

APPENDIX A

RESPIRABLE PARTICLE RELEASES FOR EACH RELEASE EVENT

This appendix contains the release estimates for <3- μ m, 3–10- μ m, and 10–15- μ m particles for the six discrete release events and baseline releases. These release quantities were extracted from the 903 Area source term model ([Weber et al. 1999](#)) and are summarized in terms of percentiles on the cumulative density function. Transport calculations using RATCHET did not use these percentile summaries. The output from each of the 1000 Monte Carlo trials on which these percentiles were based were used instead to preserve correlation among particle sizes.

**Table A-1. Percentiles of Release Quantities in Curies for <3- μ m Particles
for the Six Discrete Events**

Percentile	05-Dec-68	06-Jan-69	07-Jan-69	30-Jan-69	19-Mar-69	07-Apr-69
0.0%	5.20E-05	1.96E-04	5.94E-04	4.46E-04	5.60E-05	4.65E-04
2.5%	2.03E-04	8.14E-04	4.15E-03	2.39E-03	1.82E-04	1.68E-03
5.0%	2.62E-04	1.42E-03	5.96E-03	3.43E-03	2.87E-04	2.68E-03
10.0%	6.48E-04	2.16E-03	1.06E-02	6.29E-03	5.23E-04	4.23E-03
15.0%	8.82E-04	3.10E-03	1.43E-02	7.75E-03	8.47E-04	5.73E-03
20.0%	1.12E-03	3.68E-03	1.89E-02	9.83E-03	1.07E-03	7.16E-03
25.0%	1.39E-03	4.48E-03	2.29E-02	1.21E-02	1.38E-03	8.64E-03
30.0%	1.65E-03	5.28E-03	2.82E-02	1.53E-02	1.83E-03	1.10E-02
35.0%	1.87E-03	6.16E-03	3.28E-02	1.82E-02	2.05E-03	1.27E-02
40.0%	2.30E-03	7.93E-03	3.74E-02	2.03E-02	2.46E-03	1.52E-02
45.0%	2.76E-03	8.85E-03	4.34E-02	2.46E-02	3.00E-03	1.81E-02
50.0%	3.18E-03	1.04E-02	4.96E-02	2.86E-02	3.52E-03	2.18E-02
55.0%	3.61E-03	1.28E-02	5.80E-02	3.43E-02	3.96E-03	2.49E-02
60.0%	4.23E-03	1.46E-02	6.62E-02	3.98E-02	4.70E-03	2.94E-02
65.0%	4.95E-03	1.67E-02	7.52E-02	4.80E-02	5.60E-03	3.33E-02
70.0%	5.56E-03	1.95E-02	9.05E-02	5.63E-02	6.34E-03	4.03E-02
75.0%	6.85E-03	2.35E-02	1.11E-01	6.52E-02	6.95E-03	4.67E-02
80.0%	8.46E-03	2.72E-02	1.34E-01	7.36E-02	8.19E-03	5.70E-02
85.0%	9.81E-03	3.25E-02	1.70E-01	9.11E-02	1.01E-02	7.14E-02
90.0%	1.22E-02	4.31E-02	2.15E-01	1.29E-01	1.48E-02	8.77E-02
95.0%	1.87E-02	6.30E-02	3.37E-01	1.88E-01	2.91E-02	1.25E-01
97.5%	2.78E-02	7.89E-02	5.57E-01	2.34E-01	6.61E-02	1.60E-01
100.0%	8.77E-02	1.72E-01	1.27E+00	5.28E-01	1.31E-01	5.99E-01

