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**Data Collection Handbook to Support Modeling
the Impacts of Radioactive Material in Soil**

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TABLE 1.3. Default Values, Lower Bounds, and Upper Bounds for RESRAD Input Parameters

Parameter	Unit	Default Value	Lower ^a Bound	Upper ^a Bound
Soil bulk density				
Cover material	g/cm ³	1.5	0	100
Contaminated zone	g/cm ³	1.5	0	100
Unsatuated zone	g/cm ³	1.5	0	100
Saturated zone	g/cm ³	1.5	0	100
Building foundation material	g/cm ³	2.4	0	100
Total porosity				
Cover material	-	.4	0	1
Contaminated zone	-	.4	0	1
Unsatuated zone	-	.4	0	1
Saturated zone	-	.4	0	1
Building foundation material	-	.1	0	1
Effective porosity				
Contaminated zone	-	.2	0	1
Saturated zone	-	.2	0	1
Unsatuated zone	-	.2	0	1
Hydraulic conductivity				
Contaminated zone	m/yr	10	0	1 × 10 ¹⁰
Unsatuated zone	m/yr	10	0	1 × 10 ¹⁰
Saturated zone	m/yr	100	0	1 × 10 ¹⁰
Volumetric water content				
Cover material	-	0.05	0	1
Building foundation material	-	0.03	0	1
Effective radon diffusion coefficient				
Cover material	m ² /s	2 × 10 ⁻⁶	c	1
Contaminated zone	m ² /s	2 × 10 ⁻⁶	c	1
Building foundation material	m ² /s	3 × 10 ⁻⁷	c	1
Radon emanation coefficient (Rn-222/Rn-220)				
	-	0.25/0.15	0.01	1
Precipitation rate				
	m/yr	1	0	10
Runoff coefficient				
	-	0.2	0	1
Irrigation rate				
	m/yr	0.2	0	10
Evapotranspiration coefficient				
	-	0.5	0	0.999
Soil-specific ϕ parameter				
Contaminated zone	-	5.3	0	15
Unsatuated zone	-	5.3	0	15
Saturated zone	-	5.3	0	15
Erosion rate				
Cover material	m/yr	0.001	0	5
Contaminated zone	m/yr	0.001	0	5
Hydraulic gradient				
	-	0.02	0	10
Length of contaminated zone parallel to the aquifer flow				
	m	100	0	-

TABLE 1.3 (Cont.)

Parameter	Unit	Default Value	Lower ^a Bound	Upper ^b Bound
Watershed area for nearby stream or pond	m ²	1 x 10 ⁶	0	-
Water table drop rate	m/yr	0.001	0	5
Well-pump intake depth	m	10	0	1,000
Radon vertical dimension of mixing	m	2	0	1,000
Average annual wind speed	m/s	2	0	100
Average building air exchange rate	1/h	0.5	0	1,000
Building room height	m	2.5	0	100
Building indoor area factor	-	0	0	100
Thickness of uncontaminated unsaturated zone	m	4	0	10,000
Building foundation thickness	m	0.15	0	10
Foundation depth below ground surface	m	1	0	100
Fraction of time spent indoors on-site	-	0.5	0	1
Fraction of time spent outdoors on-site	-	0.25	0	1
Area of contaminated zone	m ²	10,000	0	-
Cover depth	m	0	0	100
Distribution coefficients	cm ³ /g	d	0	1 x 10 ¹⁰
Fractions of annular areas within contaminated area	-	0	0	1
Radionuclide concentration in groundwater	pCi/L	0	0	1 x 10 ²⁰
Leach rate	1/yr	0	0	1 x 10 ¹⁰
Livestock fodder intake				
Meat	kg/d	68	0	300
Milk	kg/d	55	0	300
Mass loading for inhalation	g/m ³	2 x 10 ⁻⁴	0	2
Milk consumption rate	L/yr	92	0	1,000
Shielding factor for inhalation	-	0.4	0	1
Depth of roots	m	0.9	0	100
Soil ingestion rate	g/yr	38.5	0	10,000

TABLE 1.3 (Cont.)

Parameter	Unit	Default Value	Lower ^a Bound	Upper ^a Bound
Thickness of contaminated zone	m	2	1×10^{-10}	1,000
Radiation dose limit	mrem/yr	30	0.01	10,000
Dilution length for airborne dust	m	2	0	1,000
Seafood consumption rate				
Fish	kg/yr	5.4	0	1,000
Other seafood	kg/yr	0.9	0	100
Fruit, vegetable, and grain consumption rates	kg/yr	160	0	1,000
Inhalation rate	m ³ /yr	8,400	0	20,000
Leafy vegetable consumption rate	kg/yr	14	0	100
Livestock water intake rate				
Meat	L/d	50	0	500
Milk	L/d	160	0	500
Meat and poultry consumption rate	kg/yr	63	0	300
Shielding factor for external gamma	-	0.7	0	1
Elapsed time of waste placement	yr	0	0	1,000
Shape factor, external gamma	-	1	0 ^c	1
Initial concentrations of principal radionuclide	pCi/g	d	0	1×10^{30}
Drinking water intake rate	L/yr	510	0	1,000
Fraction of drinking water from site	-	1	0	1
Fraction of aquatic food from site	-	0.5	0	1
Mass loading for foliar deposition	g/m ²	1×10^{-4}	0	1
Depth of soil mixing layer	m	0.16	0	1
Fraction from groundwater				
Drinking water	-	1	0	1
Livestock water	-	1	0	1
Irrigation water	-	1	0	1

^a The lower and upper bound values represent the lower and upper limit of an input parameter that can be used in RESRAD. For some secondary (derived) parameters (e.g., leach rate), the upper and lower bounds are derived from other primary (basic) parameters (e.g., thickness of contaminated zone).

^b A hyphen indicates that the parameter is dimensionless.

^c A negative value for this parameter serves as a flag in RESRAD. See the section in the handbook on the particular parameter for details.

^d The default value is radionuclide dependent.

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