

CAP88-PC Version 4 Testing Report

Revision 1

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**Radiation Protection Division
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Washington, D.C. 20460**

Submitted by:

**Trinity Engineering Associates, Inc.
8832 Falmouth Drive
Cincinnati, Ohio 45231-5011**

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Telephone No.**

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Dr. Raymond Wood
513-521-3515
Reid Rosnick
202-343-9563**

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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 (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 (χ/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 χ/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 (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 (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 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	9.250E+08	9.271E+08	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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 χ/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 χ/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 ⁻¹)			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⁻¹ of sodium-22 (Na-22) and 2,000 Ci y⁻¹ of sodium-24 (Na-24). The height of both sources is 0 m. The areas of the sources are 100 square meters (m²) and 150 m², respectively. The plume type is “Momentum” with an exit velocity of 0.1 meters per second (m s⁻¹) and 0.2 m s⁻¹ 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 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	1.188E+10	1.191E+10	-0.25%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	2.388E+06	2.394E+06	-0.24%

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

Dose Factors for Na-24	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	2.423E+10	2.429E+10	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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.

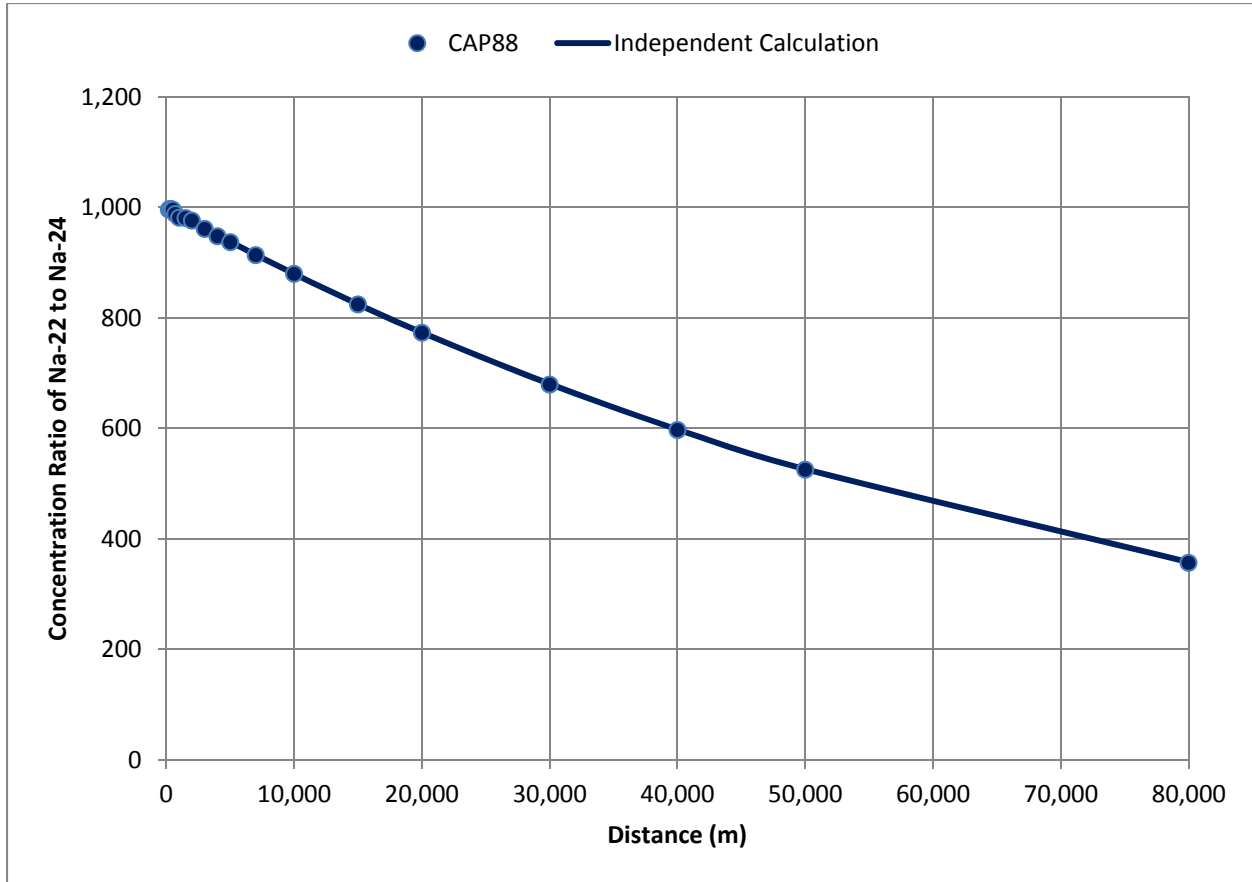


Figure 1: Air Concentration Ratio of Na-24 to Na-22 for Test Case 2

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

Pathway	Effective Dose Equivalent for Selected Individual (mrem y ⁻¹)			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 ⁻¹)			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⁻¹ 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 ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	8.073E+05	8.092E-13	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	2.668E+01	2.674E-13	-0.22%



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

Dose Factors for Co-60m	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹)			
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 ³ μCi ⁻¹ y ⁻¹)	2.260E+07	2.265E-11	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	4.940E+03	4.951E-11	-0.22%

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

Dose Factors for Co-60	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹)			
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 ³ μCi ⁻¹ y ⁻¹)	1.386E+10	1.389E-08	-0.25%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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 ⁻¹)			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 ⁻¹)			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⁻¹ 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 m², 50 m², 70 m², and 120 m², 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 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi⁻¹)			
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⁻¹) 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⁻¹) for Sulfur Dioxide (SO₂)			
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⁻¹) for Carbon Disulfide Dioxide (CS₂)			
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 ³ μCi ⁻¹ y ⁻¹)	3.577E+05	3.585E+05	-0.21%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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 ⁻¹)			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⁻¹, 0.565 Ci y⁻¹, and 11.3 Ci y⁻¹ 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 m², 1.2 m², 1.0 m², 1.3 m², and 0.8 m, respectively. The plume type is “Buoyant” with heat releases of 10 cal s⁻¹, 20 cal s⁻¹, 15 cal s⁻¹, 25 cal s⁻¹, and 5 cal s⁻¹, 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 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹)			
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 ³ μCi ⁻¹ y ⁻¹)	2.575E+06	2.580E+06	-0.21%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	5.312E+03	5.324E+03	-0.23%

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

Dose Factors for Tc-98	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	7.468E+09	7.485E+09	-0.22%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	1.561E+06	1.565E+06	-0.23%



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

Dose Factors for Tc-99	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	3.355E+06	3.363E-12	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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 Selected Individual (mrem y ⁻¹)			Total Lifetime Fatal Cancer Risk for Selected Individual		
	CAP88	Independent Calculation	Relative Difference	CAP88	Independent Calculation	Relative 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 ⁻¹)			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⁻¹ 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⁻¹ of Fe-52 and 0.006 Ci y⁻¹ of K-40. The heights of the area sources are all 5 m. The areas of the sources are 1 m², 2 m², 3 m², 4 m², 5 m², and 6 m², 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 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹)			
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 ³ μCi ⁻¹ y ⁻¹)	3.821E+09	3.830E+09	-0.23%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	8.272E+05	8.290E+05	-0.22%

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

Dose Factors for Mn-52m	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi ⁻¹)			
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 ⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	1.316E+10	1.319E+10	-0.26%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	2.749E+06	2.756E+06	-0.24%



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

Dose Factors for Mn-52	CAP88 Version 4	DCFPK2.2	Relative Difference
Ingestion (mrem pCi⁻¹)			
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⁻¹) 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 ³ μCi ⁻¹ y ⁻¹)	1.887E+10	1.892E+10	-0.24%
Ground Surface (mrem cm ² μCi ⁻¹ y ⁻¹)	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 ⁻³)			
	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-52: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

