10                           | 2.31E-09                              |
| SSE            | 3000                 | Mn-52   | 8.47E-08                | 1.52E-14                           | 8.10E-15                           | 2.33E-14                              |
| SSE            | 3000                 | K-40    | 2.52E-05                | 4.53E-12                           | 2.41E-12                           | 6.94E-12                              |
| SSE            | 4000                 | Fe-52   | 1.60E-02                | 2.88E-09                           | 1.75E-09                           | 4.63E-09                              |
| SSE            | 4000                 | Mn-52m  | 6.81E-03                | 1.23E-09                           | 7.45E-10                           | 1.97E-09                              |
| SSE            | 4000                 | Mn-52   | 9.37E-08                | 1.69E-14                           | 1.02E-14                           | 2.71E-14                              |
| SSE            | 4000                 | K-40    | 1.64E-05                | 2.95E-12                           | 1.79E-12                           | 4.74E-12                              |
| SSE            | 5000                 | Fe-52   | 1.14E-02                | 2.06E-09                           | 1.38E-09                           | 3.44E-09                              |
| SSE            | 5000                 | Mn-52m  | 5.75E-03                | 1.03E-09                           | 6.95E-10                           | 1.73E-09                              |
| SSE            | 5000                 | Mn-52   | 1.01E-07                | 1.82E-14                           | 1.22E-14                           | 3.04E-14                              |
| SSE            | 5000                 | K-40    | 1.18E-05                | 2.12E-12                           | 1.42E-12                           | 3.55E-12                              |
| SSE            | 7000                 | Fe-52   | 6.84E-03                | 1.23E-09                           | 9.65E-10                           | 2.20E-09                              |
| SSE            | 7000                 | Mn-52m  | 4.29E-03                | 7.72E-10                           | 6.05E-10                           | 1.38E-09                              |
| SSE            | 7000                 | Mn-52   | 1.10E-07                | 1.98E-14                           | 1.55E-14                           | 3.53E-14                              |
| SSE            | 7000                 | K-40    | 7.13E-06                | 1.28E-12                           | 1.00E-12                           | 2.29E-12                              |
| SSE            | 10000                | Fe-52   | 3.98E-03                | 7.16E-10                           | 6.53E-10                           | 1.37E-09                              |
| SSE            | 10000                | Mn-52m  | 3.04E-03                | 5.46E-10                           | 4.98E-10                           | 1.04E-09                              |
| SSE            | 10000                | Mn-52   | 1.18E-07                | 2.12E-14                           | 1.93E-14                           | 4.05E-14                              |
| SSE            | 10000                | K-40    | 4.22E-06                | 7.59E-13                           | 6.92E-13                           | 1.45E-12                              |
| SSE            | 15000                | Fe-52   | 2.33E-03                | 4.20E-10                           | 4.14E-10                           | 8.34E-10                              |
| SSE            | 15000                | Mn-52m  | 2.09E-03                | 3.77E-10                           | 3.72E-10                           | 7.49E-10                              |
| SSE            | 15000                | Mn-52   | 1.33E-07                | 2.39E-14                           | 2.37E-14                           | 4.76E-14                              |
| SSE            | 15000                | K-40    | 2.54E-06                | 4.58E-13                           | 4.52E-13                           | 9.10E-13                              |
| SSE            | 20000                | Fe-52   | 1.56E-03                | 2.80E-10                           | 2.95E-10                           | 5.75E-10                              |
| SSE            | 20000                | Mn-52m  | 1.51E-03                | 2.71E-10                           | 2.86E-10                           | 5.57E-10                              |
| SSE            | 20000                | Mn-52   | 1.38E-07                | 2.48E-14                           | 2.61E-14                           | 5.09E-14                              |
| SSE            | 20000                | K-40    | 1.75E-06                | 3.15E-13                           | 3.32E-13                           | 6.46E-13                              |
| SSE            | 30000                | Fe-52   | 8.49E-04                | 1.53E-10                           | 1.77E-10                           | 3.30E-10                              |
| SSE            | 30000                | Mn-52m  | 8.69E-04                | 1.56E-10                           | 1.81E-10                           | 3.38E-10                              |
| SSE            | 30000                | Mn-52   | 1.34E-07                | 2.42E-14                           | 2.80E-14                           | 5.21E-14                              |
| SSE            | 30000                | K-40    | 1.01E-06                | 1.82E-13                           | 2.11E-13                           | 3.93E-13                              |
| SSE            | 50000                | Fe-52   | 3.86E-04                | 6.94E-11                           | 8.80E-11                           | 1.57E-10                              |
| SSE            | 50000                | Mn-52m  | 4.02E-04                | 7.24E-11                           | 9.17E-11                           | 1.64E-10                              |
| SSE            | 50000                | Mn-52   | 1.21E-07                | 2.18E-14                           | 2.76E-14                           | 4.94E-14                              |
| SSE            | 50000                | K-40    | 5.16E-07                | 9.28E-14                           | 1.18E-13                           | 2.10E-13                              |
| SSE            | 80000                | Fe-52   | 1.50E-04                | 2.69E-11                           | 4.03E-11                           | 6.72E-11                              |
| SSE            | 80000                | Mn-52m  | 1.56E-04                | 2.81E-11                           | 4.20E-11                           | 7.01E-11                              |
| SSE            | 80000                | Mn-52   | 8.72E-08                | 1.57E-14                           | 2.35E-14                           | 3.92E-14                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SSE            | 80000                | K-40    | 2.38E-07                | 4.29E-14                           | 6.41E-14                           | 1.07E-13                              |
| SE             | 100                  | Fe-52   | 3.28E+00                | 5.91E-07                           | 6.88E-08                           | 6.60E-07                              |
| SE             | 100                  | Mn-52m  | 4.12E-02                | 7.42E-09                           | 8.65E-10                           | 8.29E-09                              |
| SE             | 100                  | Mn-52   | 1.20E-08                | 2.16E-15                           | 2.51E-16                           | 2.41E-15                              |
| SE             | 100                  | K-40    | 3.28E-03                | 5.91E-10                           | 6.89E-11                           | 6.60E-10                              |
| SE             | 150                  | Fe-52   | 2.19E+00                | 3.95E-07                           | 4.58E-08                           | 4.41E-07                              |
| SE             | 150                  | Mn-52m  | 4.12E-02                | 7.42E-09                           | 8.61E-10                           | 8.28E-09                              |
| SE             | 150                  | Mn-52   | 1.80E-08                | 3.23E-15                           | 3.75E-16                           | 3.61E-15                              |
| SE             | 150                  | K-40    | 2.20E-03                | 3.95E-10                           | 4.59E-11                           | 4.41E-10                              |
| SE             | 200                  | Fe-52   | 1.61E+00                | 2.91E-07                           | 3.43E-08                           | 3.25E-07                              |
| SE             | 200                  | Mn-52m  | 4.03E-02                | 7.26E-09                           | 8.57E-10                           | 8.11E-09                              |
| SE             | 200                  | Mn-52   | 2.35E-08                | 4.22E-15                           | 4.99E-16                           | 4.72E-15                              |
| SE             | 200                  | K-40    | 1.62E-03                | 2.91E-10                           | 3.44E-11                           | 3.25E-10                              |
| SE             | 300                  | Fe-52   | 9.97E-01                | 1.79E-07                           | 2.28E-08                           | 2.02E-07                              |
| SE             | 300                  | Mn-52m  | 3.71E-02                | 6.68E-09                           | 8.50E-10                           | 7.53E-09                              |
| SE             | 300                  | Mn-52   | 3.25E-08                | 5.85E-15                           | 7.43E-16                           | 6.59E-15                              |
| SE             | 300                  | K-40    | 9.99E-04                | 1.80E-10                           | 2.29E-11                           | 2.03E-10                              |
| SE             | 400                  | Fe-52   | 6.68E-01                | 1.20E-07                           | 1.71E-08                           | 1.37E-07                              |
| SE             | 400                  | Mn-52m  | 3.30E-02                | 5.93E-09                           | 8.43E-10                           | 6.78E-09                              |
| SE             | 400                  | Mn-52   | 3.85E-08                | 6.94E-15                           | 9.85E-16                           | 7.92E-15                              |
| SE             | 400                  | K-40    | 6.69E-04                | 1.20E-10                           | 1.71E-11                           | 1.38E-10                              |
| SE             | 500                  | Fe-52   | 4.74E-01                | 8.53E-08                           | 1.36E-08                           | 9.89E-08                              |
| SE             | 500                  | Mn-52m  | 2.90E-02                | 5.23E-09                           | 8.36E-10                           | 6.06E-09                              |
| SE             | 500                  | Mn-52   | 4.25E-08                | 7.66E-15                           | 1.22E-15                           | 8.88E-15                              |
| SE             | 500                  | K-40    | 4.75E-04                | 8.55E-11                           | 1.37E-11                           | 9.92E-11                              |
| SE             | 700                  | Fe-52   | 2.71E-01                | 4.87E-08                           | 9.70E-09                           | 5.84E-08                              |
| SE             | 700                  | Mn-52m  | 2.30E-02                | 4.13E-09                           | 8.22E-10                           | 4.96E-09                              |
| SE             | 700                  | Mn-52   | 4.73E-08                | 8.51E-15                           | 1.69E-15                           | 1.02E-14                              |
| SE             | 700                  | K-40    | 2.72E-04                | 4.89E-11                           | 9.73E-12                           | 5.87E-11                              |
| SE             | 1000                 | Fe-52   | 1.44E-01                | 2.60E-08                           | 6.75E-09                           | 3.27E-08                              |
| SE             | 1000                 | Mn-52m  | 1.72E-02                | 3.09E-09                           | 8.03E-10                           | 3.89E-09                              |
| SE             | 1000                 | Mn-52   | 5.08E-08                | 9.15E-15                           | 2.38E-15                           | 1.15E-14                              |
| SE             | 1000                 | K-40    | 1.45E-04                | 2.61E-11                           | 6.79E-12                           | 3.29E-11                              |
| SE             | 1500                 | Fe-52   | 7.37E-02                | 1.33E-08                           | 4.47E-09                           | 1.77E-08                              |
| SE             | 1500                 | Mn-52m  | 1.28E-02                | 2.30E-09                           | 7.74E-10                           | 3.07E-09                              |
| SE             | 1500                 | Mn-52   | 5.74E-08                | 1.03E-14                           | 3.47E-15                           | 1.38E-14                              |
| SE             | 1500                 | K-40    | 7.43E-05                | 1.34E-11                           | 4.50E-12                           | 1.79E-11                              |
| SE             | 2000                 | Fe-52   | 4.55E-02                | 8.19E-09                           | 3.33E-09                           | 1.15E-08                              |
| SE             | 2000                 | Mn-52m  | 1.02E-02                | 1.84E-09                           | 7.47E-10                           | 2.59E-09                              |
| SE             | 2000                 | Mn-52   | 6.18E-08                | 1.11E-14                           | 4.52E-15                           | 1.56E-14                              |
| SE             | 2000                 | K-40    | 4.60E-05                | 8.28E-12                           | 3.36E-12                           | 1.16E-11                              |
| SE             | 3000                 | Fe-52   | 2.30E-02                | 4.13E-09                           | 2.19E-09                           | 6.32E-09                              |
| SE             | 3000                 | Mn-52m  | 7.30E-03                | 1.31E-09                           | 6.97E-10                           | 2.01E-09                              |
| SE             | 3000                 | Mn-52   | 6.76E-08                | 1.22E-14                           | 6.45E-15                           | 1.86E-14                              |
| SE             | 3000                 | K-40    | 2.33E-05                | 4.20E-12                           | 2.23E-12                           | 6.43E-12                              |
| SE             | 4000                 | Fe-52   | 1.49E-02                | 2.67E-09                           | 1.62E-09                           | 4.30E-09                              |
| SE             | 4000                 | Mn-52m  | 5.95E-03                | 1.07E-09                           | 6.50E-10                           | 1.72E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| SE             | 4000                 | Mn-52   | 7.51E-08                | 1.35E-14                           | 8.20E-15                           | 2.17E-14                              |
| SE             | 4000                 | K-40    | 1.52E-05                | 2.73E-12                           | 1.66E-12                           | 4.39E-12                              |
| SE             | 5000                 | Fe-52   | 1.06E-02                | 1.92E-09                           | 1.28E-09                           | 3.20E-09                              |
| SE             | 5000                 | Mn-52m  | 5.05E-03                | 9.08E-10                           | 6.09E-10                           | 1.52E-09                              |
| SE             | 5000                 | Mn-52   | 8.12E-08                | 1.46E-14                           | 9.79E-15                           | 2.44E-14                              |
| SE             | 5000                 | K-40    | 1.09E-05                | 1.97E-12                           | 1.32E-12                           | 3.29E-12                              |
| SE             | 7000                 | Fe-52   | 6.38E-03                | 1.15E-09                           | 8.97E-10                           | 2.05E-09                              |
| SE             | 7000                 | Mn-52m  | 3.81E-03                | 6.86E-10                           | 5.35E-10                           | 1.22E-09                              |
| SE             | 7000                 | Mn-52   | 8.91E-08                | 1.60E-14                           | 1.25E-14                           | 2.86E-14                              |
| SE             | 7000                 | K-40    | 6.63E-06                | 1.19E-12                           | 9.32E-13                           | 2.12E-12                              |
| SE             | 10000                | Fe-52   | 3.72E-03                | 6.70E-10                           | 6.09E-10                           | 1.28E-09                              |
| SE             | 10000                | Mn-52m  | 2.73E-03                | 4.91E-10                           | 4.46E-10                           | 9.38E-10                              |
| SE             | 10000                | Mn-52   | 9.64E-08                | 1.74E-14                           | 1.58E-14                           | 3.31E-14                              |
| SE             | 10000                | K-40    | 3.93E-06                | 7.07E-13                           | 6.42E-13                           | 1.35E-12                              |
| SE             | 15000                | Fe-52   | 2.19E-03                | 3.94E-10                           | 3.88E-10                           | 7.82E-10                              |
| SE             | 15000                | Mn-52m  | 1.92E-03                | 3.45E-10                           | 3.39E-10                           | 6.84E-10                              |
| SE             | 15000                | Mn-52   | 1.10E-07                | 1.98E-14                           | 1.95E-14                           | 3.94E-14                              |
| SE             | 15000                | K-40    | 2.37E-06                | 4.27E-13                           | 4.21E-13                           | 8.48E-13                              |
| SE             | 20000                | Fe-52   | 1.47E-03                | 2.65E-10                           | 2.78E-10                           | 5.42E-10                              |
| SE             | 20000                | Mn-52m  | 1.40E-03                | 2.52E-10                           | 2.64E-10                           | 5.16E-10                              |
| SE             | 20000                | Mn-52   | 1.15E-07                | 2.08E-14                           | 2.18E-14                           | 4.26E-14                              |
| SE             | 20000                | K-40    | 1.64E-06                | 2.95E-13                           | 3.09E-13                           | 6.04E-13                              |
| SE             | 30000                | Fe-52   | 8.10E-04                | 1.46E-10                           | 1.68E-10                           | 3.14E-10                              |
| SE             | 30000                | Mn-52m  | 8.24E-04                | 1.48E-10                           | 1.70E-10                           | 3.19E-10                              |
| SE             | 30000                | Mn-52   | 1.15E-07                | 2.06E-14                           | 2.37E-14                           | 4.43E-14                              |
| SE             | 30000                | K-40    | 9.52E-07                | 1.71E-13                           | 1.97E-13                           | 3.68E-13                              |
| SE             | 50000                | Fe-52   | 3.74E-04                | 6.73E-11                           | 8.45E-11                           | 1.52E-10                              |
| SE             | 50000                | Mn-52m  | 3.90E-04                | 7.01E-11                           | 8.81E-11                           | 1.58E-10                              |
| SE             | 50000                | Mn-52   | 1.06E-07                | 1.90E-14                           | 2.39E-14                           | 4.29E-14                              |
| SE             | 50000                | K-40    | 4.89E-07                | 8.80E-14                           | 1.11E-13                           | 1.99E-13                              |
| SE             | 80000                | Fe-52   | 1.50E-04                | 2.69E-11                           | 3.96E-11                           | 6.65E-11                              |
| SE             | 80000                | Mn-52m  | 1.56E-04                | 2.81E-11                           | 4.13E-11                           | 6.95E-11                              |
| SE             | 80000                | Mn-52   | 7.84E-08                | 1.41E-14                           | 2.08E-14                           | 3.49E-14                              |
| SE             | 80000                | K-40    | 2.30E-07                | 4.14E-14                           | 6.08E-14                           | 1.02E-13                              |
| ESE            | 100                  | Fe-52   | 3.05E+00                | 5.49E-07                           | 6.39E-08                           | 6.13E-07                              |
| ESE            | 100                  | Mn-52m  | 3.56E-02                | 6.40E-09                           | 7.46E-10                           | 7.15E-09                              |
| ESE            | 100                  | Mn-52   | 9.59E-09                | 1.73E-15                           | 2.01E-16                           | 1.93E-15                              |
| ESE            | 100                  | K-40    | 3.05E-03                | 5.49E-10                           | 6.40E-11                           | 6.13E-10                              |
| ESE            | 150                  | Fe-52   | 2.04E+00                | 3.67E-07                           | 4.26E-08                           | 4.09E-07                              |
| ESE            | 150                  | Mn-52m  | 3.56E-02                | 6.40E-09                           | 7.43E-10                           | 7.14E-09                              |
| ESE            | 150                  | Mn-52   | 1.44E-08                | 2.59E-15                           | 3.01E-16                           | 2.89E-15                              |
| ESE            | 150                  | K-40    | 2.04E-03                | 3.67E-10                           | 4.26E-11                           | 4.10E-10                              |
| ESE            | 200                  | Fe-52   | 1.50E+00                | 2.70E-07                           | 3.19E-08                           | 3.02E-07                              |
| ESE            | 200                  | Mn-52m  | 3.48E-02                | 6.26E-09                           | 7.40E-10                           | 7.00E-09                              |
| ESE            | 200                  | Mn-52   | 1.88E-08                | 3.38E-15                           | 4.00E-16                           | 3.78E-15                              |
| ESE            | 200                  | K-40    | 1.50E-03                | 2.70E-10                           | 3.19E-11                           | 3.02E-10                              |
| ESE            | 300                  | Fe-52   | 9.26E-01                | 1.67E-07                           | 2.12E-08                           | 1.88E-07                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 300                  | Mn-52m  | 3.21E-02                | 5.77E-09                           | 7.34E-10                           | 6.50E-09                              |
| ESE            | 300                  | Mn-52   | 2.60E-08                | 4.69E-15                           | 5.96E-16                           | 5.28E-15                              |
| ESE            | 300                  | K-40    | 9.28E-04                | 1.67E-10                           | 2.12E-11                           | 1.88E-10                              |
| ESE            | 400                  | Fe-52   | 6.21E-01                | 1.12E-07                           | 1.59E-08                           | 1.28E-07                              |
| ESE            | 400                  | Mn-52m  | 2.85E-02                | 5.13E-09                           | 7.28E-10                           | 5.85E-09                              |
| ESE            | 400                  | Mn-52   | 3.09E-08                | 5.56E-15                           | 7.90E-16                           | 6.35E-15                              |
| ESE            | 400                  | K-40    | 6.22E-04                | 1.12E-10                           | 1.59E-11                           | 1.28E-10                              |
| ESE            | 500                  | Fe-52   | 4.40E-01                | 7.93E-08                           | 1.27E-08                           | 9.19E-08                              |
| ESE            | 500                  | Mn-52m  | 2.51E-02                | 4.52E-09                           | 7.22E-10                           | 5.24E-09                              |
| ESE            | 500                  | Mn-52   | 3.41E-08                | 6.14E-15                           | 9.82E-16                           | 7.12E-15                              |
| ESE            | 500                  | K-40    | 4.41E-04                | 7.94E-11                           | 1.27E-11                           | 9.21E-11                              |
| ESE            | 700                  | Fe-52   | 2.52E-01                | 4.53E-08                           | 9.01E-09                           | 5.43E-08                              |
| ESE            | 700                  | Mn-52m  | 1.99E-02                | 3.58E-09                           | 7.12E-10                           | 4.29E-09                              |
| ESE            | 700                  | Mn-52   | 3.80E-08                | 6.83E-15                           | 1.36E-15                           | 8.19E-15                              |
| ESE            | 700                  | K-40    | 2.53E-04                | 4.55E-11                           | 9.04E-12                           | 5.45E-11                              |
| ESE            | 1000                 | Fe-52   | 1.34E-01                | 2.41E-08                           | 6.28E-09                           | 3.04E-08                              |
| ESE            | 1000                 | Mn-52m  | 1.49E-02                | 2.68E-09                           | 6.97E-10                           | 3.38E-09                              |
| ESE            | 1000                 | Mn-52   | 4.09E-08                | 7.35E-15                           | 1.91E-15                           | 9.27E-15                              |
| ESE            | 1000                 | K-40    | 1.35E-04                | 2.43E-11                           | 6.31E-12                           | 3.06E-11                              |
| ESE            | 1500                 | Fe-52   | 6.86E-02                | 1.24E-08                           | 4.15E-09                           | 1.65E-08                              |
| ESE            | 1500                 | Mn-52m  | 1.11E-02                | 2.00E-09                           | 6.73E-10                           | 2.67E-09                              |
| ESE            | 1500                 | Mn-52   | 4.62E-08                | 8.32E-15                           | 2.80E-15                           | 1.11E-14                              |
| ESE            | 1500                 | K-40    | 6.92E-05                | 1.24E-11                           | 4.19E-12                           | 1.66E-11                              |
| ESE            | 2000                 | Fe-52   | 4.24E-02                | 7.63E-09                           | 3.10E-09                           | 1.07E-08                              |
| ESE            | 2000                 | Mn-52m  | 8.91E-03                | 1.60E-09                           | 6.51E-10                           | 2.25E-09                              |
| ESE            | 2000                 | Mn-52   | 4.99E-08                | 8.98E-15                           | 3.64E-15                           | 1.26E-14                              |
| ESE            | 2000                 | K-40    | 4.28E-05                | 7.71E-12                           | 3.13E-12                           | 1.08E-11                              |
| ESE            | 3000                 | Fe-52   | 2.14E-02                | 3.85E-09                           | 2.04E-09                           | 5.89E-09                              |
| ESE            | 3000                 | Mn-52m  | 6.40E-03                | 1.15E-09                           | 6.10E-10                           | 1.76E-09                              |
| ESE            | 3000                 | Mn-52   | 5.48E-08                | 9.86E-15                           | 5.22E-15                           | 1.51E-14                              |
| ESE            | 3000                 | K-40    | 2.17E-05                | 3.91E-12                           | 2.07E-12                           | 5.98E-12                              |
| ESE            | 4000                 | Fe-52   | 1.39E-02                | 2.50E-09                           | 1.51E-09                           | 4.01E-09                              |
| ESE            | 4000                 | Mn-52m  | 5.25E-03                | 9.44E-10                           | 5.72E-10                           | 1.52E-09                              |
| ESE            | 4000                 | Mn-52   | 6.11E-08                | 1.10E-14                           | 6.66E-15                           | 1.76E-14                              |
| ESE            | 4000                 | K-40    | 1.42E-05                | 2.55E-12                           | 1.54E-12                           | 4.09E-12                              |
| ESE            | 5000                 | Fe-52   | 9.95E-03                | 1.79E-09                           | 1.20E-09                           | 2.99E-09                              |
| ESE            | 5000                 | Mn-52m  | 4.47E-03                | 8.04E-10                           | 5.38E-10                           | 1.34E-09                              |
| ESE            | 5000                 | Mn-52   | 6.62E-08                | 1.19E-14                           | 7.98E-15                           | 1.99E-14                              |
| ESE            | 5000                 | K-40    | 1.02E-05                | 1.84E-12                           | 1.23E-12                           | 3.07E-12                              |
| ESE            | 7000                 | Fe-52   | 5.98E-03                | 1.08E-09                           | 8.39E-10                           | 1.92E-09                              |
| ESE            | 7000                 | Mn-52m  | 3.40E-03                | 6.12E-10                           | 4.77E-10                           | 1.09E-09                              |
| ESE            | 7000                 | Mn-52   | 7.32E-08                | 1.32E-14                           | 1.03E-14                           | 2.34E-14                              |
| ESE            | 7000                 | K-40    | 6.19E-06                | 1.11E-12                           | 8.69E-13                           | 1.98E-12                              |
| ESE            | 10000                | Fe-52   | 3.50E-03                | 6.30E-10                           | 5.70E-10                           | 1.20E-09                              |
| ESE            | 10000                | Mn-52m  | 2.47E-03                | 4.44E-10                           | 4.02E-10                           | 8.46E-10                              |
| ESE            | 10000                | Mn-52   | 7.99E-08                | 1.44E-14                           | 1.30E-14                           | 2.74E-14                              |
| ESE            | 10000                | K-40    | 3.68E-06                | 6.62E-13                           | 5.99E-13                           | 1.26E-12                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 15000                | Fe-52   | 2.07E-03                | 3.72E-10                           | 3.65E-10                           | 7.37E-10                              |
| ESE            | 15000                | Mn-52m  | 1.76E-03                | 3.16E-10                           | 3.10E-10                           | 6.27E-10                              |
| ESE            | 15000                | Mn-52   | 9.24E-08                | 1.66E-14                           | 1.63E-14                           | 3.29E-14                              |
| ESE            | 15000                | K-40    | 2.23E-06                | 4.01E-13                           | 3.93E-13                           | 7.94E-13                              |
| ESE            | 20000                | Fe-52   | 1.39E-03                | 2.51E-10                           | 2.62E-10                           | 5.12E-10                              |
| ESE            | 20000                | Mn-52m  | 1.30E-03                | 2.34E-10                           | 2.44E-10                           | 4.78E-10                              |
| ESE            | 20000                | Mn-52   | 9.77E-08                | 1.76E-14                           | 1.84E-14                           | 3.59E-14                              |
| ESE            | 20000                | K-40    | 1.54E-06                | 2.77E-13                           | 2.89E-13                           | 5.66E-13                              |
| ESE            | 30000                | Fe-52   | 7.75E-04                | 1.39E-10                           | 1.59E-10                           | 2.99E-10                              |
| ESE            | 30000                | Mn-52m  | 7.81E-04                | 1.41E-10                           | 1.61E-10                           | 3.01E-10                              |
| ESE            | 30000                | Mn-52   | 9.87E-08                | 1.78E-14                           | 2.03E-14                           | 3.80E-14                              |
| ESE            | 30000                | K-40    | 9.00E-07                | 1.62E-13                           | 1.85E-13                           | 3.47E-13                              |
| ESE            | 50000                | Fe-52   | 3.62E-04                | 6.52E-11                           | 8.13E-11                           | 1.46E-10                              |
| ESE            | 50000                | Mn-52m  | 3.77E-04                | 6.79E-11                           | 8.46E-11                           | 1.52E-10                              |
| ESE            | 50000                | Mn-52   | 9.28E-08                | 1.67E-14                           | 2.08E-14                           | 3.75E-14                              |
| ESE            | 50000                | K-40    | 4.65E-07                | 8.37E-14                           | 1.04E-13                           | 1.88E-13                              |
| ESE            | 80000                | Fe-52   | 1.49E-04                | 2.68E-11                           | 3.88E-11                           | 6.56E-11                              |
| ESE            | 80000                | Mn-52m  | 1.55E-04                | 2.80E-11                           | 4.05E-11                           | 6.85E-11                              |
| ESE            | 80000                | Mn-52   | 7.08E-08                | 1.27E-14                           | 1.85E-14                           | 3.12E-14                              |
| ESE            | 80000                | K-40    | 2.22E-07                | 3.99E-14                           | 5.79E-14                           | 9.78E-14                              |
| E              | 100                  | Fe-52   | 2.85E+00                | 5.12E-07                           | 5.97E-08                           | 5.72E-07                              |
| E              | 100                  | Mn-52m  | 3.10E-02                | 5.58E-09                           | 6.50E-10                           | 6.23E-09                              |
| E              | 100                  | Mn-52   | 7.80E-09                | 1.40E-15                           | 1.64E-16                           | 1.57E-15                              |
| E              | 100                  | K-40    | 2.85E-03                | 5.12E-10                           | 5.97E-11                           | 5.72E-10                              |
| E              | 150                  | Fe-52   | 1.90E+00                | 3.42E-07                           | 3.97E-08                           | 3.82E-07                              |
| E              | 150                  | Mn-52m  | 3.10E-02                | 5.58E-09                           | 6.48E-10                           | 6.23E-09                              |
| E              | 150                  | Mn-52   | 1.17E-08                | 2.11E-15                           | 2.45E-16                           | 2.35E-15                              |
| E              | 150                  | K-40    | 1.90E-03                | 3.43E-10                           | 3.98E-11                           | 3.82E-10                              |
| E              | 200                  | Fe-52   | 1.40E+00                | 2.52E-07                           | 2.98E-08                           | 2.82E-07                              |
| E              | 200                  | Mn-52m  | 3.03E-02                | 5.46E-09                           | 6.45E-10                           | 6.11E-09                              |
| E              | 200                  | Mn-52   | 1.53E-08                | 2.75E-15                           | 3.25E-16                           | 3.08E-15                              |
| E              | 200                  | K-40    | 1.40E-03                | 2.52E-10                           | 2.98E-11                           | 2.82E-10                              |
| E              | 300                  | Fe-52   | 8.65E-01                | 1.56E-07                           | 1.98E-08                           | 1.76E-07                              |
| E              | 300                  | Mn-52m  | 2.80E-02                | 5.04E-09                           | 6.40E-10                           | 5.68E-09                              |
| E              | 300                  | Mn-52   | 2.12E-08                | 3.81E-15                           | 4.85E-16                           | 4.30E-15                              |
| E              | 300                  | K-40    | 8.66E-04                | 1.56E-10                           | 1.98E-11                           | 1.76E-10                              |
| E              | 400                  | Fe-52   | 5.80E-01                | 1.04E-07                           | 1.48E-08                           | 1.19E-07                              |
| E              | 400                  | Mn-52m  | 2.49E-02                | 4.48E-09                           | 6.36E-10                           | 5.11E-09                              |
| E              | 400                  | Mn-52   | 2.52E-08                | 4.53E-15                           | 6.43E-16                           | 5.17E-15                              |
| E              | 400                  | K-40    | 5.81E-04                | 1.05E-10                           | 1.48E-11                           | 1.19E-10                              |
| E              | 500                  | Fe-52   | 4.11E-01                | 7.40E-08                           | 1.18E-08                           | 8.59E-08                              |
| E              | 500                  | Mn-52m  | 2.19E-02                | 3.95E-09                           | 6.31E-10                           | 4.58E-09                              |
| E              | 500                  | Mn-52   | 2.78E-08                | 5.00E-15                           | 8.00E-16                           | 5.80E-15                              |
| E              | 500                  | K-40    | 4.12E-04                | 7.42E-11                           | 1.19E-11                           | 8.61E-11                              |
| E              | 700                  | Fe-52   | 2.35E-01                | 4.23E-08                           | 8.42E-09                           | 5.08E-08                              |
| E              | 700                  | Mn-52m  | 1.74E-02                | 3.13E-09                           | 6.22E-10                           | 3.75E-09                              |
| E              | 700                  | Mn-52   | 3.10E-08                | 5.57E-15                           | 1.11E-15                           | 6.68E-15                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| E              | 700                  | K-40    | 2.36E-04                | 4.25E-11                           | 8.45E-12                           | 5.09E-11                              |
| E              | 1000                 | Fe-52   | 1.25E-01                | 2.26E-08                           | 5.87E-09                           | 2.84E-08                              |
| E              | 1000                 | Mn-52m  | 1.30E-02                | 2.35E-09                           | 6.10E-10                           | 2.96E-09                              |
| E              | 1000                 | Mn-52   | 3.34E-08                | 6.00E-15                           | 1.56E-15                           | 7.57E-15                              |
| E              | 1000                 | K-40    | 1.26E-04                | 2.27E-11                           | 5.89E-12                           | 2.86E-11                              |
| E              | 1500                 | Fe-52   | 6.42E-02                | 1.16E-08                           | 3.89E-09                           | 1.54E-08                              |
| E              | 1500                 | Mn-52m  | 9.76E-03                | 1.76E-09                           | 5.91E-10                           | 2.35E-09                              |
| E              | 1500                 | Mn-52   | 3.78E-08                | 6.81E-15                           | 2.29E-15                           | 9.09E-15                              |
| E              | 1500                 | K-40    | 6.47E-05                | 1.16E-11                           | 3.91E-12                           | 1.56E-11                              |
| E              | 2000                 | Fe-52   | 3.97E-02                | 7.15E-09                           | 2.90E-09                           | 1.00E-08                              |
| E              | 2000                 | Mn-52m  | 7.84E-03                | 1.41E-09                           | 5.72E-10                           | 1.98E-09                              |
| E              | 2000                 | Mn-52   | 4.09E-08                | 7.36E-15                           | 2.98E-15                           | 1.03E-14                              |
| E              | 2000                 | K-40    | 4.01E-05                | 7.21E-12                           | 2.92E-12                           | 1.01E-11                              |
| E              | 3000                 | Fe-52   | 2.01E-02                | 3.61E-09                           | 1.91E-09                           | 5.52E-09                              |
| E              | 3000                 | Mn-52m  | 5.65E-03                | 1.02E-09                           | 5.39E-10                           | 1.56E-09                              |
| E              | 3000                 | Mn-52   | 4.50E-08                | 8.10E-15                           | 4.29E-15                           | 1.24E-14                              |
| E              | 3000                 | K-40    | 2.03E-05                | 3.66E-12                           | 1.94E-12                           | 5.60E-12                              |
| E              | 4000                 | Fe-52   | 1.30E-02                | 2.34E-09                           | 1.42E-09                           | 3.76E-09                              |
| E              | 4000                 | Mn-52m  | 4.66E-03                | 8.38E-10                           | 5.07E-10                           | 1.35E-09                              |
| E              | 4000                 | Mn-52   | 5.03E-08                | 9.06E-15                           | 5.48E-15                           | 1.45E-14                              |
| E              | 4000                 | K-40    | 1.33E-05                | 2.39E-12                           | 1.44E-12                           | 3.83E-12                              |
| E              | 5000                 | Fe-52   | 9.34E-03                | 1.68E-09                           | 1.12E-09                           | 2.81E-09                              |
| E              | 5000                 | Mn-52m  | 3.98E-03                | 7.17E-10                           | 4.79E-10                           | 1.20E-09                              |
| E              | 5000                 | Mn-52   | 5.47E-08                | 9.85E-15                           | 6.59E-15                           | 1.64E-14                              |
| E              | 5000                 | K-40    | 9.56E-06                | 1.72E-12                           | 1.15E-12                           | 2.87E-12                              |
| E              | 7000                 | Fe-52   | 5.63E-03                | 1.01E-09                           | 7.87E-10                           | 1.80E-09                              |
| E              | 7000                 | Mn-52m  | 3.06E-03                | 5.50E-10                           | 4.28E-10                           | 9.78E-10                              |
| E              | 7000                 | Mn-52   | 6.09E-08                | 1.10E-14                           | 8.52E-15                           | 1.95E-14                              |
| E              | 7000                 | K-40    | 5.81E-06                | 1.05E-12                           | 8.13E-13                           | 1.86E-12                              |
| E              | 10000                | Fe-52   | 3.30E-03                | 5.94E-10                           | 5.36E-10                           | 1.13E-09                              |
| E              | 10000                | Mn-52m  | 2.24E-03                | 4.03E-10                           | 3.64E-10                           | 7.67E-10                              |
| E              | 10000                | Mn-52   | 6.69E-08                | 1.20E-14                           | 1.09E-14                           | 2.29E-14                              |
| E              | 10000                | K-40    | 3.46E-06                | 6.22E-13                           | 5.62E-13                           | 1.18E-12                              |
| E              | 15000                | Fe-52   | 1.95E-03                | 3.52E-10                           | 3.44E-10                           | 6.96E-10                              |
| E              | 15000                | Mn-52m  | 1.62E-03                | 2.91E-10                           | 2.85E-10                           | 5.76E-10                              |
| E              | 15000                | Mn-52   | 7.82E-08                | 1.41E-14                           | 1.38E-14                           | 2.78E-14                              |
| E              | 15000                | K-40    | 2.10E-06                | 3.77E-13                           | 3.69E-13                           | 7.46E-13                              |
| E              | 20000                | Fe-52   | 1.32E-03                | 2.38E-10                           | 2.48E-10                           | 4.85E-10                              |
| E              | 20000                | Mn-52m  | 1.21E-03                | 2.18E-10                           | 2.27E-10                           | 4.45E-10                              |
| E              | 20000                | Mn-52   | 8.34E-08                | 1.50E-14                           | 1.56E-14                           | 3.06E-14                              |
| E              | 20000                | K-40    | 1.45E-06                | 2.61E-13                           | 2.72E-13                           | 5.33E-13                              |
| E              | 30000                | Fe-52   | 7.41E-04                | 1.33E-10                           | 1.52E-10                           | 2.85E-10                              |
| E              | 30000                | Mn-52m  | 7.41E-04                | 1.33E-10                           | 1.51E-10                           | 2.85E-10                              |
| E              | 30000                | Mn-52   | 8.56E-08                | 1.54E-14                           | 1.75E-14                           | 3.29E-14                              |
| E              | 30000                | K-40    | 8.52E-07                | 1.53E-13                           | 1.74E-13                           | 3.28E-13                              |
| E              | 50000                | Fe-52   | 3.51E-04                | 6.32E-11                           | 7.82E-11                           | 1.41E-10                              |
| E              | 50000                | Mn-52m  | 3.64E-04                | 6.56E-11                           | 8.12E-11                           | 1.47E-10                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| E              | 50000                | Mn-52   | 8.20E-08                | 1.48E-14                           | 1.83E-14                           | 3.30E-14                              |
| E              | 50000                | K-40    | 4.43E-07                | 7.97E-14                           | 9.87E-14                           | 1.78E-13                              |
| E              | 80000                | Fe-52   | 1.48E-04                | 2.66E-11                           | 3.80E-11                           | 6.46E-11                              |
| E              | 80000                | Mn-52m  | 1.54E-04                | 2.77E-11                           | 3.97E-11                           | 6.74E-11                              |
| E              | 80000                | Mn-52   | 6.40E-08                | 1.15E-14                           | 1.65E-14                           | 2.80E-14                              |
| E              | 80000                | K-40    | 2.14E-07                | 3.85E-14                           | 5.51E-14                           | 9.37E-14                              |
| ENE            | 100                  | Fe-52   | 2.67E+00                | 4.80E-07                           | 5.60E-08                           | 5.36E-07                              |
| ENE            | 100                  | Mn-52m  | 2.73E-02                | 4.91E-09                           | 5.72E-10                           | 5.48E-09                              |
| ENE            | 100                  | Mn-52   | 6.43E-09                | 1.16E-15                           | 1.35E-16                           | 1.29E-15                              |
| ENE            | 100                  | K-40    | 2.67E-03                | 4.81E-10                           | 5.60E-11                           | 5.37E-10                              |
| ENE            | 150                  | Fe-52   | 1.78E+00                | 3.21E-07                           | 3.73E-08                           | 3.58E-07                              |
| ENE            | 150                  | Mn-52m  | 2.73E-02                | 4.91E-09                           | 5.70E-10                           | 5.48E-09                              |
| ENE            | 150                  | Mn-52   | 9.66E-09                | 1.74E-15                           | 2.02E-16                           | 1.94E-15                              |
| ENE            | 150                  | K-40    | 1.79E-03                | 3.21E-10                           | 3.73E-11                           | 3.59E-10                              |
| ENE            | 200                  | Fe-52   | 1.31E+00                | 2.36E-07                           | 2.79E-08                           | 2.64E-07                              |
| ENE            | 200                  | Mn-52m  | 2.67E-02                | 4.81E-09                           | 5.68E-10                           | 5.37E-09                              |
| ENE            | 200                  | Mn-52   | 1.26E-08                | 2.27E-15                           | 2.68E-16                           | 2.54E-15                              |
| ENE            | 200                  | K-40    | 1.31E-03                | 2.37E-10                           | 2.79E-11                           | 2.64E-10                              |
| ENE            | 300                  | Fe-52   | 8.11E-01                | 1.46E-07                           | 1.86E-08                           | 1.65E-07                              |
| ENE            | 300                  | Mn-52m  | 2.46E-02                | 4.43E-09                           | 5.64E-10                           | 5.00E-09                              |
| ENE            | 300                  | Mn-52   | 1.75E-08                | 3.15E-15                           | 4.00E-16                           | 3.55E-15                              |
| ENE            | 300                  | K-40    | 8.12E-04                | 1.46E-10                           | 1.86E-11                           | 1.65E-10                              |
| ENE            | 400                  | Fe-52   | 5.44E-01                | 9.79E-08                           | 1.39E-08                           | 1.12E-07                              |
| ENE            | 400                  | Mn-52m  | 2.19E-02                | 3.94E-09                           | 5.60E-10                           | 4.50E-09                              |
| ENE            | 400                  | Mn-52   | 2.08E-08                | 3.74E-15                           | 5.31E-16                           | 4.27E-15                              |
| ENE            | 400                  | K-40    | 5.45E-04                | 9.81E-11                           | 1.39E-11                           | 1.12E-10                              |
| ENE            | 500                  | Fe-52   | 3.86E-01                | 6.95E-08                           | 1.11E-08                           | 8.06E-08                              |
| ENE            | 500                  | Mn-52m  | 1.93E-02                | 3.48E-09                           | 5.56E-10                           | 4.04E-09                              |
| ENE            | 500                  | Mn-52   | 2.30E-08                | 4.13E-15                           | 6.60E-16                           | 4.79E-15                              |
| ENE            | 500                  | K-40    | 3.87E-04                | 6.96E-11                           | 1.11E-11                           | 8.07E-11                              |
| ENE            | 700                  | Fe-52   | 2.21E-01                | 3.97E-08                           | 7.90E-09                           | 4.76E-08                              |
| ENE            | 700                  | Mn-52m  | 1.53E-02                | 2.76E-09                           | 5.49E-10                           | 3.31E-09                              |
| ENE            | 700                  | Mn-52   | 2.56E-08                | 4.61E-15                           | 9.16E-16                           | 5.52E-15                              |
| ENE            | 700                  | K-40    | 2.21E-04                | 3.99E-11                           | 7.93E-12                           | 4.78E-11                              |
| ENE            | 1000                 | Fe-52   | 1.18E-01                | 2.12E-08                           | 5.51E-09                           | 2.67E-08                              |
| ENE            | 1000                 | Mn-52m  | 1.15E-02                | 2.07E-09                           | 5.38E-10                           | 2.61E-09                              |
| ENE            | 1000                 | Mn-52   | 2.76E-08                | 4.97E-15                           | 1.29E-15                           | 6.26E-15                              |
| ENE            | 1000                 | K-40    | 1.18E-04                | 2.13E-11                           | 5.53E-12                           | 2.68E-11                              |
| ENE            | 1500                 | Fe-52   | 6.03E-02                | 1.09E-08                           | 3.65E-09                           | 1.45E-08                              |
| ENE            | 1500                 | Mn-52m  | 8.64E-03                | 1.55E-09                           | 5.22E-10                           | 2.08E-09                              |
| ENE            | 1500                 | Mn-52   | 3.13E-08                | 5.64E-15                           | 1.89E-15                           | 7.53E-15                              |
| ENE            | 1500                 | K-40    | 6.07E-05                | 1.09E-11                           | 3.67E-12                           | 1.46E-11                              |
| ENE            | 2000                 | Fe-52   | 3.73E-02                | 6.72E-09                           | 2.72E-09                           | 9.44E-09                              |
| ENE            | 2000                 | Mn-52m  | 6.96E-03                | 1.25E-09                           | 5.07E-10                           | 1.76E-09                              |
| ENE            | 2000                 | Mn-52   | 3.39E-08                | 6.11E-15                           | 2.47E-15                           | 8.58E-15                              |
| ENE            | 2000                 | K-40    | 3.76E-05                | 6.78E-12                           | 2.74E-12                           | 9.52E-12                              |
| ENE            | 3000                 | Fe-52   | 1.89E-02                | 3.40E-09                           | 1.80E-09                           | 5.19E-09                              |





