HPNS RG Risk

Parent ROC	Contributing Progeny	RG pCi/cm2	Bounding Ingestion	Bounding External Risk*	Bounding Total Risk*
^{241}Am		0.45	5.29E-06	2.89E-07	5.6E-06
^{60}Co		22.5	5.14E-05	2.01E-04	2.5E-04
^{137}Cs	^{137m}Ba	22.5	6.06E-05	1.37E-04	2.0E-04
^{152}Eu		22.5	2.05E-05	2.13E-04	2.3E-04
^{154}Eu		22.5	3.51E-05	1.71E-04	2.1E-04
^{3}H		22.5	1.26E-07	0.00E+00	1.3E-07
^{239}Pu	^{235m}U	0.45	6.57E-06	4.14E-09	6.6E-06
^{226}Ra	^{222}Rn+D	0.45	1.95E-05	1.17E-05	3.1E-05
	^{210}Pb+D				
	^{210}Po+D				
^{90}Sr	^{90}Y	4.5	3.84E-05	2.34E-06	4.1E-05
^{232}Th		0.164	2.28E-05	5.81E-06	2.9E-05
	^{228}Ra+D				
	^{228}Th+D				
^{235}U	^{231}Th	2.2	2.08E-05	8.36E-06	2.9E-05

*** Assumptions**

Room	10x10x10	Walls to a hieght of 6ft, no ceiling contamination - concrete
Fin	1	BPRG Default and EFH 95th percentile
Fi-ingest	0.67	Accounts for time sleeping
Fi-external	1	Accounts for external while sleeping
Position	Corner	Conservative assumption (better fit for 2 walls and floor contar

Utilized BPRG calculator and ORNL Splash correction to post process results for external.
External Equilibrium (no decay) for long lived decay chains Ra-226 and Th-232,
For external Sr-90 and Cs-137 dughter half lives modified to account for ingrowth and decay
Decay assumed for all others
Ingestion rate corrected for BPRG default time on hard and soft surfaces (assume transfer to sot
Ingestion used +D slope factor when appropriate (contributing progeny)

Exposure Factors Hanbook Values for Calculations

EFH		Table 16-1
		Time indoors (Fin)
Age	Fin (mean)	Fin (95th percentile)
0 - 0.5	0.769444444	1
0.5 - 1	0.769444444	1
1 - 1.5	0.739583333	1
1.5 - 2	0.739583333	1
2 - 2.5	0.679861111	0.900000000
2.5 - 3	0.679861111	0.900000000
3 - 3.5	0.664583333	0.940972222
3.5 - 4	0.664583333	0.940972222
4 - 4.5	0.664583333	0.940972222
4.5 - 5	0.664583333	0.940972222
5 - 5.5	0.664583333	0.940972222
5.5 - 6	0.664583333	0.940972222
6 - 6.5	0.620138889	0.885416667
6.5 - 7	0.620138889	0.885416667
7 - 7.5	0.620138889	0.885416667
7.5 - 8	0.620138889	0.885416667
8- 8.5	0.620138889	0.885416667
8.5 - 9	0.620138889	0.885416667
9 -9.5	0.620138889	0.885416667
9.5 - 10	0.620138889	0.885416667
10 - 10.5	0.620138889	0.885416667
10.5 - 11	0.620138889	0.885416667
11 - 11.5	0.617361111	0.913194444
11.5 - 12	0.617361111	0.913194444
12 - 12.5	0.617361111	0.913194444
12.5 - 13	0.617361111	0.913194444
13 - 13.5	0.617361111	0.913194444
13.5 - 14	0.617361111	0.913194444
14 - 14.5	0.617361111	0.913194444
14.5 - 15	0.617361111	0.913194444
15 - 15.5	0.617361111	0.913194444
15.5 - 16	0.617361111	0.913194444
16 - 16.5	0.578472222	0.894444444
16.5 - 17	0.578472222	0.894444444
17 - 17.5	0.578472222	0.894444444
17.5 - 18	0.578472222	0.894444444
18 - 18.5	0.578472222	0.894444444
18.5 - 19	0.578472222	0.894444444
19 - 19.5	0.578472222	0.894444444
19.5 - 20	0.578472222	0.894444444
20 - 20.5	0.578472222	0.894444444