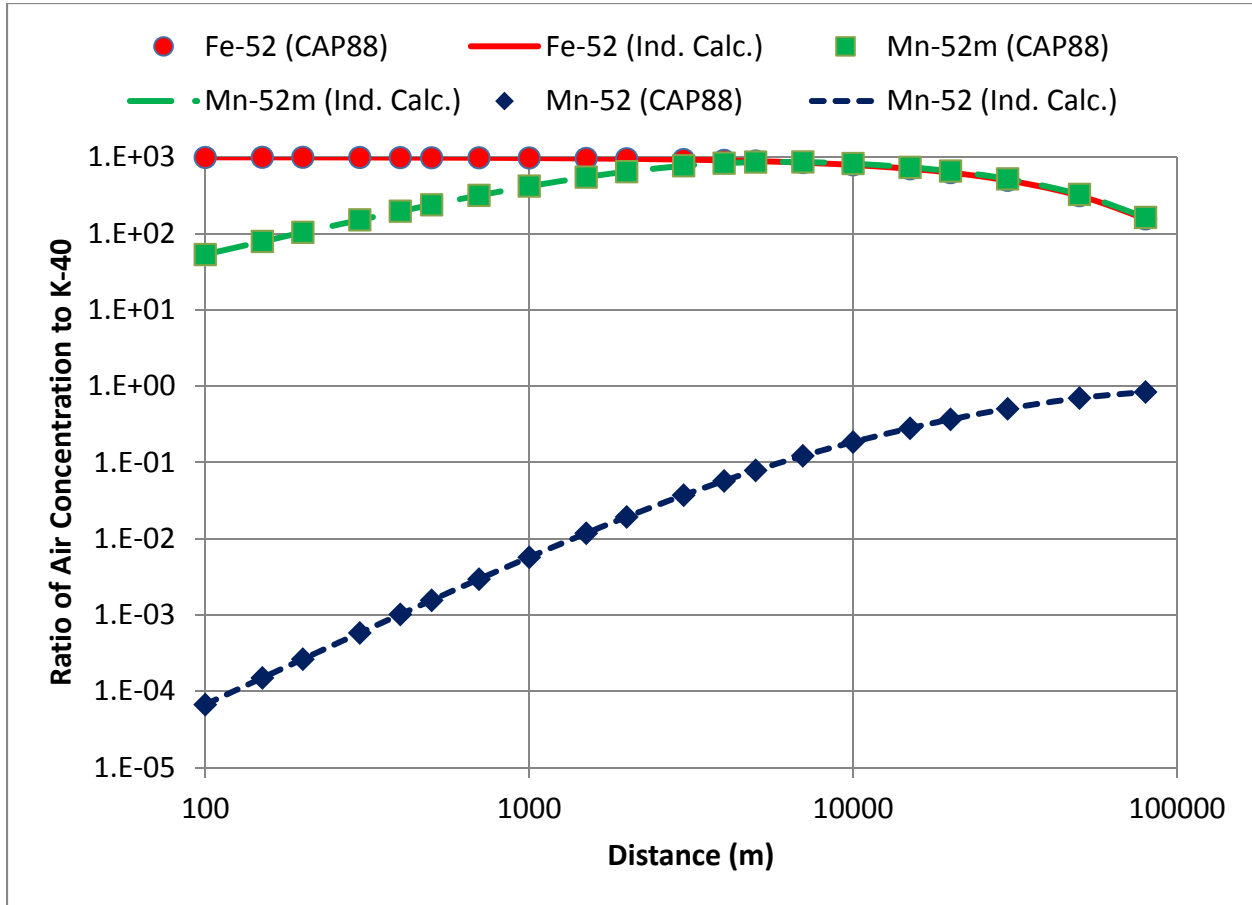


Figure 2: Radionuclide Ratios for Test Case 6 as a Function of Distance Downwind

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 ⁻¹)			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 ⁻¹)			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 ⁻¹)	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"> 1.Add a step between Steps 1 and 2 to extract the files from the compressed zip file 2.Change Step 2 to instruct the user to "Run setup.exe as Administrator" 3.Change Step 6 to instruct the user to "run the migration tool by clicking 'Run'"
Category	Installation Failure
Related Issues	None
Comments/Resolution	<p>David Stuenkel 3/16/2012 4:36:09 PM 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 2/15/2012 2:44:21 PM 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 2/15/2012 2:37:38 PM 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	David Stuenkel 3/12/2012 1:22:14 PM 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. Doug L. Williams 3/3/2012 3:03:28 PM 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.
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	David Stuenkel 3/9/2012 2:44:00 PM General reports included in the outputs of Beta Version 1-3 include the correct units of "Cubic meters/yr" for the human inhalation rate. Doug L. Williams 3/3/2012 3:09:54 PM We switched the units in report to match the units in the EPA spreadsheet. Will be viewable in the next release.
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 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 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"> •The relative difference between Version 3 and 4 for milk and meat are the same (within rounding errors) for each radionuclide. •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.
Category	Incorrect Value
Related Issues	None
Comments/Resolution	<p>David Stuenkel 5/28/20122:34:55 PM 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. Williams3/13/20128:21:23 PM 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>



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



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 3/16/2012 5:07:59 PM 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. Williams 3/10/2012 11:42:40 AM 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



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 Error messages were not observed while regenerating reports using Beta Version 1-6.</p> <p>Raymond P. Wood 4/5/20121:34:40 PM 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 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



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 4/18/2012 3:44:40 PM 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. Williams 3/10/2012 12:23:27 PM 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



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 3/16/2012 5:15:02 PM User interface for Beta 1-4 allows emission years between 1949 and 2017. (Note that emission year can also be left blank if desired.) Doug L. Williams 3/10/2012 10:52:36 AM 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



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



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 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 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



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	David Stuenkel 5/7/201210:40:52 PM 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. Doug L. Williams4/27/201210:13:44 PM 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).
Date Entered	04/27/12
Beta Revision Number	Beta 1-6
Location Observed	Output Report



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 5/28/2012 2:41:28 PM Beta Version 1-11 prints the correct headers and labels for "Buoyant", "Momentum", "Fixed", and "None".</p> <p>Doug L. Williams 5/17/2012 7:12:29 PM 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. Williams 4/27/2012 9:49:17 PM 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



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. 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. Reading fortranlog.txt 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 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 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



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 chi/Q. Concentrations, deposition rates, and doses are still apparently positive (even for values of zero for chi/Q).</p>
Category	Incorrect Value
Related Issues	None
Comments/Resolution	<p>David Stuenkel 5/7/2012 10:32:19 PM 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 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



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	David Stuenkel 5/28/2011 22:46:41 PM 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. Doug L. Williams 5/17/2012 7:54:51 PM The fortran removes spaces, so the VB does when copying the fortran report files as well. Test solution in Beta 1-10.
Date Entered	05/14/12
Beta Revision Number	Beta 1-9
Location Observed	User Interface



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 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 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



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 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 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



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 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



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 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



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 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



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 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 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



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 Updated the introduction, and added a line in another help file indicating the need for a value at least 1.0e-25 ci/yr Raymond P. Wood 10/16/2012 4:08:47 PM 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



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 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



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 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



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 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



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 This text was already present in the help documentation. I added an additional link to it from the first page. Raymond P. Wood 10/16/2012 4:23:45 PM 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



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 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 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	<p>Doug L. Williams 10/22/2012 9:58:09 PM I added text to the migration form and the help text to specifically mention the version supported in migration.</p> <p>Raymond P. Wood 10/16/2012 4:35:35 PM TEA will attempt to add text stating the need for migration input files to be from the latest version 3 release.</p>
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;