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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ENE            | 3000                 | Mn-52m  | 5.03E-03                | 9.06E-10                           | 4.79E-10                           | 1.39E-09                              |
| ENE            | 3000                 | Mn-52   | 3.74E-08                | 6.74E-15                           | 3.57E-15                           | 1.03E-14                              |
| ENE            | 3000                 | K-40    | 1.91E-05                | 3.44E-12                           | 1.82E-12                           | 5.26E-12                              |
| ENE            | 4000                 | Fe-52   | 1.23E-02                | 2.21E-09                           | 1.33E-09                           | 3.54E-09                              |
| ENE            | 4000                 | Mn-52m  | 4.16E-03                | 7.49E-10                           | 4.53E-10                           | 1.20E-09                              |
| ENE            | 4000                 | Mn-52   | 4.20E-08                | 7.56E-15                           | 4.57E-15                           | 1.21E-14                              |
| ENE            | 4000                 | K-40    | 1.25E-05                | 2.25E-12                           | 1.36E-12                           | 3.60E-12                              |
| ENE            | 5000                 | Fe-52   | 8.81E-03                | 1.58E-09                           | 1.06E-09                           | 2.64E-09                              |
| ENE            | 5000                 | Mn-52m  | 3.57E-03                | 6.43E-10                           | 4.29E-10                           | 1.07E-09                              |
| ENE            | 5000                 | Mn-52   | 4.58E-08                | 8.24E-15                           | 5.50E-15                           | 1.37E-14                              |
| ENE            | 5000                 | K-40    | 9.00E-06                | 1.62E-12                           | 1.08E-12                           | 2.70E-12                              |
| ENE            | 7000                 | Fe-52   | 5.31E-03                | 9.56E-10                           | 7.42E-10                           | 1.70E-09                              |
| ENE            | 7000                 | Mn-52m  | 2.76E-03                | 4.97E-10                           | 3.86E-10                           | 8.82E-10                              |
| ENE            | 7000                 | Mn-52   | 5.12E-08                | 9.21E-15                           | 7.15E-15                           | 1.64E-14                              |
| ENE            | 7000                 | K-40    | 5.48E-06                | 9.86E-13                           | 7.65E-13                           | 1.75E-12                              |
| ENE            | 10000                | Fe-52   | 3.12E-03                | 5.62E-10                           | 5.06E-10                           | 1.07E-09                              |
| ENE            | 10000                | Mn-52m  | 2.04E-03                | 3.67E-10                           | 3.31E-10                           | 6.98E-10                              |
| ENE            | 10000                | Mn-52   | 5.66E-08                | 1.02E-14                           | 9.18E-15                           | 1.94E-14                              |
| ENE            | 10000                | K-40    | 3.26E-06                | 5.87E-13                           | 5.29E-13                           | 1.12E-12                              |
| ENE            | 15000                | Fe-52   | 1.85E-03                | 3.34E-10                           | 3.25E-10                           | 6.59E-10                              |
| ENE            | 15000                | Mn-52m  | 1.49E-03                | 2.69E-10                           | 2.62E-10                           | 5.31E-10                              |
| ENE            | 15000                | Mn-52   | 6.67E-08                | 1.20E-14                           | 1.17E-14                           | 2.37E-14                              |
| ENE            | 15000                | K-40    | 1.98E-06                | 3.56E-13                           | 3.47E-13                           | 7.04E-13                              |
| ENE            | 20000                | Fe-52   | 1.26E-03                | 2.26E-10                           | 2.35E-10                           | 4.61E-10                              |
| ENE            | 20000                | Mn-52m  | 1.13E-03                | 2.03E-10                           | 2.11E-10                           | 4.14E-10                              |
| ENE            | 20000                | Mn-52   | 7.18E-08                | 1.29E-14                           | 1.34E-14                           | 2.63E-14                              |
| ENE            | 20000                | K-40    | 1.37E-06                | 2.47E-13                           | 2.56E-13                           | 5.03E-13                              |
| ENE            | 30000                | Fe-52   | 7.10E-04                | 1.28E-10                           | 1.44E-10                           | 2.72E-10                              |
| ENE            | 30000                | Mn-52m  | 7.03E-04                | 1.27E-10                           | 1.43E-10                           | 2.70E-10                              |
| ENE            | 30000                | Mn-52   | 7.47E-08                | 1.34E-14                           | 1.52E-14                           | 2.86E-14                              |
| ENE            | 30000                | K-40    | 8.10E-07                | 1.46E-13                           | 1.65E-13                           | 3.10E-13                              |
| ENE            | 50000                | Fe-52   | 3.40E-04                | 6.12E-11                           | 7.53E-11                           | 1.36E-10                              |
| ENE            | 50000                | Mn-52m  | 3.52E-04                | 6.34E-11                           | 7.80E-11                           | 1.41E-10                              |
| ENE            | 50000                | Mn-52   | 7.28E-08                | 1.31E-14                           | 1.61E-14                           | 2.92E-14                              |
| ENE            | 50000                | K-40    | 4.23E-07                | 7.61E-14                           | 9.36E-14                           | 1.70E-13                              |
| ENE            | 80000                | Fe-52   | 1.46E-04                | 2.62E-11                           | 3.71E-11                           | 6.34E-11                              |
| ENE            | 80000                | Mn-52m  | 1.52E-04                | 2.74E-11                           | 3.88E-11                           | 6.62E-11                              |
| ENE            | 80000                | Mn-52   | 5.81E-08                | 1.05E-14                           | 1.48E-14                           | 2.53E-14                              |
| ENE            | 80000                | K-40    | 2.07E-07                | 3.72E-14                           | 5.27E-14                           | 8.99E-14                              |
| NE             | 100                  | Fe-52   | 2.51E+00                | 4.52E-07                           | 5.27E-08                           | 5.05E-07                              |
| NE             | 100                  | Mn-52m  | 2.42E-02                | 4.35E-09                           | 5.06E-10                           | 4.85E-09                              |
| NE             | 100                  | Mn-52   | 5.36E-09                | 9.65E-16                           | 1.12E-16                           | 1.08E-15                              |
| NE             | 100                  | K-40    | 2.51E-03                | 4.52E-10                           | 5.27E-11                           | 5.05E-10                              |
| NE             | 150                  | Fe-52   | 1.68E+00                | 3.02E-07                           | 3.51E-08                           | 3.37E-07                              |
| NE             | 150                  | Mn-52m  | 2.42E-02                | 4.35E-09                           | 5.05E-10                           | 4.85E-09                              |
| NE             | 150                  | Mn-52   | 8.05E-09                | 1.45E-15                           | 1.68E-16                           | 1.62E-15                              |
| NE             | 150                  | K-40    | 1.68E-03                | 3.02E-10                           | 3.51E-11                           | 3.38E-10                              |