**Table A-2. Percentiles of Release Quantities in Curies for 3–10- μ m Particles
for the Six Discrete Events**

Percentile	05-Dec-68	06-Jan-69	07-Jan-69	30-Jan-69	19-Mar-69	07-Apr-69
0.0%	1.56E-05	5.89E-05	1.78E-04	1.34E-04	1.74E-05	1.40E-04
2.5%	6.25E-05	2.63E-04	1.57E-03	8.02E-04	7.74E-05	6.62E-04
5.0%	8.75E-05	5.66E-04	3.04E-03	1.52E-03	1.28E-04	1.01E-03
10.0%	3.17E-04	1.35E-03	5.84E-03	3.12E-03	2.81E-04	2.18E-03
15.0%	5.84E-04	2.05E-03	9.49E-03	4.72E-03	5.45E-04	3.30E-03
20.0%	8.63E-04	2.92E-03	1.37E-02	6.89E-03	7.65E-04	4.60E-03
25.0%	1.01E-03	3.39E-03	1.77E-02	8.46E-03	1.03E-03	6.26E-03
30.0%	1.32E-03	4.06E-03	2.29E-02	1.11E-02	1.45E-03	7.56E-03
35.0%	1.54E-03	5.28E-03	2.66E-02	1.43E-02	1.65E-03	9.68E-03
40.0%	1.89E-03	6.59E-03	3.13E-02	1.71E-02	2.02E-03	1.13E-02
45.0%	2.23E-03	7.77E-03	3.57E-02	2.09E-02	2.52E-03	1.43E-02
50.0%	2.76E-03	9.34E-03	4.36E-02	2.47E-02	3.02E-03	1.85E-02
55.0%	3.09E-03	1.09E-02	4.88E-02	2.91E-02	3.37E-03	2.11E-02
60.0%	3.65E-03	1.26E-02	5.69E-02	3.47E-02	4.04E-03	2.43E-02
65.0%	4.34E-03	1.47E-02	6.35E-02	4.23E-02	4.91E-03	2.83E-02
70.0%	5.01E-03	1.70E-02	7.66E-02	4.79E-02	5.55E-03	3.50E-02
75.0%	6.02E-03	2.00E-02	9.85E-02	5.88E-02	6.06E-03	4.06E-02
80.0%	7.47E-03	2.40E-02	1.18E-01	6.74E-02	7.25E-03	4.92E-02
85.0%	8.80E-03	2.97E-02	1.51E-01	8.31E-02	8.97E-03	6.29E-02
90.0%	1.10E-02	3.84E-02	1.97E-01	1.12E-01	1.33E-02	7.95E-02
95.0%	1.69E-02	5.64E-02	3.05E-01	1.72E-01	2.60E-02	1.11E-01
97.5%	2.55E-02	7.26E-02	4.92E-01	2.14E-01	6.01E-02	1.48E-01
100.0%	8.11E-02	1.52E-01	1.17E+00	4.83E-01	1.20E-01	5.48E-01

**Table A-3. Percentiles of Release Quantities in Curies for 10–15- μ m Particles
for the Six Discrete Events**

Percentile	05-Dec-68	06-Jan-69	07-Jan-69	30-Jan-69	19-Mar-69	07-Apr-69
0.0%	4.37E-05	1.38E-04	1.70E-03	3.84E-04	2.41E-05	3.83E-04
2.5%	1.38E-04	4.66E-04	2.88E-03	1.31E-03	1.15E-04	1.12E-03
5.0%	2.29E-04	7.80E-04	3.51E-03	2.00E-03	1.90E-04	1.56E-03
10.0%	3.39E-04	1.23E-03	5.98E-03	3.15E-03	3.55E-04	2.69E-03
15.0%	4.41E-04	1.86E-03	8.08E-03	4.51E-03	5.32E-04	3.74E-03
20.0%	5.88E-04	2.31E-03	9.84E-03	5.66E-03	6.69E-04	5.16E-03
25.0%	7.42E-04	2.82E-03	1.28E-02	7.01E-03	8.25E-04	6.09E-03
30.0%	9.69E-04	3.48E-03	1.58E-02	8.46E-03	1.04E-03	7.00E-03
35.0%	1.13E-03	3.91E-03	1.89E-02	1.02E-02	1.17E-03	9.14E-03
40.0%	1.26E-03	4.56E-03	2.21E-02	1.24E-02	1.37E-03	1.10E-02
45.0%	1.45E-03	5.18E-03	2.59E-02	1.43E-02	1.67E-03	1.26E-02
50.0%	1.72E-03	5.80E-03	3.01E-02	1.70E-02	1.99E-03	1.52E-02
55.0%	1.93E-03	6.64E-03	3.55E-02	1.98E-02	2.23E-03	1.83E-02
60.0%	2.46E-03	7.71E-03	3.99E-02	2.34E-02	2.60E-03	2.08E-02
65.0%	2.93E-03	9.17E-03	4.94E-02	2.71E-02	3.11E-03	2.34E-02
70.0%	3.38E-03	1.09E-02	5.79E-02	3.25E-02	3.60E-03	2.75E-02
75.0%	3.84E-03	1.25E-02	7.03E-02	3.78E-02	4.03E-03	3.18E-02
80.0%	4.66E-03	1.48E-02	8.44E-02	4.62E-02	4.88E-03	4.16E-02
85.0%	6.45E-03	1.81E-02	1.01E-01	5.77E-02	6.15E-03	4.84E-02
90.0%	8.47E-03	2.54E-02	1.38E-01	7.70E-02	8.96E-03	5.95E-02
95.0%	1.26E-02	3.94E-02	2.08E-01	1.16E-01	1.30E-02	8.81E-02
97.5%	1.96E-02	4.79E-02	3.13E-01	1.51E-01	2.01E-02	1.21E-01
100.0%	4.59E-02	1.13E-01	1.21E+00	3.29E-01	3.25E-02	2.05E-01