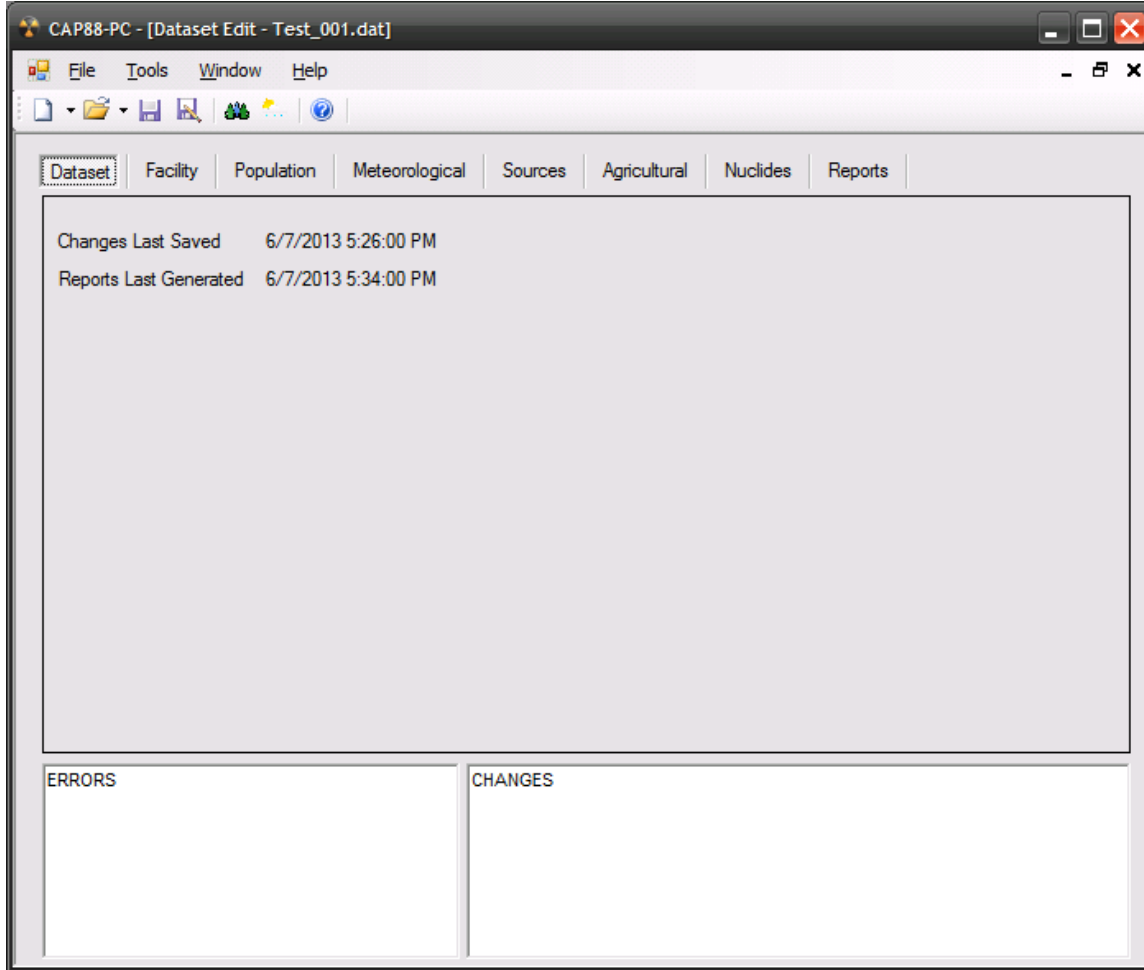
- Installing and executing under Windows XP with Service Pack 3, Windows Vista, and Windows 7 operating systems (both 32 and 64 bit); and
- Generating dose and results that agree with independent calculations based on the CAP88 outputs for air concentrations and ground deposition rates.



Appendix A: Test Case 1 Inputs and Reports

A.1 Inputs

A.1.1 Dataset





A.1.2 Facility

The screenshot shows the 'Facility' tab in the CAP88-PC software. The form contains the following data:

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

At the bottom of the window, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



A.1.3 Population

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

The screenshot shows the 'CAP88-PC - [Dataset Edit - Test_001.dat]' window. The 'Meteorological' tab is selected. The interface includes a menu bar (File, Tools, Window, Help) and a toolbar. Below the tabs, there are instructions: 'Files with * are in the same folder as the dataset' and 'Files with ! are in a non-default folder'. The path 'C:\Documents and Settings\XPMUser\Documents\CAP88\Wind Files\SPRG1990.' is displayed. A 'File' field contains 'SPRG1990' and a dropdown menu shows 'Sprinfield'. Below this are four input fields with labels and units: 'Annual Precipitation' (10.00 cm/year), 'Annual Ambient Temperature' (10.00 Celsius), 'Lid Height' (1000.00 meters), and 'Absolute Humidity' (8.00 grams/cu meter). At the bottom, there are two empty panels labeled 'ERRORS' and 'CHANGES'.

Parameter	Value	Unit
Annual Precipitation	10.00	cm/year
Annual Ambient Temperature	10.00	Celsius
Lid Height	1000.00	meters
Absolute Humidity	8.00	grams/cu meter



A.1.5 Sources

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

The screenshot shows the 'Nuclides' window in CAP88-PC. The window title is 'CAP88-PC - [Dataset Edit - Test_001.dat]'. The menu bar includes File, Tools, Window, and Help. The main area has tabs for Dataset, Facility, Population, Meteorological, Sources, Agricultural, Nuclides, and Reports. The Nuclides tab is active, showing a form with the following elements:

- Chain Length: max (dropdown)
- Radon Only:
- Ac-223 (dropdown)
- Add (button)
- Released Nuclide Count: 1
- Total Nuclide Count: 1
- Delete rows w/all 0 RR (button)
- Remove selected row (button)
- Remove (button)

Below the form, there is a text instruction: 'Adjust nuclide parameters, and enter release rates (ci/year) for each source'. A note in red text reads: '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

At the bottom of the window, there are two empty panels labeled 'ERRORS' and '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



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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 Equivalent (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 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

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
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	



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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- 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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GENERAL
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	CONCENTRATION 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



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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)

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
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (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 Individual (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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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

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



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SUMMARY
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CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
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PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime 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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NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
K-40	1.22E-06
TOTAL	1.22E-06



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

Distance (m)

Direction	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

Distance (m)

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

Distance (m)

Direction	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

Distance (m)

Direction	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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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:

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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 Immersion	Ground 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 Immersion	Ground 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



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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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
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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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



A.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 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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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	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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CHI/Q
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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)

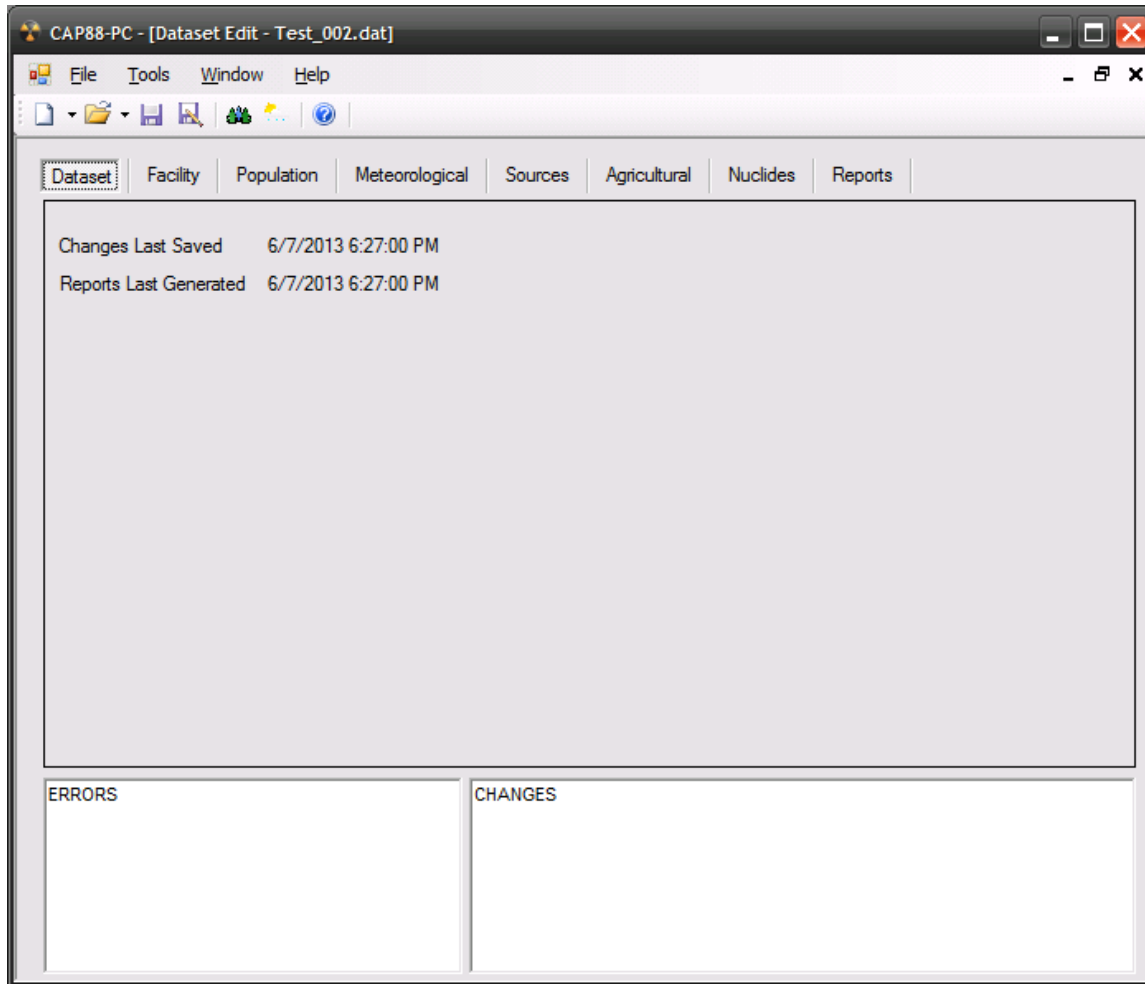
Dir	10000	15000	20000	30000	50000	80000
N	7.070E-08	4.130E-08	2.700E-08	1.375E-08	6.491E-09	2.283E-09
NNW	5.749E-08	3.407E-08	2.272E-08	1.212E-08	5.947E-09	2.279E-09
NW	4.830E-08	2.888E-08	1.950E-08	1.072E-08	5.390E-09	2.204E-09
WNW	4.162E-08	2.503E-08	1.705E-08	9.567E-09	4.892E-09	2.101E-09
W	3.655E-08	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