		Table 16-15 worst case room = Bedroom doers			
		Time in Room (Fi)			
Fin (BPRG Default)		Fi (mean)	Fi (95th percentile)	Fin (BPRG Default)	Notes
1		0.5375	0.760416667	1	
1		0.5375	0.760416667	1	
1		0.545138889	0.715277778	1	
1		0.545138889	0.715277778	1	
1		0.495138889	0.646527778	1	
1		0.495138889	0.646527778	1	
1		0.488888889	0.65625	1	
1		0.488888889	0.65625	1	
1		0.488888889	0.65625	1	
1		0.488888889	0.65625	1	
1		0.488888889	0.65625	1	
1		0.488888889	0.65625	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.463194444	0.633333333	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.443055556	0.660416667	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	
1		0.424305556	0.676388889	1	

Excerpt Table 16-1

	Time Indoors (at residence) minutes/day		
Birth to <1year	1,108	1,440	
1 to <2 years	1,065	1,440	
2 to <3 years	979	1,296	Children, Birth to <21 years: U.S.
3 to <6 years	957	1,355	data from U.S. EPA (1996). Doer:
6 to <11 years	893	1,275	
11 to <16 years	889	1,315	Adults, ≥18 years (U.S. EPA, 199
16 to <21 years	833	1,288	Table 16-16.
18 to <65 years	948	1,428	
≥65 years	1,175	1,440	

Excerpt table 16-15 (Bedroom room spent the most time in)

Table 16-15. Time Spent (minutes/day) in Various Rooms at Home and Population and Doers Only, Children <21 Years (

Age (years)	N	Mean	Min	Percentiles 1	2	5	10	25	50	75
Bedroom—Whole Population										
Birth to <1	63	16	0	0	0	0	0	0	0	30
1 to <2	118	26	0	0	0	0	0	0	15	30
2 to <3	118	29	0	0	0	0	0	1	20	30
3 to <6	357	22	0	0	0	0	0	0	15	30
6 to <11	497	22	0	0	0	0	0	0	15	30
11 to <16	466	20	0	0	0	0	0	0	15	30
16 to <21	481	26	0	0	0	0	0	10	20	32
Bedroom—Doers Only										
Birth to <1	31	32	5	7	8	10	15	18	30	40
1 to <2	77	39	6	6	8	10	15	15	30	30
2 to <3	88	38	2	3	5	12	15	15	30	45
3 to <6	240	33	1	1	2	5	11	15	30	38
6 to <11	356	31	1	2	3	5	9	15	25	35
11 to <16	335	29	1	2	2	5	6	12	20	35
16 to <21	392	31	1	2	5	5	10	15	25	40
Bedroom—Whole Population										
Birth to <1	63	749	0	0	104	468	566	653	750	863
1 to <2	118	771	0	56	340	443	559	645	808	884
2 to <3	118	701	0	5	91	419	517	618	718	835
3 to <6	357	696	0	92	210	432	540	630	695	790
6 to <11	497	653	0	0	0	304	480	585	660	735
11 to <16	466	626	0	0	20	134	403	543	645	745
16 to <21	481	588	0	0	0	60	335	475	595	720
Bedroom—Doers Only										
Birth to <1	61	774	435	453	470	495	590	660	750	865
1 to <2	116	785	330	362	384	450	570	656	810	885
2 to <3	116	713	30	215	266	484	520	620	720	836
3 to <6	353	704	165	210	268	464	540	630	695	790
6 to <11	486	667	120	183	261	439	513	599	660	735

. EPA re-analysis of source
s[a] only. See Table 16-15.