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| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 200                  | Fe-52   | 1.24E+00                | 2.22E-07                           | 2.63E-08                           | 2.49E-07                              |
| NE             | 200                  | Mn-52m  | 2.37E-02                | 4.26E-09                           | 5.03E-10                           | 4.76E-09                              |
| NE             | 200                  | Mn-52   | 1.05E-08                | 1.89E-15                           | 2.24E-16                           | 2.12E-15                              |
| NE             | 200                  | K-40    | 1.24E-03                | 2.23E-10                           | 2.63E-11                           | 2.49E-10                              |
| NE             | 300                  | Fe-52   | 7.64E-01                | 1.37E-07                           | 1.75E-08                           | 1.55E-07                              |
| NE             | 300                  | Mn-52m  | 2.18E-02                | 3.93E-09                           | 5.00E-10                           | 4.43E-09                              |
| NE             | 300                  | Mn-52   | 1.46E-08                | 2.63E-15                           | 3.34E-16                           | 2.96E-15                              |
| NE             | 300                  | K-40    | 7.65E-04                | 1.38E-10                           | 1.75E-11                           | 1.55E-10                              |
| NE             | 400                  | Fe-52   | 5.12E-01                | 9.22E-08                           | 1.31E-08                           | 1.05E-07                              |
| NE             | 400                  | Mn-52m  | 1.94E-02                | 3.50E-09                           | 4.97E-10                           | 3.99E-09                              |
| NE             | 400                  | Mn-52   | 1.73E-08                | 3.12E-15                           | 4.43E-16                           | 3.56E-15                              |
| NE             | 400                  | K-40    | 5.13E-04                | 9.23E-11                           | 1.31E-11                           | 1.05E-10                              |
| NE             | 500                  | Fe-52   | 3.63E-01                | 6.54E-08                           | 1.05E-08                           | 7.59E-08                              |
| NE             | 500                  | Mn-52m  | 1.72E-02                | 3.09E-09                           | 4.93E-10                           | 3.58E-09                              |
| NE             | 500                  | Mn-52   | 1.92E-08                | 3.45E-15                           | 5.51E-16                           | 4.00E-15                              |
| NE             | 500                  | K-40    | 3.64E-04                | 6.55E-11                           | 1.05E-11                           | 7.60E-11                              |
| NE             | 700                  | Fe-52   | 2.08E-01                | 3.74E-08                           | 7.44E-09                           | 4.49E-08                              |
| NE             | 700                  | Mn-52m  | 1.36E-02                | 2.45E-09                           | 4.87E-10                           | 2.94E-09                              |
| NE             | 700                  | Mn-52   | 2.14E-08                | 3.85E-15                           | 7.65E-16                           | 4.61E-15                              |
| NE             | 700                  | K-40    | 2.09E-04                | 3.75E-11                           | 7.46E-12                           | 4.50E-11                              |
| NE             | 1000                 | Fe-52   | 1.11E-01                | 2.00E-08                           | 5.19E-09                           | 2.52E-08                              |
| NE             | 1000                 | Mn-52m  | 1.02E-02                | 1.84E-09                           | 4.79E-10                           | 2.32E-09                              |
| NE             | 1000                 | Mn-52   | 2.31E-08                | 4.15E-15                           | 1.08E-15                           | 5.23E-15                              |
| NE             | 1000                 | K-40    | 1.11E-04                | 2.01E-11                           | 5.21E-12                           | 2.53E-11                              |
| NE             | 1500                 | Fe-52   | 5.69E-02                | 1.02E-08                           | 3.44E-09                           | 1.37E-08                              |
| NE             | 1500                 | Mn-52m  | 7.70E-03                | 1.39E-09                           | 4.65E-10                           | 1.85E-09                              |
| NE             | 1500                 | Mn-52   | 2.62E-08                | 4.72E-15                           | 1.58E-15                           | 6.30E-15                              |
| NE             | 1500                 | K-40    | 5.72E-05                | 1.03E-11                           | 3.46E-12                           | 1.38E-11                              |
| NE             | 2000                 | Fe-52   | 3.52E-02                | 6.34E-09                           | 2.57E-09                           | 8.90E-09                              |
| NE             | 2000                 | Mn-52m  | 6.21E-03                | 1.12E-09                           | 4.52E-10                           | 1.57E-09                              |
| NE             | 2000                 | Mn-52   | 2.84E-08                | 5.12E-15                           | 2.07E-15                           | 7.19E-15                              |
| NE             | 2000                 | K-40    | 3.55E-05                | 6.39E-12                           | 2.59E-12                           | 8.97E-12                              |
| NE             | 3000                 | Fe-52   | 1.78E-02                | 3.21E-09                           | 1.69E-09                           | 4.90E-09                              |
| NE             | 3000                 | Mn-52m  | 4.51E-03                | 8.11E-10                           | 4.29E-10                           | 1.24E-09                              |
| NE             | 3000                 | Mn-52   | 3.15E-08                | 5.66E-15                           | 2.99E-15                           | 8.66E-15                              |
| NE             | 3000                 | K-40    | 1.80E-05                | 3.25E-12                           | 1.72E-12                           | 4.96E-12                              |
| NE             | 4000                 | Fe-52   | 1.16E-02                | 2.08E-09                           | 1.26E-09                           | 3.34E-09                              |
| NE             | 4000                 | Mn-52m  | 3.74E-03                | 6.73E-10                           | 4.07E-10                           | 1.08E-09                              |
| NE             | 4000                 | Mn-52   | 3.54E-08                | 6.37E-15                           | 3.85E-15                           | 1.02E-14                              |
| NE             | 4000                 | K-40    | 1.18E-05                | 2.12E-12                           | 1.28E-12                           | 3.40E-12                              |
| NE             | 5000                 | Fe-52   | 8.32E-03                | 1.50E-09                           | 9.99E-10                           | 2.50E-09                              |
| NE             | 5000                 | Mn-52m  | 3.22E-03                | 5.79E-10                           | 3.86E-10                           | 9.66E-10                              |
| NE             | 5000                 | Mn-52   | 3.87E-08                | 6.96E-15                           | 4.64E-15                           | 1.16E-14                              |
| NE             | 5000                 | K-40    | 8.50E-06                | 1.53E-12                           | 1.02E-12                           | 2.55E-12                              |
| NE             | 7000                 | Fe-52   | 5.03E-03                | 9.05E-10                           | 7.01E-10                           | 1.61E-09                              |
| NE             | 7000                 | Mn-52m  | 2.50E-03                | 4.51E-10                           | 3.49E-10                           | 8.00E-10                              |
| NE             | 7000                 | Mn-52   | 4.34E-08                | 7.81E-15                           | 6.05E-15                           | 1.39E-14                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NE             | 7000                 | K-40    | 5.17E-06                | 9.31E-13                           | 7.22E-13                           | 1.65E-12                              |
| NE             | 10000                | Fe-52   | 2.96E-03                | 5.33E-10                           | 4.79E-10                           | 1.01E-09                              |
| NE             | 10000                | Mn-52m  | 1.87E-03                | 3.36E-10                           | 3.02E-10                           | 6.38E-10                              |
| NE             | 10000                | Mn-52   | 4.83E-08                | 8.69E-15                           | 7.82E-15                           | 1.65E-14                              |
| NE             | 10000                | K-40    | 3.09E-06                | 5.55E-13                           | 4.99E-13                           | 1.05E-12                              |
| NE             | 15000                | Fe-52   | 1.76E-03                | 3.17E-10                           | 3.09E-10                           | 6.26E-10                              |
| NE             | 15000                | Mn-52m  | 1.38E-03                | 2.49E-10                           | 2.42E-10                           | 4.91E-10                              |
| NE             | 15000                | Mn-52   | 5.74E-08                | 1.03E-14                           | 1.01E-14                           | 2.04E-14                              |
| NE             | 15000                | K-40    | 1.88E-06                | 3.38E-13                           | 3.28E-13                           | 6.66E-13                              |
| NE             | 20000                | Fe-52   | 1.20E-03                | 2.16E-10                           | 2.23E-10                           | 4.39E-10                              |
| NE             | 20000                | Mn-52m  | 1.06E-03                | 1.90E-10                           | 1.97E-10                           | 3.87E-10                              |
| NE             | 20000                | Mn-52   | 6.22E-08                | 1.12E-14                           | 1.16E-14                           | 2.28E-14                              |
| NE             | 20000                | K-40    | 1.30E-06                | 2.34E-13                           | 2.42E-13                           | 4.77E-13                              |
| NE             | 30000                | Fe-52   | 6.82E-04                | 1.23E-10                           | 1.38E-10                           | 2.61E-10                              |
| NE             | 30000                | Mn-52m  | 6.67E-04                | 1.20E-10                           | 1.35E-10                           | 2.55E-10                              |
| NE             | 30000                | Mn-52   | 6.56E-08                | 1.18E-14                           | 1.33E-14                           | 2.51E-14                              |
| NE             | 30000                | K-40    | 7.71E-07                | 1.39E-13                           | 1.56E-13                           | 2.95E-13                              |
| NE             | 50000                | Fe-52   | 3.29E-04                | 5.92E-11                           | 7.25E-11                           | 1.32E-10                              |
| NE             | 50000                | Mn-52m  | 3.40E-04                | 6.12E-11                           | 7.50E-11                           | 1.36E-10                              |
| NE             | 50000                | Mn-52   | 6.49E-08                | 1.17E-14                           | 1.43E-14                           | 2.60E-14                              |
| NE             | 50000                | K-40    | 4.04E-07                | 7.27E-14                           | 8.90E-14                           | 1.62E-13                              |
| NE             | 80000                | Fe-52   | 1.44E-04                | 2.59E-11                           | 3.63E-11                           | 6.21E-11                              |
| NE             | 80000                | Mn-52m  | 1.50E-04                | 2.70E-11                           | 3.79E-11                           | 6.49E-11                              |
| NE             | 80000                | Mn-52   | 5.29E-08                | 9.53E-15                           | 1.34E-14                           | 2.29E-14                              |
| NE             | 80000                | K-40    | 2.00E-07                | 3.59E-14                           | 5.04E-14                           | 8.63E-14                              |
| NNE            | 100                  | Fe-52   | 2.37E+00                | 4.27E-07                           | 4.97E-08                           | 4.77E-07                              |
| NNE            | 100                  | Mn-52m  | 2.16E-02                | 3.88E-09                           | 4.52E-10                           | 4.33E-09                              |
| NNE            | 100                  | Mn-52   | 4.52E-09                | 8.13E-16                           | 9.47E-17                           | 9.08E-16                              |
| NNE            | 100                  | K-40    | 2.37E-03                | 4.27E-10                           | 4.98E-11                           | 4.77E-10                              |
| NNE            | 150                  | Fe-52   | 1.59E+00                | 2.86E-07                           | 3.31E-08                           | 3.19E-07                              |
| NNE            | 150                  | Mn-52m  | 2.16E-02                | 3.88E-09                           | 4.51E-10                           | 4.33E-09                              |
| NNE            | 150                  | Mn-52   | 6.79E-09                | 1.22E-15                           | 1.42E-16                           | 1.36E-15                              |
| NNE            | 150                  | K-40    | 1.59E-03                | 2.86E-10                           | 3.32E-11                           | 3.19E-10                              |
| NNE            | 200                  | Fe-52   | 1.17E+00                | 2.10E-07                           | 2.48E-08                           | 2.35E-07                              |
| NNE            | 200                  | Mn-52m  | 2.11E-02                | 3.80E-09                           | 4.49E-10                           | 4.25E-09                              |
| NNE            | 200                  | Mn-52   | 8.87E-09                | 1.60E-15                           | 1.89E-16                           | 1.78E-15                              |
| NNE            | 200                  | K-40    | 1.17E-03                | 2.10E-10                           | 2.48E-11                           | 2.35E-10                              |
| NNE            | 300                  | Fe-52   | 7.22E-01                | 1.30E-07                           | 1.65E-08                           | 1.46E-07                              |
| NNE            | 300                  | Mn-52m  | 1.95E-02                | 3.51E-09                           | 4.46E-10                           | 3.96E-09                              |
| NNE            | 300                  | Mn-52   | 1.23E-08                | 2.21E-15                           | 2.81E-16                           | 2.50E-15                              |
| NNE            | 300                  | K-40    | 7.22E-04                | 1.30E-10                           | 1.65E-11                           | 1.47E-10                              |
| NNE            | 400                  | Fe-52   | 4.84E-01                | 8.71E-08                           | 1.24E-08                           | 9.95E-08                              |
| NNE            | 400                  | Mn-52m  | 1.74E-02                | 3.12E-09                           | 4.44E-10                           | 3.57E-09                              |
| NNE            | 400                  | Mn-52   | 1.46E-08                | 2.63E-15                           | 3.74E-16                           | 3.00E-15                              |
| NNE            | 400                  | K-40    | 4.85E-04                | 8.72E-11                           | 1.24E-11                           | 9.96E-11                              |
| NNE            | 500                  | Fe-52   | 3.43E-01                | 6.18E-08                           | 9.88E-09                           | 7.17E-08                              |
| NNE            | 500                  | Mn-52m  | 1.53E-02                | 2.76E-09                           | 4.41E-10                           | 3.20E-09                              |