B.1.2 Facility

The screenshot shows the CAP88-PC software interface for editing a dataset. The window title is "CAP88-PC - [Dataset Edit - Test_002.dat]". The menu bar includes File, Tools, Window, and Help. Below the menu bar is a toolbar with icons for file operations. The main area has a tabbed interface with tabs for Dataset, Facility, Population, Meteorological, Sources, Agricultural, Nuclides, and Reports. The Facility tab is active, displaying a form with the following fields:

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		

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



B.1.3 Population

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

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

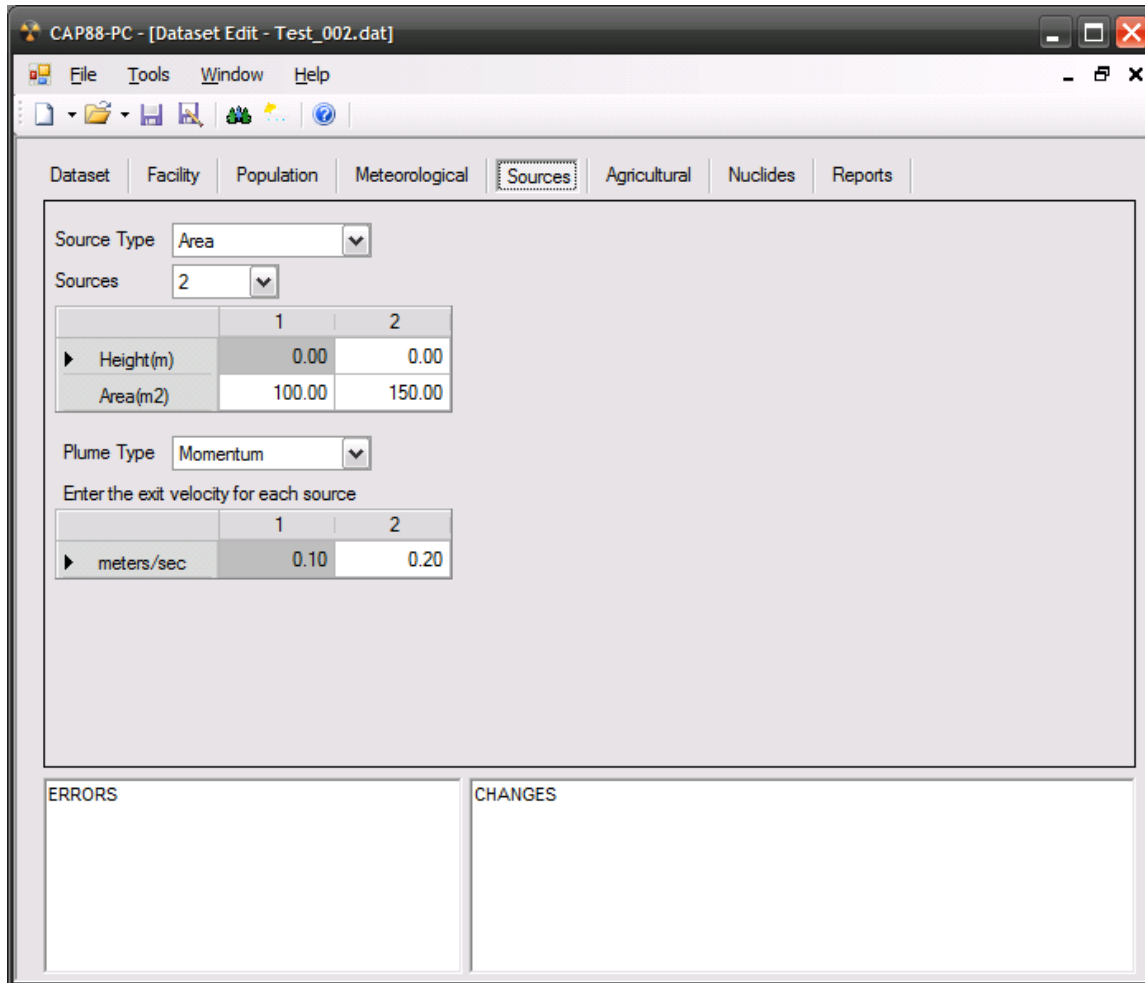
Annual Precipitation	100.00	cm/year
Annual Ambient Temperature	10.00	Celsius
Lid Height	1000.00	meters
Absolute Humidity	8.00	grams/cu meter

ERRORS

CHANGES



B.1.5 Sources



The screenshot shows the 'Sources' dialog box in the CAP88-PC software. The window title is 'CAP88-PC - [Dataset Edit - Test_002.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The 'Sources' tab is selected, with other tabs being 'Dataset', 'Facility', 'Population', 'Meteorological', 'Agricultural', 'Nuclides', and 'Reports'. The 'Source Type' is set to 'Area' and 'Sources' is set to '2'. Below this are two tables for source parameters. The first table shows 'Height(m)' and 'Area(m2)' for sources 1 and 2. The second table shows 'meters/sec' for source exit velocities. At the bottom, there are two empty text boxes labeled 'ERRORS' and 'CHANGES'.