16). Doors[a] only. See

l in All Rooms Combined Whole (continued)

90	95	98	99	Max
40	59	81	87	90
45	60	80	239	600
60	62	138	290	345
49	65	90	120	270
45	60	81	118	535
45	60	86	97	220
59	65	105	123	547
60	78	87	89	90
57	60	176	349	600
60	70	208	319	345
60	75	112	123	270
50	60	90	180	535
50	64	90	100	220
60	72	111	135	547
972	1,092	1,119	1,179	1,275
975	1,029	1,190	1,325	1,440
894	931	979	990	1,040
875	945	1,033	1,135	1,440
840	906	1,005	1,096	1,440
860	950	1,027	1,118	1,277
855	960	1,082	1,146	1,375
975	1,095	1,119	1,182	1,275
975	1,030	1,191	1,328	1,440
896	931	981	990	1,040
875	945	1,034	1,137	1,440
843	912	1,005	1,100	1,440

20.5 - 21	0.578472222	0.894444444
21 - 21.5	0.658333333	0.991666667
21.5 - 22	0.658333333	0.991666667
22 - 22.5	0.658333333	0.991666667
22.5 - 23	0.658333333	0.991666667
23 - 23.5	0.658333333	0.991666667
23.5 - 24	0.658333333	0.991666667
24 - 24.5	0.658333333	0.991666667
24.5 - 25	0.658333333	0.991666667
25 - 25.5	0.658333333	0.991666667
25.5 - 26	0.658333333	0.991666667
Averages	0.636698718	0.928712607

1		0.424305556	0.676388889	1	
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.369930556	0.569444444	1	See table 16-16
1		0.444110577	0.645726496	1	

11 to <16	457	638	15	55	115	179	430	550	646	750
16 to <21	463	611	15	34	100	273	395	480	600	725

860	951	1,029	1,122	1,277
859	974	1,090	1,147	1,375

EFH Table 5-33 values

Dusts

Age	Mean 100% hard	Mean 100% soft
0.5	0.1	0.02
1	0.1	0.02
2	0.1	0.02
3	0.1	0.02
4	0.1	0.02
5	0.078	0.016
6	0.078	0.016
7	0.078	0.016
8	0.078	0.016
9	0.078	0.016
10	0.078	0.016
11	0.078	0.016
12	0.0053	0.0011
13	0.0053	0.0011
14	0.0053	0.0011
15	0.0053	0.0011
16	0.0053	0.0011
17	0.0053	0.0011
18	0.0053	0.0011
19	0.0053	0.0011
20	0.0062	0.0012
21	0.0062	0.0012
22	0.0062	0.0012
23	0.0062	0.0012
24	0.0062	0.0012
25	0.0062	0.0012
26	0.0062	0.0012
0-0.5		0.025

EFH Table 5-33 values

Dusts

Age	95th 100% hard	95th 100% soft
0.5	0.34	0.067
1	0.34	0.067
2	0.34	0.067
3	0.34	0.067
4	0.34	0.067
5	0.29	0.059
6	0.29	0.059
7	0.29	0.059

Data Transform into fraction of total ingested

Age	mean m2/day BPRG ratio
0 - 0.5	0.025
0.5 - 1	0.05
1 - 1.5	0.05
1.5 - 2	0.05
2 - 2.5	0.05
2.5 - 3	0.05
3 - 3.5	0.05
3.5 - 4	0.05
4 - 4.5	0.05
4.5 - 5	0.05
5 - 5.5	0.03925
5.5 - 6	0.03925
6 - 6.5	0.03925
6.5 - 7	0.03925
7 - 7.5	0.03925
7.5 - 8	0.03925
8- 8.5	0.03925
8.5 - 9	0.03925
9 -9.5	0.03925
9.5 - 10	0.03925
10 - 10.5	0.03925
10.5 - 11	0.03925
11 - 11.5	0.03925
11.5 - 12	0.03925
12 - 12.5	0.002675
12.5 - 13	0.002675
13 - 13.5	0.002675
13.5 - 14	0.002675
14 - 14.5	0.002675
14.5 - 15	0.002675
15 - 15.5	0.002675
15.5 - 16	0.002675
16 - 16.5	0.002675
16.5 - 17	0.002675
17 - 17.5	0.002675
17.5 - 18	0.002675
18 - 18.5	0.002675
18.5 - 19	0.002675
19 - 19.5	0.002675
19.5 - 20	0.002675

	m2/day 95th	mean m2/day BPRG ratio
	0.088	0.025
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.169375	0.05
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.145625	0.03925
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675
	0.008	0.002675

Assume:

Ti
Age Gro
Infant (0–6 month
Toddler (7 months
Child (5–11 years)
Teen (12–19 years
Adult (20–59 year
Senior (60+ years)
a Based on b Infants v
Source: Wilson e