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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNE            | 500                  | Mn-52   | 1.62E-08                | 2.91E-15                           | 4.65E-16                           | 3.37E-15                              |
| NNE            | 500                  | K-40    | 3.44E-04                | 6.19E-11                           | 9.90E-12                           | 7.18E-11                              |
| NNE            | 700                  | Fe-52   | 1.97E-01                | 3.54E-08                           | 7.03E-09                           | 4.24E-08                              |
| NNE            | 700                  | Mn-52m  | 1.22E-02                | 2.19E-09                           | 4.36E-10                           | 2.63E-09                              |
| NNE            | 700                  | Mn-52   | 1.80E-08                | 3.25E-15                           | 6.45E-16                           | 3.89E-15                              |
| NNE            | 700                  | K-40    | 1.97E-04                | 3.55E-11                           | 7.05E-12                           | 4.25E-11                              |
| NNE            | 1000                 | Fe-52   | 1.05E-01                | 1.89E-08                           | 4.90E-09                           | 2.38E-08                              |
| NNE            | 1000                 | Mn-52m  | 9.17E-03                | 1.65E-09                           | 4.29E-10                           | 2.08E-09                              |
| NNE            | 1000                 | Mn-52   | 1.95E-08                | 3.51E-15                           | 9.11E-16                           | 4.42E-15                              |
| NNE            | 1000                 | K-40    | 1.05E-04                | 1.90E-11                           | 4.92E-12                           | 2.39E-11                              |
| NNE            | 1500                 | Fe-52   | 5.38E-02                | 9.69E-09                           | 3.25E-09                           | 1.29E-08                              |
| NNE            | 1500                 | Mn-52m  | 6.90E-03                | 1.24E-09                           | 4.17E-10                           | 1.66E-09                              |
| NNE            | 1500                 | Mn-52   | 2.22E-08                | 3.99E-15                           | 1.34E-15                           | 5.33E-15                              |
| NNE            | 1500                 | K-40    | 5.41E-05                | 9.74E-12                           | 3.27E-12                           | 1.30E-11                              |
| NNE            | 2000                 | Fe-52   | 3.33E-02                | 6.00E-09                           | 2.43E-09                           | 8.42E-09                              |
| NNE            | 2000                 | Mn-52m  | 5.58E-03                | 1.00E-09                           | 4.06E-10                           | 1.41E-09                              |
| NNE            | 2000                 | Mn-52   | 2.41E-08                | 4.33E-15                           | 1.75E-15                           | 6.09E-15                              |
| NNE            | 2000                 | K-40    | 3.36E-05                | 6.04E-12                           | 2.45E-12                           | 8.49E-12                              |
| NNE            | 3000                 | Fe-52   | 1.69E-02                | 3.04E-09                           | 1.60E-09                           | 4.64E-09                              |
| NNE            | 3000                 | Mn-52m  | 4.06E-03                | 7.31E-10                           | 3.86E-10                           | 1.12E-09                              |
| NNE            | 3000                 | Mn-52   | 2.67E-08                | 4.81E-15                           | 2.54E-15                           | 7.35E-15                              |
| NNE            | 3000                 | K-40    | 1.71E-05                | 3.07E-12                           | 1.62E-12                           | 4.69E-12                              |
| NNE            | 4000                 | Fe-52   | 1.10E-02                | 1.98E-09                           | 1.19E-09                           | 3.17E-09                              |
| NNE            | 4000                 | Mn-52m  | 3.38E-03                | 6.09E-10                           | 3.67E-10                           | 9.76E-10                              |
| NNE            | 4000                 | Mn-52   | 3.01E-08                | 5.42E-15                           | 3.27E-15                           | 8.69E-15                              |
| NNE            | 4000                 | K-40    | 1.11E-05                | 2.01E-12                           | 1.21E-12                           | 3.22E-12                              |
| NNE            | 5000                 | Fe-52   | 7.89E-03                | 1.42E-09                           | 9.46E-10                           | 2.37E-09                              |
| NNE            | 5000                 | Mn-52m  | 2.92E-03                | 5.25E-10                           | 3.50E-10                           | 8.75E-10                              |
| NNE            | 5000                 | Mn-52   | 3.29E-08                | 5.93E-15                           | 3.95E-15                           | 9.88E-15                              |
| NNE            | 5000                 | K-40    | 8.05E-06                | 1.45E-12                           | 9.65E-13                           | 2.41E-12                              |
| NNE            | 7000                 | Fe-52   | 4.77E-03                | 8.59E-10                           | 6.65E-10                           | 1.52E-09                              |
| NNE            | 7000                 | Mn-52m  | 2.28E-03                | 4.11E-10                           | 3.18E-10                           | 7.28E-10                              |
| NNE            | 7000                 | Mn-52   | 3.71E-08                | 6.68E-15                           | 5.17E-15                           | 1.19E-14                              |
| NNE            | 7000                 | K-40    | 4.91E-06                | 8.83E-13                           | 6.83E-13                           | 1.57E-12                              |
| NNE            | 10000                | Fe-52   | 2.82E-03                | 5.07E-10                           | 4.55E-10                           | 9.62E-10                              |
| NNE            | 10000                | Mn-52m  | 1.71E-03                | 3.09E-10                           | 2.77E-10                           | 5.85E-10                              |
| NNE            | 10000                | Mn-52   | 4.16E-08                | 7.48E-15                           | 6.71E-15                           | 1.42E-14                              |
| NNE            | 10000                | K-40    | 2.93E-06                | 5.27E-13                           | 4.73E-13                           | 1.00E-12                              |
| NNE            | 15000                | Fe-52   | 1.68E-03                | 3.03E-10                           | 2.94E-10                           | 5.96E-10                              |
| NNE            | 15000                | Mn-52m  | 1.28E-03                | 2.31E-10                           | 2.24E-10                           | 4.55E-10                              |
| NNE            | 15000                | Mn-52   | 4.98E-08                | 8.96E-15                           | 8.70E-15                           | 1.77E-14                              |
| NNE            | 15000                | K-40    | 1.78E-06                | 3.21E-13                           | 3.11E-13                           | 6.32E-13                              |
| NNE            | 20000                | Fe-52   | 1.15E-03                | 2.06E-10                           | 2.13E-10                           | 4.19E-10                              |
| NNE            | 20000                | Mn-52m  | 9.88E-04                | 1.78E-10                           | 1.84E-10                           | 3.61E-10                              |
| NNE            | 20000                | Mn-52   | 5.43E-08                | 9.78E-15                           | 1.01E-14                           | 1.99E-14                              |
| NNE            | 20000                | K-40    | 1.24E-06                | 2.23E-13                           | 2.30E-13                           | 4.53E-13                              |
| NNE            | 30000                | Fe-52   | 6.55E-04                | 1.18E-10                           | 1.32E-10                           | 2.50E-10                              |