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

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

Chain Length Radon Only

Released Nuclide Count 2 Total Nuclide Count 2 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
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 Equivalent (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 Ci/y	#2 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		



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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- 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
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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	CONCENTRATION 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
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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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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 Individual (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 Individual (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 Individual (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 Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime 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 Total Lifetime 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)

Distance (m)

Direction	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

Distance (m)

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

Distance (m)

Direction	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

Distance (m)

Direction	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)

Distance (m)

Direction	20000	30000	40000	50000	80000
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



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
Page 1

DOSE AND RISK FACTOR UNITS

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

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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 Immersion	Ground 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 Immersion	Ground 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 *

DOSE RATE CONVERSION FACTORS FOR: Fifteen

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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



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CONCEN
Page 1

ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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



B.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 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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CHI/Q
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)

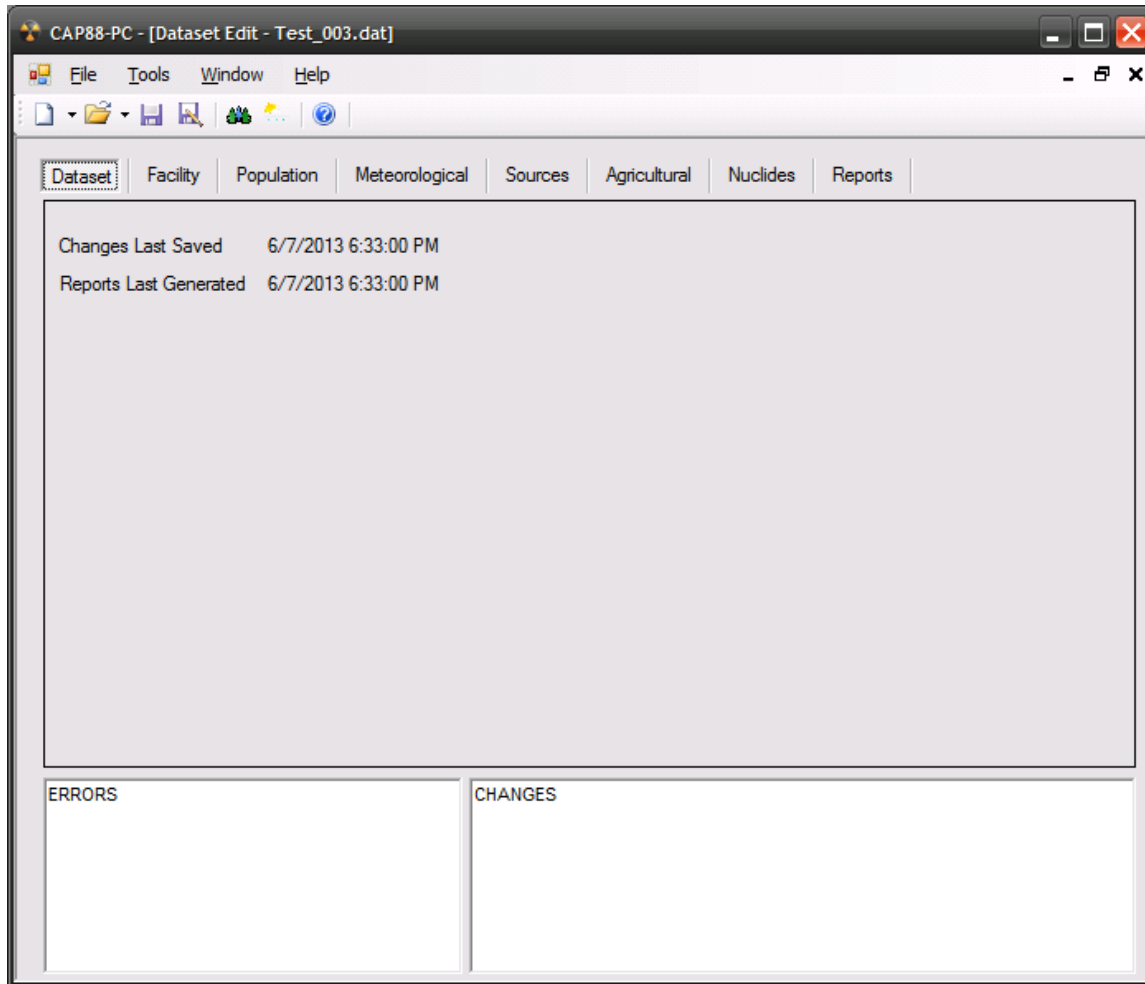
Dir	20000	30000	40000	50000	80000
N	1.715E-08	7.386E-09	4.024E-09	2.285E-09	4.466E-10
NNW	1.615E-08	7.494E-09	4.365E-09	2.668E-09	6.462E-10
NW	1.483E-08	7.241E-09	4.395E-09	2.812E-09	7.906E-10
WNW	1.356E-08	6.868E-09	4.286E-09	2.829E-09	8.846E-10
W	1.243E-08	6.468E-09	4.117E-09	2.779E-09	9.411E-10
WSW	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





C.1.2 Facility

The screenshot shows the CAP88-PC software interface with the 'Facility' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_003.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The toolbar contains icons for file operations and help. The 'Facility' tab is active, showing the following fields:

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		

At the bottom of the window, there are two empty panels labeled 'ERRORS' and '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: sprg200 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

The screenshot shows the 'CAP88-PC - [Dataset Edit - Test_003.dat]' window. The 'Meteorological' tab is selected. The interface includes a menu bar (File, Tools, Window, Help), a toolbar, and a main data entry area. The main area contains instructions, a file path, a file name dropdown, and four input fields for meteorological data. At the bottom, there are two empty boxes labeled 'ERRORS' and 'CHANGES'.

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

	Vegetable	Milk	Meat
Fraction home produced	<input type="text" value="0.0"/>	<input type="text" value="0.0"/>	<input type="text" value="0.0"/>
Fraction from assessment area	<input type="text" value="1.0"/>	<input type="text" value="1.0"/>	<input type="text" value="1.0"/>
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



C.1.7 Nuclides

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

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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



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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 Individual (mrem/y)	Collective Population (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 Ci/y	Source #2 Ci/y	Source #3 Ci/y	TOTAL 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 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



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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

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



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GENERAL
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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	DECAY CONSTANT (PER DAY)			TRANSFER COEFFICIENT	
	Radio- 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
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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	CONCENTRATION 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
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NUMBER OF BEEF CATTLE

Distance (meters)

Direction	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

Distance (meters)

Direction	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

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

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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AREA OF VEGETABLE CROP PRODUCTION (M**2)

Distance (meters)

Direction	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

Distance (meters)

Direction	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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VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

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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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	
(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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WEATHER
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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: 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
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (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 Individual (mrem/y)	Collective Population (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 Individual (mrem/y)	Collective Population (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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CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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 Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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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NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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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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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COLLECTIVE FATAL CANCER RATE (deaths/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	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

Distance (m)

Direction	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
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DOSE AND RISK FACTOR UNITS

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

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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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* NUCLIDE Fe-60 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: Ten

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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 *

DOSE RATE CONVERSION FACTORS FOR: Ten

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE Co-60 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: Ten

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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



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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 CHIQ/Q VALUES FOR Fe-60
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	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

Distance (meters)