EFH Table 5-33 values corrected for BPRG default of 6 hr per day on hard and 10 hrs per day on soft.
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in nthe E

able 5-33. Dust Ingestion Rates at Residential Settings[a] Based on an Activity Pattern Modeling Approach

	Mean ± SD (95th percentile) Dust Ingestion Rates (m^2/d)		
oup	100% Hard Surfaces	100% Soft Surfaces	50% Hard/50% Soft Surfaces
s)	....[b]	0.025 ± 0.024 (0.088)	0.025 ± 0.024 (0.088)[b]
–4 years)	0.10 ± 0.092 (0.34)	0.020 ± 0.018 (0.067)	0.061 ± 0.055 (0.20)
)	0.078 ± 0.081 (0.29)	0.016 ± 0.016 (0.059)	0.047 ± 0.048 (0.18)
)	0.0053 ± 0.0042 (0.016)	0.0011 ± 0.00084(0.0032)	0.0032 ± 0.0025 (0.0094)
s)	0.0062 ± 0.0050 (0.019)	0.0012 ± 0.00098 (0.0038)	0.0037 ± 0.0029 (0.0093)
)	0.0063 ± 0.0051 (0.019)	0.0013 ± 0.0010 (0.0039)	0.0038 ± 0.0030 (0.012)

n probabilistic approach (200,000 trials).
were assumed to contact soft surfaces only.

et al. (2016).

FH)

	8	0.29	0.059	20 - 20.5	0.003075
	9	0.29	0.059	20.5 - 21	0.003075
	10	0.29	0.059	21 - 21.5	0.003075
	11	0.29	0.059	21.5 - 22	0.003075
	12	0.016	0.0032	22 - 22.5	0.003075
	13	0.016	0.0032	22.5 - 23	0.003075
	14	0.016	0.0032	23 - 23.5	0.003075
	15	0.016	0.0032	23.5 - 24	0.003075
	16	0.016	0.0032	24 - 24.5	0.003075
	17	0.016	0.0032	24.5 - 25	0.003075
	18	0.016	0.0032	25 - 25.5	0.003075
	19	0.016	0.0032	25.5 - 26	0.003075
	20	0.019	0.0038		
	21	0.019	0.0038		
	22	0.019	0.0038		
	23	0.019	0.0038		
	24	0.019	0.0038		
	25	0.019	0.0038		
	26	0.019	0.0038		
0-0.5			0.088		

	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075
	0.0095	0.003075

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Co-60	2.25E+05	0.2	32	7200000	1440000	1923.55	3.81E-11		5.49E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	1440000	1	0.67	484209	1	1.84E-05
0.5 - 1	1	0.169375	894957	1	0.67	579214	1	2.21E-05
1 - 1.5	1.5	0.169375	295647	1	0.67	191342	1	7.29E-06
1.5 - 2	2	0.169375	97666	1	0.67	63209	1	2.41E-06
2 - 2.5	2.5	0.169375	32264	1	0.67	20881	1	7.96E-07
2.5 - 3	3	0.169375	10658	1	0.67	6898	1	2.63E-07
3 - 3.5	3.5	0.169375	3521	1	0.67	2279	1	8.68E-08
3.5 - 4	4	0.169375	1163	1	0.67	753	1	2.87E-08
4 - 4.5	4.5	0.169375	384	1	0.67	249	1	9.47E-09
4.5 - 5	5	0.169375	127	1	0.67	82	1	3.13E-09
5 - 5.5	5.5	0.145625	42	1	0.67	23	1	8.89E-10
5.5 - 6	6	0.145625	17	1	0.67	10	1	3.69E-10
6 - 6.5	6.5	0.145625	7	1	0.67	4	1	1.53E-10
6.5 - 7	7	0.145625	3	1	0.67	2	1	6.37E-11
7 - 7.5	7.5	0.145625	1	1	0.67	1	1	2.65E-11
7.5 - 8	8	0.145625	1	1	0.67	0	1	1.10E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	4.56E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	1.89E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	7.87E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	3.27E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	1.36E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	5.64E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	2.34E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	9.73E-15
12 - 12.5	12.5	0.008	0	1	0.67	0	1	2.22E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	2.01E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	1.83E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	1.66E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	1.51E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	1.37E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	1.24E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	1.13E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	1.02E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	9.28E-17