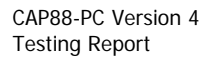


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CONCEN  
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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/m3) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|-------------------------|------------------------------------|------------------------------------|---------------------------------------|
| NNE            | 30000                | Mn-52m  | 6.34E-04                | 1.14E-10                           | 1.28E-10                           | 2.42E-10                              |
| NNE            | 30000                | Mn-52   | 5.79E-08                | 1.04E-14                           | 1.17E-14                           | 2.21E-14                              |
| NNE            | 30000                | K-40    | 7.36E-07                | 1.32E-13                           | 1.48E-13                           | 2.81E-13                              |
| NNE            | 50000                | Fe-52   | 3.19E-04                | 5.74E-11                           | 6.99E-11                           | 1.27E-10                              |
| NNE            | 50000                | Mn-52m  | 3.29E-04                | 5.91E-11                           | 7.21E-11                           | 1.31E-10                              |
| NNE            | 50000                | Mn-52   | 5.82E-08                | 1.05E-14                           | 1.28E-14                           | 2.32E-14                              |
| NNE            | 50000                | K-40    | 3.87E-07                | 6.96E-14                           | 8.49E-14                           | 1.54E-13                              |
| NNE            | 80000                | Fe-52   | 1.42E-04                | 2.55E-11                           | 3.54E-11                           | 6.09E-11                              |
| NNE            | 80000                | Mn-52m  | 1.48E-04                | 2.66E-11                           | 3.69E-11                           | 6.35E-11                              |
| NNE            | 80000                | Mn-52   | 4.83E-08                | 8.70E-15                           | 1.21E-14                           | 2.08E-14                              |
| NNE            | 80000                | K-40    | 1.93E-07                | 3.47E-14                           | 4.83E-14                           | 8.30E-14                              |



Version 4.0

Clean Air Act Assessment Package - 1988

Non-Radon Individual Assessment  
Fri Jun 07 22:15:35 2013

Facility: General Forge and Foundry Company  
Address:  
City: Ilium  
State: NY Zip: 12179

```
Source Category:
Source Type: Area
Emission Year: 1963
```

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Dataset Name: Test\_006.  
Dataset Date: Jun 7, 2013 10:15 PM  
Wind File: C:\Users\CAP88 User\Documents\CAP88\Wind Files\ilium\_ny.wnd