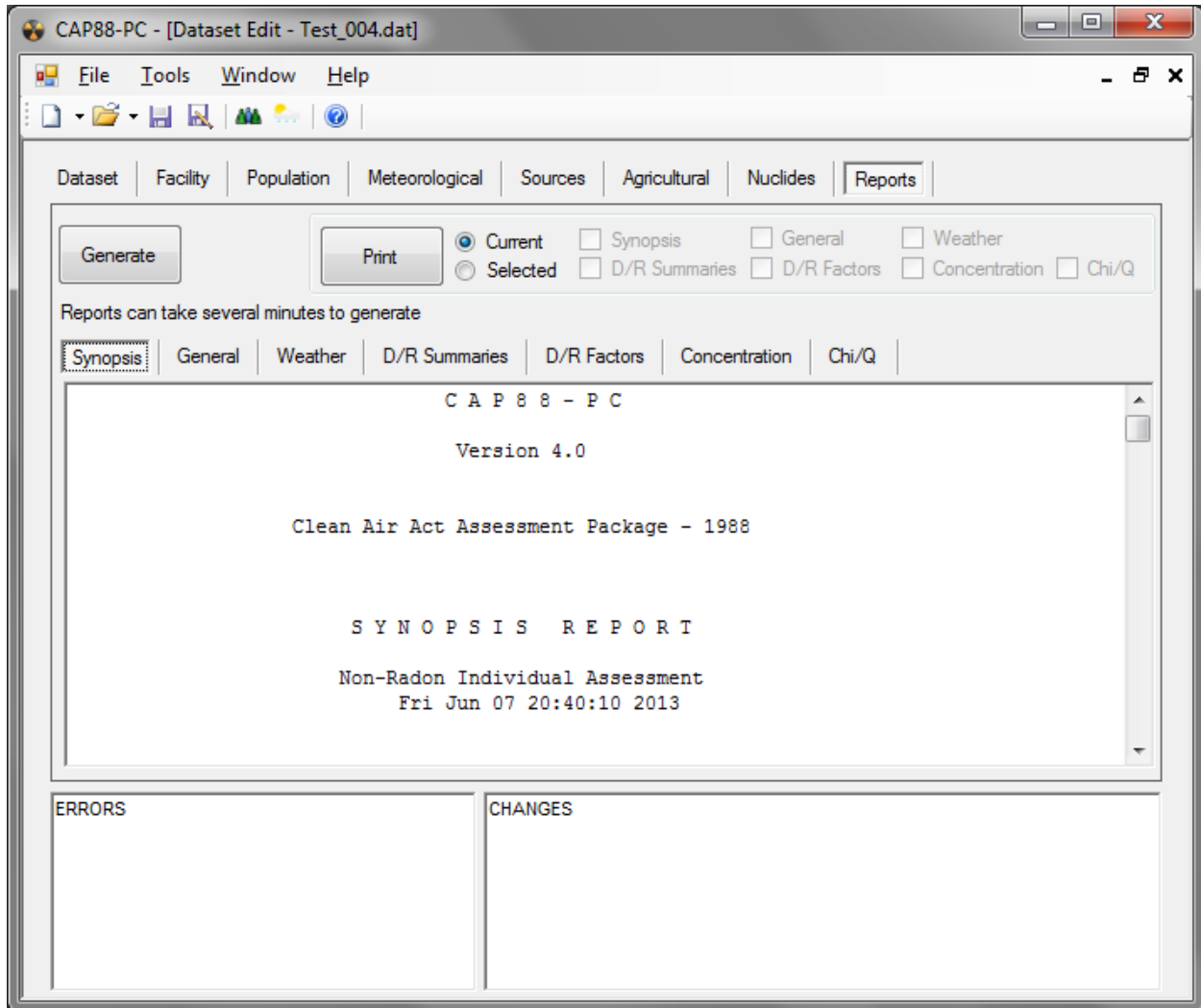
Dir	15000	25000	35000	45000	55000	70000
N	2.348E-08	6.885E-09	2.997E-09	1.409E-09	6.600E-10	2.006E-10
NNW	2.200E-08	7.529E-09	3.665E-09	1.937E-09	1.032E-09	3.850E-10
NW	2.012E-08	7.567E-09	3.942E-09	2.235E-09	1.289E-09	5.484E-10
WNW	1.833E-08	7.347E-09	4.003E-09	2.379E-09	1.447E-09	6.741E-10
W	1.675E-08	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



Appendix D: Test Case 4 Inputs and Reports

D.1 Inputs

D.1.1 Dataset





D.1.2 Facility

The screenshot shows the CAP88-PC software interface with the 'Facility' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_004.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The toolbar contains icons for file operations and help. The main area has tabs for 'Dataset', 'Facility', 'Population', 'Meteorological', 'Sources', 'Agricultural', 'Nuclides', and 'Reports'. The 'Facility' tab contains the following fields:

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		

At the bottom of the window, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



D.1.3 Population

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

The screenshot shows the 'CAP88-PC - [Dataset Edit - Test_004.dat]' window. The 'Meteorological' tab is selected in the top navigation bar. The main area contains the following text and controls:

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	<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

At the bottom, there are two empty panels labeled 'ERRORS' and '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

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 Radon Only

Released Nuclide Count 3 Total Nuclide Count 3 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
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



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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 Equivalent (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	Source	Source	Source	TOTAL
			#1	#2	#3	#4	
			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



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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		



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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
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RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	CONCENTRATION 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

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



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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



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
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (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 Individual (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 Individual (mrem)
S-35	7.32E+00
TOTAL	7.32E+00



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SUMMARY
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime 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 Total Lifetime 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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DOSE AND RISK FACTOR UNITS

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

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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 Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE S-35 :Carbon Disulfide (CS2) *

DOSE RATE CONVERSION FACTORS FOR: Five

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE S-35 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: Five

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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



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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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



D.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 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)

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

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
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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)

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

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
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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

Distance (meters)

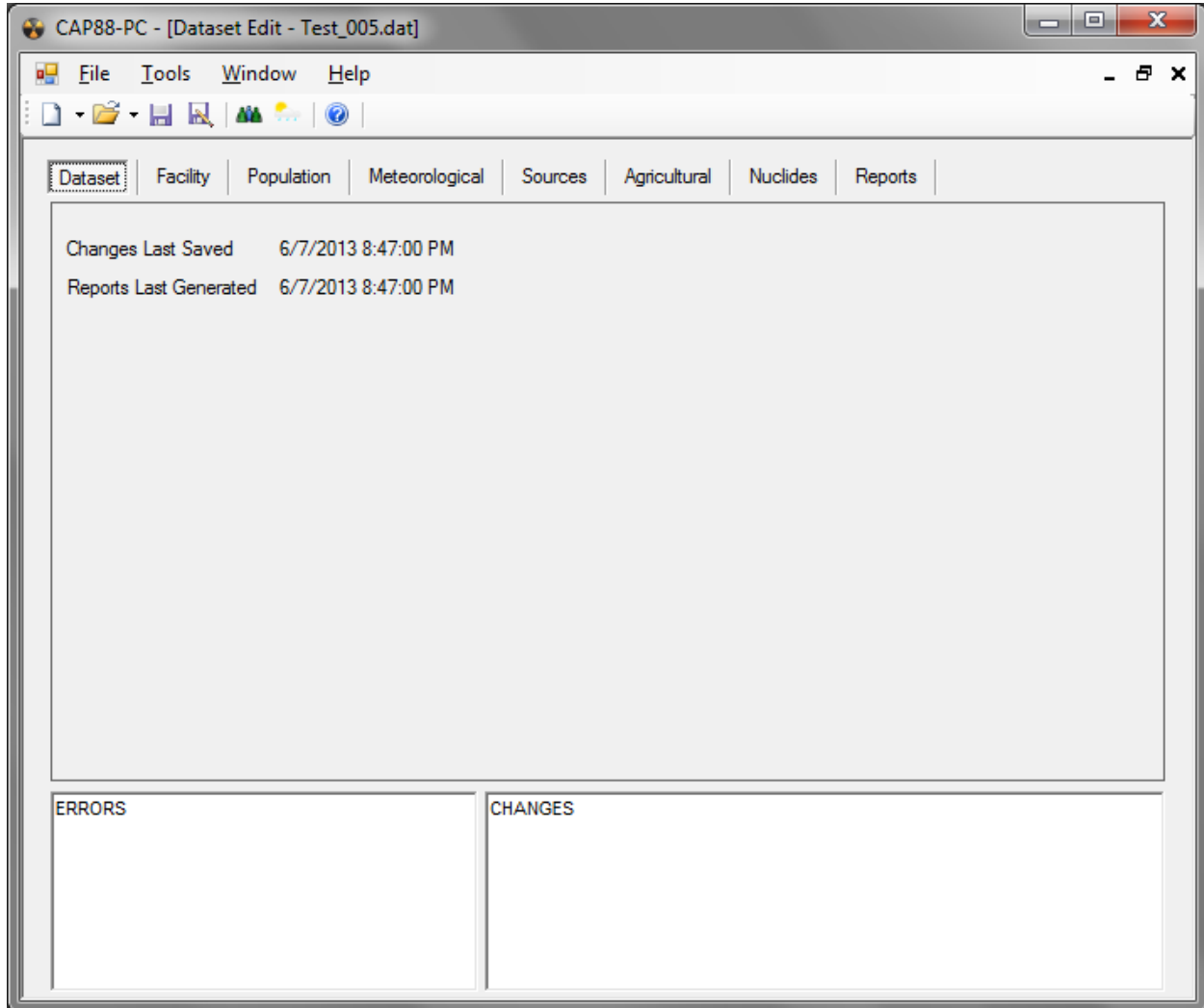
Dir	8000	9000	10000	15000	20000
N	8.910E-08	7.347E-08	6.104E-08	3.400E-08	2.122E-08
NNW	7.415E-08	6.161E-08	5.165E-08	2.953E-08	1.901E-08
NW	6.316E-08	5.273E-08	4.445E-08	2.582E-08	1.694E-08
WNW	5.492E-08	4.599E-08	3.892E-08	2.284E-08	1.519E-08
W	4.853E-08	4.074E-08	3.457E-08	2.044E-08	1.372E-08
WSW	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