**Table A-4. Percentiles of Release Quantities in Curies for <3- μ m Particles
for Baseline Releases**

Percentile	1964	1965	1966	1967	1968	1969
0%	1.82E-06	4.20E-06	1.56E-06	7.08E-06	4.05E-04	1.81E-04
5%	2.83E-05	3.30E-05	4.45E-05	1.03E-04	1.38E-03	7.73E-04
10%	4.32E-05	7.37E-05	8.13E-05	1.91E-04	1.96E-03	1.07E-03
15%	6.64E-05	1.02E-04	1.14E-04	2.61E-04	2.38E-03	1.35E-03
20%	8.24E-05	1.33E-04	1.58E-04	3.39E-04	2.92E-03	1.63E-03
25%	1.01E-04	1.79E-04	1.95E-04	4.02E-04	3.50E-03	1.90E-03
30%	1.22E-04	2.26E-04	2.41E-04	4.79E-04	4.00E-03	2.23E-03
35%	1.45E-04	2.70E-04	2.87E-04	5.56E-04	4.58E-03	2.62E-03
40%	1.74E-04	3.14E-04	3.44E-04	6.83E-04	5.21E-03	3.00E-03
45%	1.98E-04	3.90E-04	4.12E-04	8.08E-04	5.91E-03	3.35E-03
50%	2.31E-04	4.55E-04	4.76E-04	9.22E-04	6.67E-03	3.78E-03
55%	2.68E-04	5.26E-04	5.64E-04	1.03E-03	7.49E-03	4.28E-03
60%	3.03E-04	6.26E-04	6.68E-04	1.24E-03	8.58E-03	4.79E-03
65%	3.60E-04	7.33E-04	7.76E-04	1.41E-03	9.75E-03	5.48E-03
70%	4.16E-04	8.36E-04	9.43E-04	1.65E-03	1.12E-02	6.35E-03
75%	4.95E-04	1.05E-03	1.13E-03	1.98E-03	1.30E-02	7.41E-03
80%	5.91E-04	1.31E-03	1.50E-03	2.40E-03	1.54E-02	8.67E-03
85%	7.30E-04	1.59E-03	1.88E-03	2.93E-03	1.85E-02	1.02E-02
90%	8.92E-04	2.13E-03	2.52E-03	3.73E-03	2.35E-02	1.30E-02
95%	1.33E-03	3.59E-03	3.84E-03	5.71E-03	3.53E-02	1.94E-02
100%	5.15E-03	1.72E-02	2.68E-02	2.23E-02	1.38E-01	8.02E-02