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CHIQ  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR Fe-52  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 100       | 150       | 200       | 300       | 400       | 500       | 700       |
| N                 | 7.422E-05 | 4.938E-05 | 3.618E-05 | 2.214E-05 | 1.469E-05 | 1.031E-05 | 5.786E-06 |
| NNW               | 5.581E-05 | 3.719E-05 | 2.728E-05 | 1.675E-05 | 1.115E-05 | 7.851E-06 | 4.431E-06 |
| NW                | 4.469E-05 | 2.981E-05 | 2.189E-05 | 1.346E-05 | 8.974E-06 | 6.334E-06 | 3.588E-06 |
| WNW               | 3.729E-05 | 2.488E-05 | 1.828E-05 | 1.125E-05 | 7.514E-06 | 5.310E-06 | 3.015E-06 |
| W                 | 3.199E-05 | 2.135E-05 | 1.570E-05 | 9.671E-06 | 6.462E-06 | 4.571E-06 | 2.600E-06 |
| WSW               | 2.800E-05 | 1.870E-05 | 1.375E-05 | 8.475E-06 | 5.667E-06 | 4.011E-06 | 2.285E-06 |
| SW                | 2.490E-05 | 1.663E-05 | 1.223E-05 | 7.545E-06 | 5.047E-06 | 3.575E-06 | 2.038E-06 |
| SSW               | 2.242E-05 | 1.498E-05 | 1.102E-05 | 6.798E-06 | 4.550E-06 | 3.224E-06 | 1.840E-06 |
| S                 | 2.038E-05 | 1.362E-05 | 1.002E-05 | 6.185E-06 | 4.141E-06 | 2.935E-06 | 1.676E-06 |
| SSE               | 1.869E-05 | 1.249E-05 | 9.189E-06 | 5.674E-06 | 3.800E-06 | 2.694E-06 | 1.539E-06 |
| SE                | 1.726E-05 | 1.153E-05 | 8.486E-06 | 5.241E-06 | 3.511E-06 | 2.490E-06 | 1.423E-06 |
| ESE               | 1.602E-05 | 1.071E-05 | 7.882E-06 | 4.869E-06 | 3.262E-06 | 2.314E-06 | 1.323E-06 |
| E                 | 1.496E-05 | 1.000E-05 | 7.359E-06 | 4.547E-06 | 3.047E-06 | 2.162E-06 | 1.237E-06 |
| ENE               | 1.403E-05 | 9.377E-06 | 6.901E-06 | 4.264E-06 | 2.858E-06 | 2.028E-06 | 1.161E-06 |
| NE                | 1.320E-05 | 8.826E-06 | 6.496E-06 | 4.015E-06 | 2.691E-06 | 1.910E-06 | 1.093E-06 |
| NNE               | 1.247E-05 | 8.337E-06 | 6.137E-06 | 3.793E-06 | 2.543E-06 | 1.805E-06 | 1.033E-06 |

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 1500      | 2000      | 3000      | 4000      | 5000      | 7000      |
| N                 | 3.005E-06 | 1.482E-06 | 8.862E-07 | 4.244E-07 | 2.590E-07 | 1.774E-07 | 9.618E-08 |
| NNW               | 2.320E-06 | 1.158E-06 | 6.995E-07 | 3.406E-07 | 2.118E-07 | 1.472E-07 | 8.243E-08 |
| NW                | 1.888E-06 | 9.487E-07 | 5.768E-07 | 2.837E-07 | 1.785E-07 | 1.251E-07 | 7.144E-08 |
| WNW               | 1.592E-06 | 8.037E-07 | 4.906E-07 | 2.429E-07 | 1.540E-07 | 1.086E-07 | 6.284E-08 |
| W                 | 1.376E-06 | 6.970E-07 | 4.268E-07 | 2.123E-07 | 1.354E-07 | 9.586E-08 | 5.598E-08 |
| WSW               | 1.211E-06 | 6.151E-07 | 3.775E-07 | 1.884E-07 | 1.207E-07 | 8.571E-08 | 5.041E-08 |
| SW                | 1.082E-06 | 5.505E-07 | 3.384E-07 | 1.694E-07 | 1.088E-07 | 7.751E-08 | 4.584E-08 |
| SSW               | 9.776E-07 | 4.982E-07 | 3.067E-07 | 1.539E-07 | 9.911E-08 | 7.072E-08 | 4.201E-08 |
| S                 | 8.914E-07 | 4.548E-07 | 2.803E-07 | 1.409E-07 | 9.095E-08 | 6.500E-08 | 3.876E-08 |
| SSE               | 8.193E-07 | 4.185E-07 | 2.582E-07 | 1.300E-07 | 8.404E-08 | 6.014E-08 | 3.597E-08 |
| SE                | 7.580E-07 | 3.876E-07 | 2.393E-07 | 1.206E-07 | 7.811E-08 | 5.596E-08 | 3.355E-08 |
| ESE               | 7.051E-07 | 3.608E-07 | 2.229E-07 | 1.125E-07 | 7.294E-08 | 5.231E-08 | 3.143E-08 |
| E                 | 6.592E-07 | 3.375E-07 | 2.087E-07 | 1.054E-07 | 6.843E-08 | 4.911E-08 | 2.957E-08 |
| ENE               | 6.190E-07 | 3.171E-07 | 1.962E-07 | 9.917E-08 | 6.443E-08 | 4.628E-08 | 2.791E-08 |
| NE                | 5.832E-07 | 2.990E-07 | 1.850E-07 | 9.361E-08 | 6.087E-08 | 4.375E-08 | 2.642E-08 |
| NNE               | 5.515E-07 | 2.828E-07 | 1.751E-07 | 8.865E-08 | 5.769E-08 | 4.149E-08 | 2.509E-08 |



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CHIQ  
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GROUND-LEVEL CHI/Q VALUES FOR Fe-52  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 10000     | 15000     | 20000     | 30000     | 50000     | 80000     |
| N                 | 4.922E-08 | 2.442E-08 | 1.357E-08 | 4.988E-09 | 1.235E-09 | 1.658E-10 |
| NNW               | 4.398E-08 | 2.305E-08 | 1.360E-08 | 5.675E-09 | 1.714E-09 | 3.177E-10 |
| NW                | 3.911E-08 | 2.119E-08 | 1.297E-08 | 5.854E-09 | 1.996E-09 | 4.557E-10 |
| WNW               | 3.499E-08 | 1.938E-08 | 1.216E-08 | 5.788E-09 | 2.141E-09 | 5.648E-10 |
| W                 | 3.156E-08 | 1.776E-08 | 1.134E-08 | 5.610E-09 | 2.199E-09 | 6.457E-10 |
| WSW               | 2.869E-08 | 1.634E-08 | 1.057E-08 | 5.384E-09 | 2.206E-09 | 7.030E-10 |
| SW                | 2.627E-08 | 1.510E-08 | 9.877E-09 | 5.145E-09 | 2.181E-09 | 7.415E-10 |
| SSW               | 2.422E-08 | 1.402E-08 | 9.249E-09 | 4.907E-09 | 2.138E-09 | 7.659E-10 |
| S                 | 2.245E-08 | 1.308E-08 | 8.685E-09 | 4.678E-09 | 2.085E-09 | 7.798E-10 |
| SSE               | 2.092E-08 | 1.225E-08 | 8.180E-09 | 4.462E-09 | 2.026E-09 | 7.859E-10 |
| SE                | 1.958E-08 | 1.151E-08 | 7.726E-09 | 4.260E-09 | 1.965E-09 | 7.862E-10 |
| ESE               | 1.839E-08 | 1.086E-08 | 7.316E-09 | 4.071E-09 | 1.904E-09 | 7.823E-10 |
| E                 | 1.735E-08 | 1.027E-08 | 6.946E-09 | 3.896E-09 | 1.844E-09 | 7.754E-10 |
| ENE               | 1.641E-08 | 9.745E-09 | 6.611E-09 | 3.734E-09 | 1.786E-09 | 7.662E-10 |
| NE                | 1.557E-08 | 9.267E-09 | 6.304E-09 | 3.583E-09 | 1.729E-09 | 7.555E-10 |
| NNE               | 1.481E-08 | 8.834E-09 | 6.024E-09 | 3.442E-09 | 1.675E-09 | 7.437E-10 |

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CHIQ  
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GROUND-LEVEL CHI/Q VALUES FOR K-40  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 100       | 150       | 200       | 300       | 400       | 500       | 700       |
| N                 | 7.439E-05 | 4.955E-05 | 3.635E-05 | 2.230E-05 | 1.483E-05 | 1.043E-05 | 5.881E-06 |
| NNW               | 5.591E-05 | 3.729E-05 | 2.738E-05 | 1.684E-05 | 1.122E-05 | 7.920E-06 | 4.486E-06 |
| NW                | 4.476E-05 | 2.987E-05 | 2.195E-05 | 1.352E-05 | 9.024E-06 | 6.378E-06 | 3.623E-06 |
| WNW               | 3.733E-05 | 2.493E-05 | 1.832E-05 | 1.129E-05 | 7.549E-06 | 5.341E-06 | 3.040E-06 |
| W                 | 3.202E-05 | 2.139E-05 | 1.573E-05 | 9.700E-06 | 6.488E-06 | 4.594E-06 | 2.618E-06 |
| WSW               | 2.802E-05 | 1.872E-05 | 1.377E-05 | 8.497E-06 | 5.687E-06 | 4.029E-06 | 2.299E-06 |
| SW                | 2.492E-05 | 1.665E-05 | 1.225E-05 | 7.562E-06 | 5.063E-06 | 3.589E-06 | 2.049E-06 |
| SSW               | 2.243E-05 | 1.499E-05 | 1.103E-05 | 6.812E-06 | 4.563E-06 | 3.235E-06 | 1.849E-06 |
| S                 | 2.039E-05 | 1.363E-05 | 1.003E-05 | 6.196E-06 | 4.151E-06 | 2.944E-06 | 1.683E-06 |
| SSE               | 1.870E-05 | 1.250E-05 | 9.200E-06 | 5.684E-06 | 3.809E-06 | 2.702E-06 | 1.546E-06 |
| SE                | 1.726E-05 | 1.154E-05 | 8.495E-06 | 5.250E-06 | 3.518E-06 | 2.497E-06 | 1.429E-06 |
| ESE               | 1.603E-05 | 1.072E-05 | 7.889E-06 | 4.876E-06 | 3.269E-06 | 2.320E-06 | 1.328E-06 |
| E                 | 1.496E-05 | 1.001E-05 | 7.366E-06 | 4.553E-06 | 3.053E-06 | 2.167E-06 | 1.241E-06 |
| ENE               | 1.403E-05 | 9.383E-06 | 6.907E-06 | 4.270E-06 | 2.863E-06 | 2.033E-06 | 1.164E-06 |
| NE                | 1.321E-05 | 8.831E-06 | 6.501E-06 | 4.020E-06 | 2.696E-06 | 1.914E-06 | 1.096E-06 |
| NNE               | 1.247E-05 | 8.342E-06 | 6.141E-06 | 3.797E-06 | 2.547E-06 | 1.809E-06 | 1.036E-06 |

| Distance (meters) |           |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 1000      | 1500      | 2000      | 3000      | 4000      | 5000      | 7000      |
| N                 | 3.076E-06 | 1.535E-06 | 9.285E-07 | 4.551E-07 | 2.842E-07 | 1.993E-07 | 1.132E-07 |
| NNW               | 2.361E-06 | 1.189E-06 | 7.244E-07 | 3.589E-07 | 2.271E-07 | 1.606E-07 | 9.314E-08 |
| NW                | 1.915E-06 | 9.688E-07 | 5.931E-07 | 2.958E-07 | 1.887E-07 | 1.342E-07 | 7.878E-08 |
| WNW               | 1.611E-06 | 8.178E-07 | 5.022E-07 | 2.515E-07 | 1.614E-07 | 1.151E-07 | 6.817E-08 |
| W                 | 1.390E-06 | 7.075E-07 | 4.354E-07 | 2.188E-07 | 1.409E-07 | 1.008E-07 | 6.003E-08 |
| WSW               | 1.222E-06 | 6.232E-07 | 3.841E-07 | 1.934E-07 | 1.249E-07 | 8.954E-08 | 5.359E-08 |
| SW                | 1.090E-06 | 5.569E-07 | 3.437E-07 | 1.734E-07 | 1.123E-07 | 8.057E-08 | 4.840E-08 |
| SSW               | 9.844E-07 | 5.034E-07 | 3.110E-07 | 1.571E-07 | 1.019E-07 | 7.323E-08 | 4.412E-08 |
| S                 | 8.970E-07 | 4.592E-07 | 2.839E-07 | 1.436E-07 | 9.329E-08 | 6.710E-08 | 4.052E-08 |
| SSE               | 8.241E-07 | 4.222E-07 | 2.612E-07 | 1.323E-07 | 8.602E-08 | 6.192E-08 | 3.746E-08 |
| SE                | 7.621E-07 | 3.907E-07 | 2.419E-07 | 1.226E-07 | 7.981E-08 | 5.748E-08 | 3.484E-08 |
| ESE               | 7.086E-07 | 3.635E-07 | 2.252E-07 | 1.142E-07 | 7.441E-08 | 5.363E-08 | 3.255E-08 |
| E                 | 6.623E-07 | 3.399E-07 | 2.106E-07 | 1.069E-07 | 6.971E-08 | 5.027E-08 | 3.055E-08 |
| ENE               | 6.217E-07 | 3.192E-07 | 1.979E-07 | 1.005E-07 | 6.557E-08 | 4.730E-08 | 2.878E-08 |
| NE                | 5.856E-07 | 3.008E-07 | 1.865E-07 | 9.477E-08 | 6.188E-08 | 4.466E-08 | 2.719E-08 |
| NNE               | 5.536E-07 | 2.845E-07 | 1.765E-07 | 8.968E-08 | 5.859E-08 | 4.230E-08 | 2.578E-08 |



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CHIQ  
Page 4

GROUND-LEVEL CHI/Q VALUES FOR K-40  
SOLUBILITY: M  
CHEMFORM: Particulate  
SIZE: 1.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

---

| Distance (meters) |           |           |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Dir               | 10000     | 15000     | 20000     | 30000     | 50000     | 80000     |
| N                 | 6.211E-08 | 3.462E-08 | 2.160E-08 | 1.002E-08 | 3.953E-09 | 1.066E-09 |
| NNW               | 5.237E-08 | 2.995E-08 | 1.929E-08 | 9.580E-09 | 4.103E-09 | 1.283E-09 |
| NW                | 4.496E-08 | 2.612E-08 | 1.715E-08 | 8.898E-09 | 4.011E-09 | 1.392E-09 |
| WNW               | 3.931E-08 | 2.308E-08 | 1.535E-08 | 8.205E-09 | 3.830E-09 | 1.433E-09 |
| W                 | 3.487E-08 | 2.063E-08 | 1.385E-08 | 7.566E-09 | 3.621E-09 | 1.434E-09 |
| WSW               | 3.130E-08 | 1.862E-08 | 1.259E-08 | 6.995E-09 | 3.412E-09 | 1.413E-09 |
| SW                | 2.839E-08 | 1.697E-08 | 1.153E-08 | 6.493E-09 | 3.215E-09 | 1.379E-09 |
| SSW               | 2.597E-08 | 1.557E-08 | 1.064E-08 | 6.051E-09 | 3.032E-09 | 1.339E-09 |
| S                 | 2.392E-08 | 1.439E-08 | 9.860E-09 | 5.659E-09 | 2.863E-09 | 1.296E-09 |
| SSE               | 2.217E-08 | 1.337E-08 | 9.189E-09 | 5.313E-09 | 2.710E-09 | 1.252E-09 |
| SE                | 2.066E-08 | 1.248E-08 | 8.603E-09 | 5.004E-09 | 2.571E-09 | 1.208E-09 |
| ESE               | 1.933E-08 | 1.170E-08 | 8.084E-09 | 4.728E-09 | 2.443E-09 | 1.166E-09 |
| E                 | 1.817E-08 | 1.102E-08 | 7.624E-09 | 4.480E-09 | 2.327E-09 | 1.125E-09 |
| ENE               | 1.714E-08 | 1.040E-08 | 7.213E-09 | 4.256E-09 | 2.221E-09 | 1.086E-09 |
| NE                | 1.622E-08 | 9.856E-09 | 6.843E-09 | 4.052E-09 | 2.123E-09 | 1.049E-09 |
| NNE               | 1.539E-08 | 9.363E-09 | 6.510E-09 | 3.867E-09 | 2.033E-09 | 1.014E-09 |