Appendix E: Test Case 5 Inputs and Reports

E.1 Inputs

E.1.1 Dataset





E.1.2 Facility

The screenshot shows the CAP88-PC software interface with the 'Facility' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_005.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The toolbar contains icons for file operations and help. The 'Facility' tab is active, showing the following fields:

Name	<input type="text" value="The Plants"/>	Emission Year	<input type="text" value="1992"/>
Address	<input type="text" value="3684 Coupland Road"/> <input type="text"/>	Source Category	<input type="text"/>
City	<input type="text" value="Lancaster"/>		
Zip	<input type="text" value="99353"/> (Note: State is found on the Agricultural tab)		
Comments	<input type="text" value="Intended for Software Testing Purposes Only"/> <input type="text" value="Version 4.0, Release Candidate 3"/>		

At the bottom of the window, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



E.1.3 Population

The screenshot shows the CAP88-PC software interface with the 'Population' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_005.dat]'. The menu bar includes File, Tools, Window, and Help. The main area contains several configuration options:

- Run Type: Population (dropdown)
- Population Age: One (dropdown)
- Build up time: 100 (spin box) years
- Files with * are in the same folder as the dataset; Files with ! are in a non-default folder.
- File path: C:\Users\CAP88 User\Documents\CAP88\Population Files\Incr1990.pop
- File: Incr1990 (dropdown), The Plants (dropdown)
- Midpoints: 13
- Maximum Exposed Individual: Direction auto (dropdown), Midpoint index 0 (dropdown), Auto-determine (checked checkbox)

Four checkboxes are checked on the right side of the main area:

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

At the bottom, there are two empty panels labeled 'ERRORS' and 'CHANGES'.

Age Group	250.00	750.00	1500.00	2500.00	3500.00
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



E.1.4 Meteorological

The screenshot shows the CAP88-PC software interface with the 'Meteorological' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_005.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The toolbar contains icons for file operations and help. The main area has tabs for 'Dataset', 'Facility', 'Population', 'Meteorological', 'Sources', 'Agricultural', 'Nuclides', and 'Reports'. The 'Meteorological' tab contains the following text and input fields:

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

At the bottom of the window, there are two empty panels labeled 'ERRORS' and '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	0.30	0.20	0.10
Fraction from assessment area	0.60	0.70	0.80
Fraction imported	0.10	0.10	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 Radon Only

Released Nuclide Count 3 Total Nuclide Count 3

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 Individual (mrem)	Collective Population (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	Source #2	Source #3	Source #4	Source #5	TOTAL
			Ci/y	Ci/y	Ci/y	Ci/y	Ci/y	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



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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 for Vegetable Crops:	5.20E-02		



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SYNOPSIS
Page 4

POPULATION DATA

Distance (m)

Direction	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

Distance (m)

Direction	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



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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- 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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GENERAL
Page 3

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	CONCENTRATION 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

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

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

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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GENERAL
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NUMBER OF MILK CATTLE

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

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)

Distance (meters)

Direction	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

Distance (meters)

Direction	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

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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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 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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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



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\lnchr1990.wnd
Pop File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnchr1990.pop



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SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem)	Collective Population (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 Individual (mrem)	Collective Population (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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SUMMARY
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NUCLIDE COMMITTED EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem)	Collective Population (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 Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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 Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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 Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (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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SUMMARY
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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\lnchr1990.wnd
Pop File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lnchr1990.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:

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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 Tc-97 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: One

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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FACTOR
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* NUCLIDE Tc-98 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: One

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE Tc-99 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: One

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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



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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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



E.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 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\lncr1990.wnd
Population File: C:\Users\CAP88 User\Documents\CAP88\Population Files\lncr1990.pop



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CHIQ
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GROUND-LEVEL CHI/Q VALUES FOR Tc-97
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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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
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GROUND-LEVEL CHIQ/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)

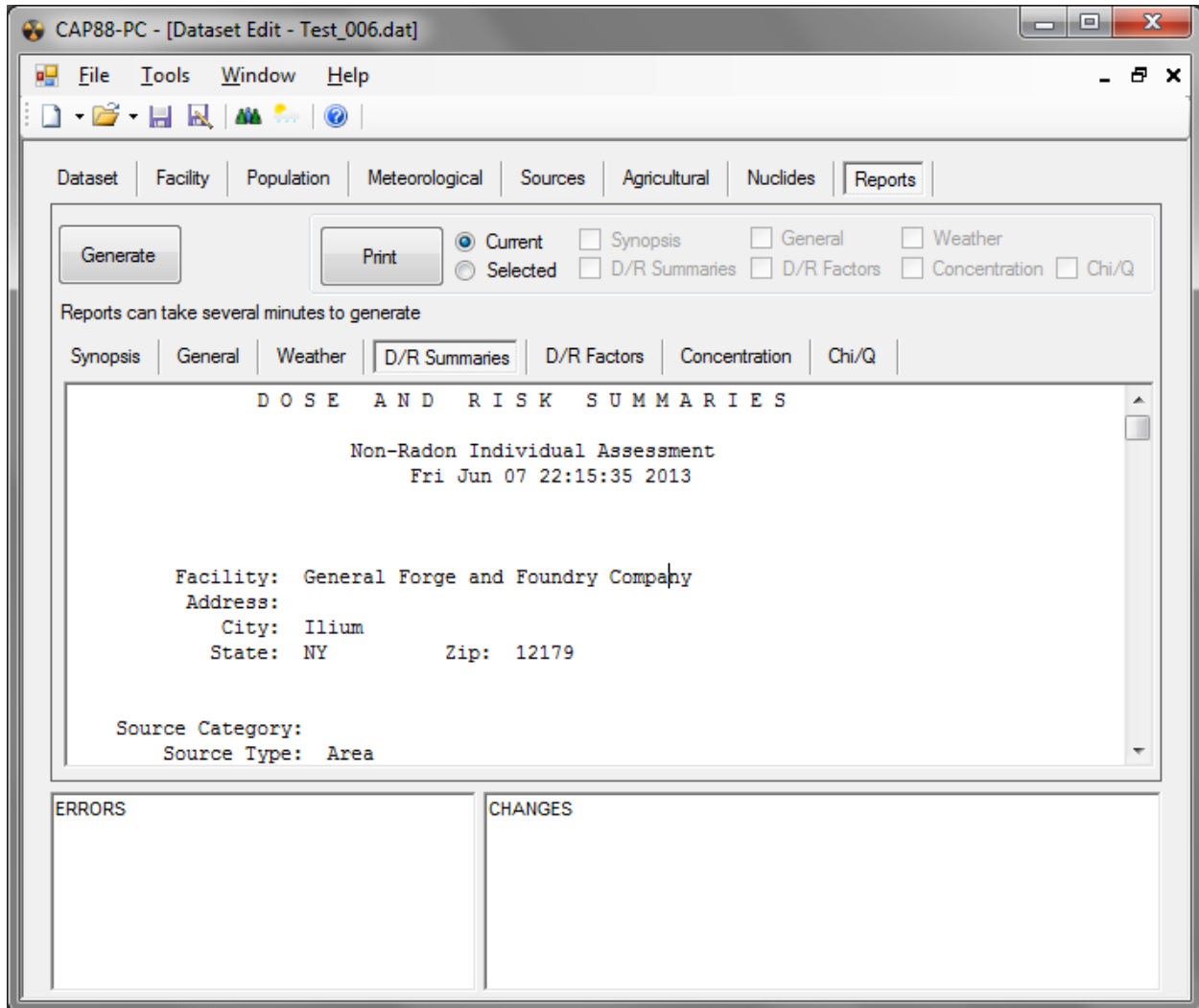
Dir	15000	25000	35000	45000	55000	70000
N	2.501E-08	1.159E-08	7.045E-09	4.628E-09	3.108E-09	1.814E-09
NNW	2.020E-08	9.815E-09	6.173E-09	4.210E-09	2.955E-09	1.837E-09
NW	1.690E-08	8.457E-09	5.429E-09	3.788E-09	2.732E-09	1.767E-09
WNW	1.452E-08	7.413E-09	4.825E-09	3.417E-09	2.510E-09	1.668E-09
W	1.272E-08	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