**Table A-5. Percentiles of Release Quantities in Curies for 3–10- μ m Particles
for Baseline Releases**

Percentile	1964	1965	1966	1967	1968	1969
0%	4.02E-06	9.31E-06	3.46E-06	1.57E-05	8.96E-04	4.00E-04
5%	6.26E-05	7.32E-05	9.85E-05	2.29E-04	3.06E-03	1.71E-03
10%	9.57E-05	1.63E-04	1.80E-04	4.23E-04	4.34E-03	2.37E-03
15%	1.47E-04	2.25E-04	2.53E-04	5.77E-04	5.28E-03	2.99E-03
20%	1.83E-04	2.95E-04	3.49E-04	7.50E-04	6.47E-03	3.60E-03
25%	2.25E-04	3.95E-04	4.31E-04	8.90E-04	7.74E-03	4.20E-03
30%	2.70E-04	4.99E-04	5.34E-04	1.06E-03	8.86E-03	4.94E-03
35%	3.22E-04	5.98E-04	6.34E-04	1.23E-03	1.01E-02	5.81E-03
40%	3.86E-04	6.95E-04	7.61E-04	1.51E-03	1.15E-02	6.64E-03
45%	4.38E-04	8.63E-04	9.12E-04	1.79E-03	1.31E-02	7.43E-03
50%	5.11E-04	1.01E-03	1.05E-03	2.04E-03	1.48E-02	8.37E-03
55%	5.94E-04	1.16E-03	1.25E-03	2.29E-03	1.66E-02	9.48E-03
60%	6.71E-04	1.39E-03	1.48E-03	2.74E-03	1.90E-02	1.06E-02
65%	7.98E-04	1.62E-03	1.72E-03	3.12E-03	2.16E-02	1.21E-02
70%	9.22E-04	1.85E-03	2.09E-03	3.65E-03	2.48E-02	1.41E-02
75%	1.10E-03	2.33E-03	2.50E-03	4.39E-03	2.88E-02	1.64E-02
80%	1.31E-03	2.89E-03	3.33E-03	5.31E-03	3.42E-02	1.92E-02
85%	1.62E-03	3.53E-03	4.16E-03	6.48E-03	4.09E-02	2.26E-02
90%	1.97E-03	4.71E-03	5.57E-03	8.26E-03	5.20E-02	2.89E-02
95%	2.94E-03	7.95E-03	8.51E-03	1.27E-02	7.81E-02	4.30E-02
100%	1.14E-02	3.81E-02	5.94E-02	4.94E-02	3.05E-01	1.78E-01

**Table A-6. Percentiles of Release Quantities in Curies for 10–15 μm Particles
for Baseline Releases**

Percentile	1964	1965	1966	1967	1968	1969
0%	4.02E-06	9.31E-06	3.46E-06	1.57E-05	8.96E-04	4.00E-04
5%	6.26E-05	7.32E-05	9.85E-05	2.29E-04	3.06E-03	1.71E-03
10%	9.57E-05	1.63E-04	1.80E-04	4.23E-04	4.34E-03	2.37E-03
15%	1.47E-04	2.25E-04	2.53E-04	5.77E-04	5.28E-03	2.99E-03
20%	1.83E-04	2.95E-04	3.49E-04	7.50E-04	6.47E-03	3.60E-03
25%	2.25E-04	3.95E-04	4.31E-04	8.90E-04	7.74E-03	4.20E-03
30%	2.70E-04	4.99E-04	5.34E-04	1.06E-03	8.86E-03	4.94E-03
35%	3.22E-04	5.98E-04	6.34E-04	1.23E-03	1.01E-02	5.81E-03
40%	3.86E-04	6.95E-04	7.61E-04	1.51E-03	1.15E-02	6.64E-03
45%	4.38E-04	8.63E-04	9.12E-04	1.79E-03	1.31E-02	7.43E-03
50%	5.11E-04	1.01E-03	1.05E-03	2.04E-03	1.48E-02	8.37E-03
55%	5.94E-04	1.16E-03	1.25E-03	2.29E-03	1.66E-02	9.48E-03
60%	6.71E-04	1.39E-03	1.48E-03	2.74E-03	1.90E-02	1.06E-02
65%	7.98E-04	1.62E-03	1.72E-03	3.12E-03	2.16E-02	1.21E-02
70%	9.22E-04	1.85E-03	2.09E-03	3.65E-03	2.48E-02	1.41E-02
75%	1.10E-03	2.33E-03	2.50E-03	4.39E-03	2.88E-02	1.64E-02
80%	1.31E-03	2.89E-03	3.33E-03	5.31E-03	3.42E-02	1.92E-02
85%	1.62E-03	3.53E-03	4.16E-03	6.48E-03	4.09E-02	2.26E-02
90%	1.97E-03	4.71E-03	5.57E-03	8.26E-03	5.20E-02	2.89E-02
95%	2.94E-03	7.95E-03	8.51E-03	1.27E-02	7.81E-02	4.30E-02
100%	1.14E-02	3.81E-02	5.94E-02	4.94E-02	3.05E-01	1.78E-01

REFERENCE

Weber, J.M., A.S. Rood, H.R. Meyer, and J.E. Till. 1999. *Development of the Rocky Flats Plant 903 Area Plutonium Source Term*. 8-CDPHE-RFP-1998-FINAL(Rev 1.). Radiological Assessments Corporation, Neeses, South Carolina.