---



## ***Appendix G: Test Case 7 Inputs and Reports***

### **G.1 Inputs**

#### ***G.1.1 Dataset***

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

Changes Last Saved 6/7/2013 10:51:00 PM  
Reports Last Generated 6/7/2013 10:51:00 PM

ERRORS

CHANGES



### G.1.2 Facility

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural Nuclides Reports

|          |   |  |      |
|----------|---|--|------|
| Name     | Trinity Radium Works                        | Emission Year                                  | 2013 |
| Address  | 8832 Falmouth Dr.                           | Source Category                                |      |
| City     | Cincinnati                                  |  |      |
| Zip      | 45231                                       | (Note: State is found on the Agricultural tab) |      |
| Comments | Intended for Software Testing Purposes Only |  |      |
|          | Version 4.0, Release Candidate 3            |  |      |

|        |         |
|--------|---------|
| ERRORS | CHANGES |
|--------|---------|



### G.1.3 Population

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility **Population** Meteorological Sources Agricultural Nuclides Reports

Run Type: Individual Population Age: Adult Build up time: 100 years

☐ Create dose and risk summaries  
☐ Create dose and risk factors  
☒ Create concentration table  
☒ Create Chi/Q table

Midpoints 4

|       |        |         |         |          |      |
|-------|--------|---------|---------|----------|------|
| 1 - 5 | 500.00 | 1000.00 | 5000.00 | 10000.00 | 0.00 |
| 6-10  | 0.00   | 0.00    | 0.00    | 0.00     | 0.00 |
| 11-15 | 0.00   | 0.00    | 0.00    | 0.00     | 0.00 |
| 16-20 | 0.00   | 0.00    | 0.00    | 0.00     | 0.00 |

Maximum Exposed Individual

Direction: auto Midpoint index: 0 ☒ Auto-determine

ERRORS

CHANGES



### G.1.4 Meteorological

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population **Meteorological** Sources Agricultural Nuclides Reports

Files with \* are in the same folder as the dataset  
Files with ! are in a non-default folder  
C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\trinity.wnd

File   ▼

|                            |                                      |                |
|----------------------------|--------------------------------------|----------------|
| Annual Precipitation       | <input type="text" value="100.00"/>  | cm/year        |
| Annual Ambient Temperature | <input type="text" value="10.00"/>   | Celsius        |
| Lid Height                 | <input type="text" value="1000.00"/> | meters         |
| Absolute Humidity          | <input type="text" value="8.00"/>    | grams/cu meter |

|                      |                      |
|----------------------|----------------------|
| ERRORS               | CHANGES              |
| <br><br><br><br><br> | <br><br><br><br><br> |



### G.1.5 Sources

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population Meteorological **Sources** Agricultural Nuclides Reports

Source Type: Area

Sources: 6

|           | 1       | 2       | 3       | 4       | 5       | 6       |
|-----------|---------|---------|---------|---------|---------|---------|
| Height(m) | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    |
| Area(m2)  | 1000.00 | 1000.00 | 1000.00 | 1000.00 | 1000.00 | 1000.00 |

Plume Type: Fixed

Enter the plume rise for each Pasquill category

|        | A     | B     | C     | D     | E     | F     | G     |
|--------|-------|-------|-------|-------|-------|-------|-------|
| meters | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |

ERRORS

CHANGES



### G.1.6 Agricultural

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources **Agricultural** Nuclides Reports

Food Source: Local

|                               | Vegetable | Milk | Meat |
|-------------------------------|-----------|------|------|
| Fraction home produced        | 1.0       | 1.0  | 1.0  |
| Fraction from assessment area | 0.0       | 0.0  | 0.0  |
| Fraction imported             | 0.0       | 0.0  | 0.0  |

Agriculture State: Ohio

|   |           |       |
|---|-----------|-------|
| Beef cattle density                     | 2.030e-01 | #/ha2 |
| Milk cattle density                     | 4.560e-02 | #/ha2 |
| Land fraction cultivated for vegetables | 1.700e-02 |       |

ERRORS

CHANGES





### G.1.7 Nuclides

CAP88-PC - [Dataset Edit - Test\_007.dat]

File Tools Window Help

Dataset Facility Population Meteorological Sources Agricultural **Nuclides** Reports

Chain Length 5 ☒ Radon Only Ac-223 Add

Released Nuclide Count 1 Total Nuclide Count 5 Delete rows w/all 0 RR Remove selected row Remove

Adjust nuclide parameters, and enter release rates (ci/year) for each source

Note: Nuclides with no chemical form have no internal dose coefficient.

| Chn | Nuclide | Chem Form | Type | Size  | RR1       | RR2       | RR3       | RR4       | RR5       | RR6       |
|-----|---------|-----------|------|-------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0   | Rn-222  |           |      | 0.... | 1.000e+03 | 1.000e+03 | 1.000e+03 | 1.000e+03 | 1.000e+03 | 1.000e+03 |

ERRORS

CHANGES



## G.2 Reports

### G.2.1 Synopsis Report

C A P 8 8 - P C

Version 4.0

Clean Air Act Assessment Package - 1988

#### S Y N O P S I S   R E P O R T

Radon Individual Assessment  
Fri Jun 07 22:51:36 2013

Facility: Trinity Radium Works  
Address: 8832 Falmouth Dr.  
City: Cincinnati  
State: OH                      Zip: 45231

Source Category:  
Source Type: Area  
Emission Year: 2013  
DOSE Age Group: Adult

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

Effective Dose Equivalent  
(mrem/year)

---

2.47E+01

---

At This Location:      500 Meters North

Dataset Name: Test\_007.  
Dataset Date: Jun 7, 2013 10:51 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind



Fri Jun 07 22:51:36 2013

SYNOPSIS  
Page 1

RN-222 MAXIMALLY EXPOSED INDIVIDUAL

|                                   |                  |
|-----------------------------------|------------------|
| Location Of The Individual:       | 500 Meters North |
| Radon Concentration (pCi/l):      | 1.60E+00         |
| Decay Product Concentration (WL): | 4.62E-03         |
| Lifetime Fatal Cancer Risk:       | 6.07E-03         |



Fri Jun 07 22:51:36 2013

SYNOPSIS  
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 2013

| Nuclide | Type | Size  | Source  | Source  | Source  | Source  | Source  | Source  | TOTAL   |
|---------|------|-------|---------|---------|---------|---------|---------|---------|---------|
|         |      |       | #1      | #2      | #3      | #4      | #5      | #6      |         |
|         |      |       | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    | Ci/y    |
| Rn-222  | B    | 0.000 | 1.0E+03 | 1.0E+03 | 1.0E+03 | 1.0E+03 | 1.0E+03 | 1.0E+03 | 6.0E+03 |

SITE INFORMATION

Temperature: 10.000 degrees C  
Precipitation: 100.000 cm/y  
Humidity: 8.000 g/cu m  
Mixing Height: 1000.0 m



Fri Jun 07 22:51:36 2013

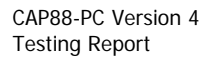
SYNOPSIS  
Page 3

SOURCE INFORMATION

| Source Number:     | 1       | 2       | 3       | 4       | 5       | 6       |       |
|--------------------|---------|---------|---------|---------|---------|---------|-------|
| Source Height (m): | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    | 0.00    |       |
| Area (sq m):       | 1000.00 | 1000.00 | 1000.00 | 1000.00 | 1000.00 | 1000.00 |       |
| Plume Rise         |         |         |         |         |         |         |       |
| Pasquill Cat:      | A       | B       | C       | D       | E       | F       | G     |
| Fixed (m):         | 10.00   | 10.00   | 10.00   | 10.00   | 10.00   | 10.00   | 10.00 |
| (Fixed Rise)       |         |         |         |         |         |         |       |

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

500 1000 5000 10000



Version 4.0

Clean Air Act Assessment Package - 1988

GENERAL DATA

Radon Individual Assessment  
Fri Jun 07 22:51:36 2013

Facility: Trinity Radium Works  
Address: 8832 Falmouth Dr.  
City: Cincinnati  
State: OH Zip: 45231

Source Category:  
Source Type: Area  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_007.
Dataset Date:  Jun 7, 2013 10:51 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\trinity.wnd

```



Fri Jun 07 22:51:36 2013

GENERAL  
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | Clearance<br>Type | Particle<br>Size<br>(microns) | Scavenging<br>Coefficient<br>(per second) | Dry<br>Deposition<br>Velocity<br>(m/s) |
|---------|-------------------|-------------------------------|---|--|
| Rn-222  | B                 | 0.000                         | 0.00E+00                                  | 0.00E+00                               |



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GENERAL  
Page 2

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

| Nuclide | DECAY CONSTANT (PER DAY) |          |          | TRANSFER COEFFICIENT |          |
|---------|--------------------------|----------|----------|----------------------|----------|
|         | Radio-<br>active         | Surface  | Water    | Milk (1)             | Meat (2) |
| Rn-222  | 1.81E-01                 | 5.48E-05 | 0.00E+00 | 0.00E+00             | 0.00E+00 |

FOOTNOTES:

- (1) Fraction of animal's daily intake of nuclide  
which appears in each L of milk (days/L)
- (2) Fraction of animal's daily intake of nuclide  
which appears in each kg of meat (days/kg)





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GENERAL  
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

---

| Nuclide | CONCENTRATION<br>UPTAKE FACTOR |            | GI UPTAKE FRACTION |           |
|---------|--------------------------------|------------|--------------------|-----------|
|         | Forage (1)                     | Edible (2) | Inhalation         | Ingestion |
| Rn-222  | 0.00E+00                       | 0.00E+00   | 0.00E+00           | 0.00E+00  |

---

FOOTNOTES: (1) Concentration factor for uptake of nuclide  
from soil for pasture and forage  
(in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide  
from soil by edible parts of crops  
(in pCi/kg wet weight per pCi/kg dry soil)

---



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GENERAL  
Page 4

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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

HUMAN INHALATION RATE  
Cubic meters/yr 5.26E+03

SOIL PARAMETERS  
Effective surface density (kg/sq m, dry weight)  
(Assumes 15 cm plow layer) 2.15E+02

BUILDUP TIMES  
For activity in soil (years) 1.00E+02  
For radionuclides deposited on ground/water (days) 3.65E+04

DELAY TIMES  
Ingestion of pasture grass by animals (hr) 0.00E+00  
Ingestion of stored feed by animals (hr) 2.16E+03  
Ingestion of leafy vegetables by man (hr) 3.36E+02  
Ingestion of produce by man (hr) 3.36E+02  
Transport time from animal feed-milk-man (day) 2.00E+00  
Time from slaughter to consumption (day) 2.00E+01

WEATHERING  
Removal rate constant for physical loss (per hr) 2.90E-03

CROP EXPOSURE DURATION  
Pasture grass (hr) 7.20E+02  
Crops/leafy vegetables (hr) 1.44E+03

AGRICULTURAL PRODUCTIVITY  
Grass-cow-milk-man pathway (kg/sq m) 2.80E-01  
Produce/leafy veg for human consumption (kg/sq m) 7.16E-01

FALLOUT INTERCEPTION FRACTIONS  
Vegetables 2.00E-01  
Pasture 5.70E-01

GRAZING PARAMETERS  
Fraction of year animals graze on pasture 4.00E-01  
Fraction of daily feed that is pasture grass  
when animal grazes on pasture 4.30E-01

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GENERAL  
Page 5

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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

---

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight) 1.56E+01

DAIRY PRODUCTIVITY

Milk production of cow (L/day) 1.10E+01

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg) 2.00E+02

Fraction of herd slaughtered (per day) 3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing  
for leafy vegetables and produce 5.00E-01

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested 1.00E+00

Leafy vegetables ingested 1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables 1.00E+00

Meat 1.00E+00

Milk 1.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside  
area listed below are actual fixed values.)

Vegetables 0.00E+00

Meat 0.00E+00

Milk 0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y) 7.62E+01

Milk ingestion (L/y) 5.30E+01

Meat ingestion (kg/y) 8.40E+01

Leafy vegetable ingestion (kg/y) 7.79E+00

SWIMMING PARAMETERS

Fraction of time spent swimming 0.00E+00

Dilution factor for water (cm) 1.00E+00

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Fri Jun 07 22:51:36 2013

GENERAL  
Page 6EXPOSURE LEVELS FOR SHORT-LIFE PROGENY OF RN-222  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(Meters) | Exposure Level<br>(Person WL)<br>(.7 EQF) | Adjusted<br>Equilibrium<br>Fraction | Adjusted<br>Exposure<br>Level |
|----------------|----------------------|---|-------------------------------------|-------------------------------|
| N              | 500                  | 1.118E-02                                 | 0.29                                | 4.616E-03                     |
| N              | 1000                 | 4.076E-03                                 | 0.31                                | 1.811E-03                     |
| N              | 5000                 | 3.448E-04                                 | 0.44                                | 2.182E-04                     |
| N              | 10000                | 1.292E-04                                 | 0.57                                | 1.045E-04                     |
| NNW            | 500                  | 8.390E-03                                 | 0.29                                | 3.464E-03                     |
| NNW            | 1000                 | 3.059E-03                                 | 0.31                                | 1.359E-03                     |
| NNW            | 5000                 | 2.593E-04                                 | 0.44                                | 1.641E-04                     |
| NNW            | 10000                | 9.743E-05                                 | 0.57                                | 7.878E-05                     |
| NW             | 500                  | 6.710E-03                                 | 0.29                                | 2.770E-03                     |
| NW             | 1000                 | 2.447E-03                                 | 0.31                                | 1.087E-03                     |
| NW             | 5000                 | 2.077E-04                                 | 0.44                                | 1.315E-04                     |
| NW             | 10000                | 7.815E-05                                 | 0.57                                | 6.319E-05                     |
| WNW            | 500                  | 5.594E-03                                 | 0.29                                | 2.309E-03                     |
| WNW            | 1000                 | 2.040E-03                                 | 0.31                                | 9.063E-04                     |
| WNW            | 5000                 | 1.733E-04                                 | 0.44                                | 1.097E-04                     |
| WNW            | 10000                | 6.528E-05                                 | 0.57                                | 5.278E-05                     |
| W              | 500                  | 4.796E-03                                 | 0.29                                | 1.980E-03                     |
| W              | 1000                 | 1.749E-03                                 | 0.31                                | 7.771E-04                     |
| W              | 5000                 | 1.487E-04                                 | 0.44                                | 9.409E-05                     |
| W              | 10000                | 5.604E-05                                 | 0.57                                | 4.531E-05                     |
| WSW            | 500                  | 4.195E-03                                 | 0.29                                | 1.732E-03                     |
| WSW            | 1000                 | 1.530E-03                                 | 0.31                                | 6.798E-04                     |
| WSW            | 5000                 | 1.301E-04                                 | 0.44                                | 8.236E-05                     |
| WSW            | 10000                | 4.908E-05                                 | 0.57                                | 3.968E-05                     |
| SW             | 500                  | 3.730E-03                                 | 0.29                                | 1.540E-03                     |
| SW             | 1000                 | 1.360E-03                                 | 0.31                                | 6.044E-04                     |
| SW             | 5000                 | 1.157E-04                                 | 0.44                                | 7.325E-05                     |
| SW             | 10000                | 4.367E-05                                 | 0.57                                | 3.531E-05                     |
| SSW            | 500                  | 3.357E-03                                 | 0.29                                | 1.386E-03                     |
| SSW            | 1000                 | 1.225E-03                                 | 0.31                                | 5.441E-04                     |
| SSW            | 5000                 | 1.042E-04                                 | 0.44                                | 6.595E-05                     |
| SSW            | 10000                | 3.933E-05                                 | 0.57                                | 3.180E-05                     |
| S              | 500                  | 3.052E-03                                 | 0.29                                | 1.260E-03                     |
| S              | 1000                 | 1.113E-03                                 | 0.31                                | 4.945E-04                     |
| S              | 5000                 | 9.475E-05                                 | 0.44                                | 5.996E-05                     |
| S              | 10000                | 3.577E-05                                 | 0.57                                | 2.892E-05                     |
| SSE            | 500                  | 2.798E-03                                 | 0.29                                | 1.155E-03                     |
| SSE            | 1000                 | 1.021E-03                                 | 0.31                                | 4.534E-04                     |
| SSE            | 5000                 | 8.688E-05                                 | 0.44                                | 5.498E-05                     |
| SSE            | 10000                | 3.281E-05                                 | 0.57                                | 2.653E-05                     |
| SE             | 500                  | 2.583E-03                                 | 0.29                                | 1.066E-03                     |
| SE             | 1000                 | 9.421E-04                                 | 0.31                                | 4.186E-04                     |
| SE             | 5000                 | 8.022E-05                                 | 0.44                                | 5.077E-05                     |
| SE             | 10000                | 3.030E-05                                 | 0.57                                | 2.450E-05                     |
| ESE            | 500                  | 2.398E-03                                 | 0.29                                | 9.900E-04                     |

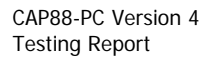


Fri Jun 07 22:51:36 2013

GENERAL  
Page 7

EXPOSURE LEVELS FOR SHORT-LIFE PROGENY OF RN-222  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(Meters) | Exposure Level<br>(Person WL)<br>(.7 EQF) | Adjusted<br>Equilibrium<br>Fraction | Adjusted<br>Exposure<br>Level |
|----------------|----------------------|---|-------------------------------------|-------------------------------|
| ESE            | 1000                 | 8.747E-04                                 | 0.31                                | 3.886E-04                     |
| ESE            | 5000                 | 7.449E-05                                 | 0.44                                | 4.714E-05                     |
| ESE            | 10000                | 2.814E-05                                 | 0.57                                | 2.275E-05                     |
| E              | 500                  | 2.238E-03                                 | 0.29                                | 9.240E-04                     |
| E              | 1000                 | 8.165E-04                                 | 0.31                                | 3.628E-04                     |
| E              | 5000                 | 6.954E-05                                 | 0.44                                | 4.401E-05                     |
| E              | 10000                | 2.628E-05                                 | 0.57                                | 2.125E-05                     |
| ENE            | 500                  | 2.098E-03                                 | 0.29                                | 8.664E-04                     |
| ENE            | 1000                 | 7.655E-04                                 | 0.31                                | 3.401E-04                     |
| ENE            | 5000                 | 6.521E-05                                 | 0.44                                | 4.127E-05                     |
| ENE            | 10000                | 2.464E-05                                 | 0.57                                | 1.992E-05                     |
| NE             | 500                  | 1.975E-03                                 | 0.29                                | 8.153E-04                     |
| NE             | 1000                 | 7.204E-04                                 | 0.31                                | 3.201E-04                     |
| NE             | 5000                 | 6.137E-05                                 | 0.44                                | 3.884E-05                     |
| NE             | 10000                | 2.319E-05                                 | 0.57                                | 1.875E-05                     |
| NNE            | 500                  | 1.865E-03                                 | 0.29                                | 7.701E-04                     |
| NNE            | 1000                 | 6.805E-04                                 | 0.31                                | 3.023E-04                     |
| NNE            | 5000                 | 5.797E-05                                 | 0.44                                | 3.669E-05                     |
| NNE            | 10000                | 2.191E-05                                 | 0.57                                | 1.772E-05                     |



Version 4.0

Clean Air Act Assessment Package - 1988

W E A T H E R     D A T A

Radon Individual Assessment  
Fri Jun 07 22:51:36 2013

Facility: Trinity Radium Works  
Address: 8832 Falmouth Dr.  
City: Cincinnati  
State: OH Zip: 45231

Source Category:  
Source Type: Area  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_007.
Dataset Date:  Jun 7, 2013 10:51 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\trinity.wnd