F.1.2 Facility

The screenshot shows the CAP88-PC software interface with the 'Facility' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_006.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The 'Facility' tab is active, showing the following fields:

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		

At the bottom of the window, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



F.1.3 Population

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

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

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

Chain Length: max Radon Only Ac-223 Add

Released Nuclide Count 2 Total Nuclide Count 4 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
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



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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 Equivalent (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





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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	



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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- 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 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



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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



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



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SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (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 Individual (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 Individual (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
Page 3

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
--------	--

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime 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 Total Lifetime 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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SUMMARY
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INDIVIDUAL COMMITTED EFFECTIVE DOSE EQUIVALENT (mrem)
(All Radionuclides and Pathways)

Distance (m)							
Direction	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

Distance (m)							
Direction	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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SUMMARY
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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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SUMMARY
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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
Page 1

DOSE AND RISK FACTOR UNITS

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

<u>Pathway</u>	<u>Units</u>
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:

<u>Pathway</u>	<u>Units</u>
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 Immersion	Ground 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 Immersion	Ground 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 *

DOSE RATE CONVERSION FACTORS FOR: Infant

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE Mn-52 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: Infant

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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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* NUCLIDE K-40 :Particulate *

DOSE RATE CONVERSION FACTORS FOR: Infant

Organ	Ingestion	Inhalation	Air Immersion	Ground 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 Immersion	Ground 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



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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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
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Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/m ³)	Dry Depo Rate (pCi/cm ² -s)	Wet Depo Rate (pCi/cm ² -s)	Ground Depo Rate (pCi/cm ² -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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ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/m3)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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



F.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 Individual Assessment
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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
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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)

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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CHI/Q
Page 2

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	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
Page 3

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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CHI/Q
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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)

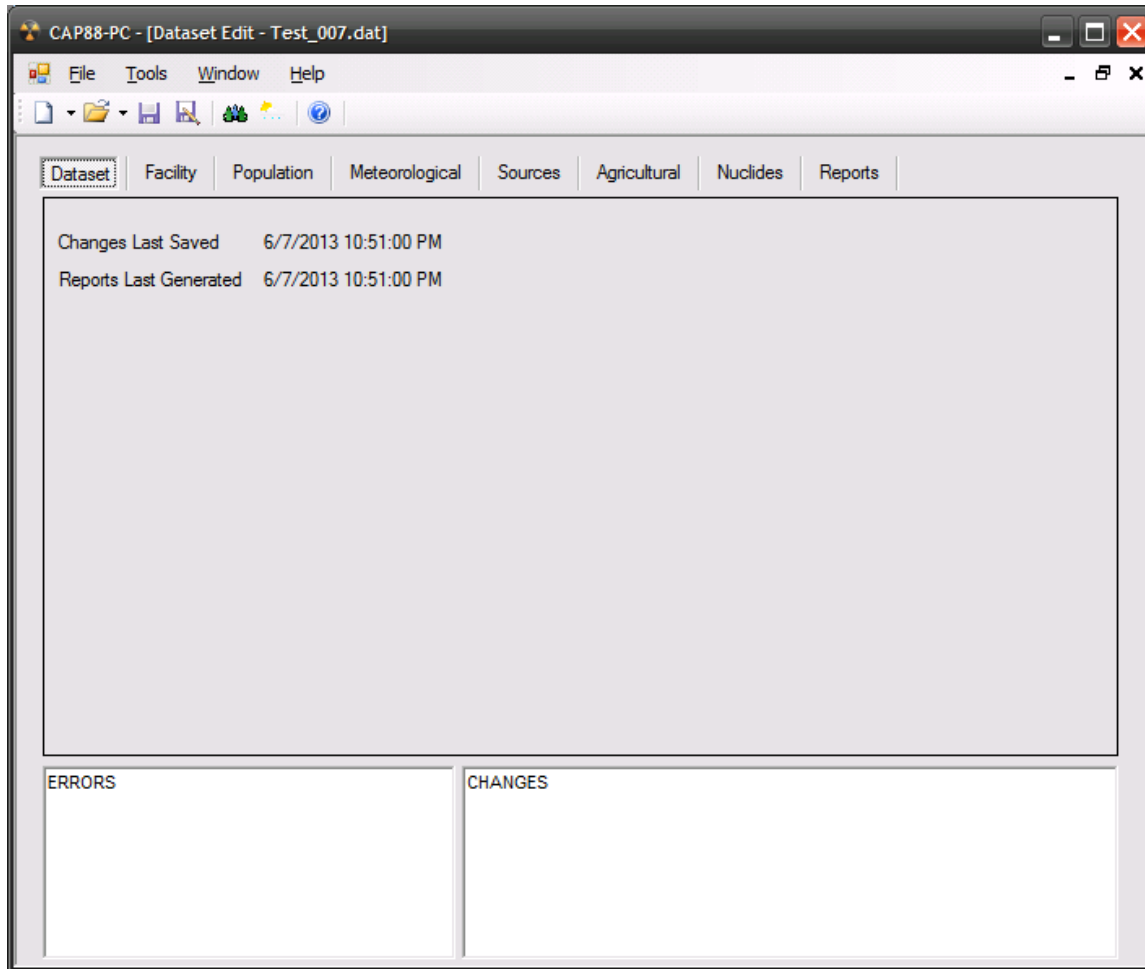
Dir	10000	15000	20000	30000	50000	80000
N	6.211E-08	3.462E-08	2.160E-08	1.002E-08	3.953E-09	1.066E-09
NNW	5.237E-08	2.995E-08	1.929E-08	9.580E-09	4.103E-09	1.283E-09
NW	4.496E-08	2.612E-08	1.715E-08	8.898E-09	4.011E-09	1.392E-09
WNW	3.931E-08	2.308E-08	1.535E-08	8.205E-09	3.830E-09	1.433E-09
W	3.487E-08	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





G.1.2 Facility

The screenshot shows the CAP88-PC software interface with the 'Facility' tab selected. The window title is 'CAP88-PC - [Dataset Edit - Test_007.dat]'. The menu bar includes 'File', 'Tools', 'Window', and 'Help'. The toolbar contains icons for file operations and help. The 'Facility' tab is active, showing the following fields:

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		

At the bottom of the window, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



G.1.3 Population

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

The screenshot shows the 'CAP88-PC - [Dataset Edit - Test_007.dat]' window. The 'Meteorological' tab is selected in the top navigation bar. The main area contains the following text and fields:

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

At the bottom, there are two empty panels labeled 'ERRORS' and 'CHANGES'.



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 Radon Only

Released Nuclide Count 1 Total Nuclide Count 5

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



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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



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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



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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



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GENERAL
Page 1

RADIONUCLIDE-DEPENDENT PARAMETERS FOR RELEASED ISOTOPES

Nuclide	Clearance Type	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (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- 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 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
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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	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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GENERAL
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EXPOSURE LEVELS FOR SHORT-LIFE PROGENY OF RN-222
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (Meters)	Exposure Level (Person WL) (.7 EQF)	Adjusted Equilibrium Fraction	Adjusted Exposure 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



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GENERAL
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EXPOSURE LEVELS FOR SHORT-LIFE PROGENY OF RN-222
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (Meters)	Exposure Level (Person WL) (.7 EQF)	Adjusted Equilibrium Fraction	Adjusted Exposure 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



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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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CONCEN
Page 1

ESTIMATED RADIONUCLIDE CONCENTRATIONS
AT VARIOUS LOCATIONS IN THE ENVIRONMENT

Wind Toward	Distance (meters)	Nuclide	Air Conc (pCi/L)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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 Toward	Distance (meters)	Nuclide	Air Conc (pCi/L)	Dry Depo Rate (pCi/cm2-s)	Wet Depo Rate (pCi/cm2-s)	Ground Depo Rate (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



G.2.5 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

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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CHIQ
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)

Distance (meters)

Dir	500	1000	5000	10000
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