```



Fri Jun 07 22:51:36 2013

WEATHER  
Page 1

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |           |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-----------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     | Wind Freq |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.062     |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 0.062     |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 0.062     |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.062     |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 0.062     |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 0.062     |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 0.062     |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 0.062     |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 0.062     |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 0.062     |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 0.062     |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 0.062     |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 0.062     |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 0.062     |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 0.062     |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 0.062     |

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

| Pasquill Stability Class |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|
| Dir                      | A     | B     | C     | D     | E     | F     | G     |
| N                        | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| NNW                      | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 | 1.333 |
| NW                       | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 | 1.667 |
| WNW                      | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 | 2.000 |
| W                        | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 | 2.333 |
| WSW                      | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 | 2.667 |
| SW                       | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 | 3.000 |
| SSW                      | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 | 3.333 |
| S                        | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 | 3.667 |
| SSE                      | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 | 4.000 |
| SE                       | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 | 4.333 |
| ESE                      | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 | 4.667 |
| E                        | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| ENE                      | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 | 5.333 |
| NE                       | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 | 5.667 |
| NNE                      | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 |



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WEATHER  
Page 2

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

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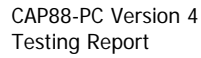
| Pasquill Stability Class |        |        |        |        |        |        |        |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|
| Dir                      | A      | B      | C      | D      | E      | F      | G      |
| N                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NW                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WNW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| W                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| WSW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SW                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSW                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| S                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SSE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| SE                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ESE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| E                        | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| ENE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NE                       | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| NNE                      | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |
| TOTAL                    | 0.1700 | 0.1700 | 0.1700 | 0.1700 | 0.1600 | 0.1600 | 0.0000 |

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ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 10.0 degrees C  
283.16 K  
Precipitation: 100.0 cm/y  
Humidity: 8.0 g/cu m  
Lid Height: 1000.0 meters  
Surface Roughness Length: 0.010 meters  
Height Of Wind Measurements: 10.0 meters  
Average Wind Speed: 3.500 m/s  
  
Vertical Temperature Gradients:  
STABILITY E 0.073 k/m  
STABILITY F 0.109 k/m  
STABILITY G 0.146 k/m





Version 4.0

Clean Air Act Assessment Package - 1988

## CONCENTRATION TABLES

Radon Individual Assessment  
Fri Jun 07 22:51:36 2013

Facility: Trinity Radium Works  
Address: 8832 Falmouth Dr.  
City: Cincinnati  
State: OH Zip: 45231

Source Category:  
Source Type: Area  
Emission Year: 2013

Comments: Intended for Software Testing Purposes Only  
Version 4.0, Release Candidate 3

```

Dataset Name:  Test_007.
Dataset Date:  Jun 7, 2013 10:51 PM
Wind File:    C:\Documents and Settings\XPMUser\Documents\CAP88\Wind
Files\trinity.wnd

```



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CONCEN  
Page 1

ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/L) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|------------------------|------------------------------------|------------------------------------|---------------------------------------|
| N              | 500                  | Rn-222  | 1.60E+00               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| N              | 1000                 | Rn-222  | 5.82E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| N              | 5000                 | Rn-222  | 4.93E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| N              | 10000                | Rn-222  | 1.85E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNW            | 500                  | Rn-222  | 1.20E+00               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNW            | 1000                 | Rn-222  | 4.37E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNW            | 5000                 | Rn-222  | 3.70E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNW            | 10000                | Rn-222  | 1.39E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NW             | 500                  | Rn-222  | 9.59E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NW             | 1000                 | Rn-222  | 3.50E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NW             | 5000                 | Rn-222  | 2.97E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NW             | 10000                | Rn-222  | 1.12E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WNW            | 500                  | Rn-222  | 7.99E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WNW            | 1000                 | Rn-222  | 2.91E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WNW            | 5000                 | Rn-222  | 2.48E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WNW            | 10000                | Rn-222  | 9.33E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| W              | 500                  | Rn-222  | 6.85E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| W              | 1000                 | Rn-222  | 2.50E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| W              | 5000                 | Rn-222  | 2.12E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| W              | 10000                | Rn-222  | 8.01E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WSW            | 500                  | Rn-222  | 5.99E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WSW            | 1000                 | Rn-222  | 2.19E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WSW            | 5000                 | Rn-222  | 1.86E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| WSW            | 10000                | Rn-222  | 7.01E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SW             | 500                  | Rn-222  | 5.33E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SW             | 1000                 | Rn-222  | 1.94E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SW             | 5000                 | Rn-222  | 1.65E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SW             | 10000                | Rn-222  | 6.24E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSW            | 500                  | Rn-222  | 4.80E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSW            | 1000                 | Rn-222  | 1.75E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSW            | 5000                 | Rn-222  | 1.49E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSW            | 10000                | Rn-222  | 5.62E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| S              | 500                  | Rn-222  | 4.36E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| S              | 1000                 | Rn-222  | 1.59E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| S              | 5000                 | Rn-222  | 1.35E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| S              | 10000                | Rn-222  | 5.11E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSE            | 500                  | Rn-222  | 4.00E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSE            | 1000                 | Rn-222  | 1.46E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSE            | 5000                 | Rn-222  | 1.24E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SSE            | 10000                | Rn-222  | 4.69E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SE             | 500                  | Rn-222  | 3.69E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SE             | 1000                 | Rn-222  | 1.35E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SE             | 5000                 | Rn-222  | 1.15E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| SE             | 10000                | Rn-222  | 4.33E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ESE            | 500                  | Rn-222  | 3.43E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ESE            | 1000                 | Rn-222  | 1.25E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ESE            | 5000                 | Rn-222  | 1.06E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |

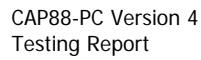


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CONCEN  
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ESTIMATED RADIONUCLIDE CONCENTRATIONS  
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

| Wind<br>Toward | Distance<br>(meters) | Nuclide | Air<br>Conc<br>(pCi/L) | Dry<br>Depo<br>Rate<br>(pCi/cm2-s) | Wet<br>Depo<br>Rate<br>(pCi/cm2-s) | Ground<br>Depo<br>Rate<br>(pCi/cm2-s) |
|----------------|----------------------|---------|------------------------|------------------------------------|------------------------------------|---------------------------------------|
| ESE            | 10000                | Rn-222  | 4.02E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| E              | 500                  | Rn-222  | 3.20E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| E              | 1000                 | Rn-222  | 1.17E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| E              | 5000                 | Rn-222  | 9.93E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| E              | 10000                | Rn-222  | 3.75E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ENE            | 500                  | Rn-222  | 3.00E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ENE            | 1000                 | Rn-222  | 1.09E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ENE            | 5000                 | Rn-222  | 9.32E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| ENE            | 10000                | Rn-222  | 3.52E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NE             | 500                  | Rn-222  | 2.82E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NE             | 1000                 | Rn-222  | 1.03E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NE             | 5000                 | Rn-222  | 8.77E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NE             | 10000                | Rn-222  | 3.31E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNE            | 500                  | Rn-222  | 2.66E-01               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNE            | 1000                 | Rn-222  | 9.72E-02               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNE            | 5000                 | Rn-222  | 8.28E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |
| NNE            | 10000                | Rn-222  | 3.13E-03               | 0.00E+00                           | 0.00E+00                           | 0.00E+00                              |



Version 4.0

Clean Air Act Assessment Package - 1988

Radon Individual Assessment  
Fri Jun 07 22:51:36 2013

```
Dataset Name: Test_007.  
Dataset Date: Jun 7, 2013 10:51 PM  
Wind File: C:\Documents and Settings\XPMUser\Documents\CAP88\Wind  
y.wnd
```



Fri Jun 07 22:51:36 2013

CHI/Q  
Page 1

GROUND-LEVEL CHI/Q VALUES FOR Rn-222  
SOLUBILITY: B  
CHEMFORM: B  
SIZE: 0.000  
CHI/Q TOWARD INDICATED DIRECTION (SEC/CUBIC METER)

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| Distance (meters) |           |           |           |           |
|-------------------|-----------|-----------|-----------|-----------|
| Dir               | 500       | 1000      | 5000      | 10000     |
| <hr/>             |           |           |           |           |
| N                 | 8.396E-06 | 3.060E-06 | 2.589E-07 | 9.700E-08 |
| NNW               | 6.300E-06 | 2.297E-06 | 1.947E-07 | 7.315E-08 |
| NW                | 5.039E-06 | 1.837E-06 | 1.560E-07 | 5.868E-08 |
| WNW               | 4.200E-06 | 1.532E-06 | 1.301E-07 | 4.901E-08 |
| W                 | 3.601E-06 | 1.313E-06 | 1.116E-07 | 4.208E-08 |
| WSW               | 3.150E-06 | 1.149E-06 | 9.771E-08 | 3.685E-08 |
| SW                | 2.801E-06 | 1.021E-06 | 8.690E-08 | 3.279E-08 |
| SSW               | 2.521E-06 | 9.195E-07 | 7.825E-08 | 2.953E-08 |
| S                 | 2.291E-06 | 8.358E-07 | 7.114E-08 | 2.686E-08 |
| SSE               | 2.101E-06 | 7.663E-07 | 6.524E-08 | 2.464E-08 |
| SE                | 1.939E-06 | 7.074E-07 | 6.023E-08 | 2.275E-08 |
| ESE               | 1.800E-06 | 6.568E-07 | 5.593E-08 | 2.113E-08 |
| E                 | 1.681E-06 | 6.131E-07 | 5.222E-08 | 1.973E-08 |
| ENE               | 1.576E-06 | 5.748E-07 | 4.896E-08 | 1.850E-08 |
| NE                | 1.483E-06 | 5.409E-07 | 4.608E-08 | 1.742E-08 |
| NNE               | 1.401E-06 | 5.109E-07 | 4.353E-08 | 1.645E-08 |

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