Ingestion Risk 0-2
4.78E-05

Assume:

Note:

Ingestion Risk 2-16
3.60E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

5.14E-05

Ingestion Risk 16-up	Total Risk
1.12E-15	5.14E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
2.62E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	8.43E-17
17.5 - 18	18	0.008	0	1	0.67	0	1	7.65E-17
18 - 18.5	18.5	0.008	0	1	0.67	0	1	6.94E-17
18.5 - 19	19	0.008	0	1	0.67	0	1	6.30E-17
19 - 19.5	19.5	0.008	0	1	0.67	0	1	5.72E-17
19.5 - 20	20	0.008	0	1	0.67	0	1	5.19E-17
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	5.60E-17
20.5 - 21	21	0.0095	0	1	0.67	0	1	5.05E-17
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	4.56E-17
21.5 - 22	22	0.0095	0	1	0.67	0	1	4.11E-17
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	3.71E-17
22.5 - 23	23	0.0095	0	1	0.67	0	1	3.35E-17
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	3.02E-17
23.5 - 24	24	0.0095	0	1	0.67	0	1	2.73E-17
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	2.46E-17
24.5 - 25	25	0.0095	0	1	0.67	0	1	2.22E-17
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	2.00E-17
25.5 - 26	26	0.0095	0	1	0.67	0	1	1.81E-17
			Average	1.00	**Total Ingested Activity**	**1.35E+06**	**Total Risk**	**5.14E-05**
					Ingestion Risk no multipliers	**5.14E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Am-241	4.50E+03	0.2	32	144000	28800	157680	1.84E-10		5.30E-06

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	28800	1	0.67	9684	1	1.78E-06
0.5 - 1	1	0.169375	19100	1	0.67	12362	1	2.27E-06
1 - 1.5	1.5	0.169375	6733	1	0.67	4358	1	8.02E-07
1.5 - 2	2	0.169375	2374	1	0.67	1536	1	2.83E-07
2 - 2.5	2.5	0.169375	837	1	0.67	542	1	9.96E-08
2.5 - 3	3	0.169375	295	1	0.67	191	1	3.51E-08
3 - 3.5	3.5	0.169375	104	1	0.67	67	1	1.24E-08
3.5 - 4	4	0.169375	37	1	0.67	24	1	4.37E-09
4 - 4.5	4.5	0.169375	13	1	0.67	8	1	1.54E-09
4.5 - 5	5	0.169375	5	1	0.67	3	1	5.42E-10
5 - 5.5	5.5	0.145625	2	1	0.67	1	1	1.64E-10
5.5 - 6	6	0.145625	1	1	0.67	0	1	7.29E-11
6 - 6.5	6.5	0.145625	0	1	0.67	0	1	3.23E-11
6.5 - 7	7	0.145625	0	1	0.67	0	1	1.43E-11
7 - 7.5	7.5	0.145625	0	1	0.67	0	1	6.34E-12
7.5 - 8	8	0.145625	0	1	0.67	0	1	2.81E-12
8- 8.5	8.5	0.145625	0	1	0.67	0	1	1.25E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	5.52E-13
9 -9.5	9.5	0.145625	0	1	0.67	0	1	2.45E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	1.08E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	4.81E-14
10.5 - 11	11	0.145625	0	1	0.67	0	1	2.13E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	9.44E-15
11.5 - 12	12	0.145625	0	1	0.67	0	1	4.19E-15
12 - 12.5	12.5	0.008	0	1	0.67	0	1	1.02E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	9.87E-17
13 - 13.5	13.5	0.008	0	1	0.67	0	1	9.56E-17
13.5 - 14	14	0.008	0	1	0.67	0	1	9.26E-17
14 - 14.5	14.5	0.008	0	1	0.67	0	1	8.97E-17
14.5 - 15	15	0.008	0	1	0.67	0	1	8.69E-17
15 - 15.5	15.5	0.008	0	1	0.67	0	1	8.42E-17
15.5 - 16	16	0.008	0	1	0.67	0	1	8.15E-17
16 - 16.5	16.5	0.008	0	1	0.67	0	1	7.90E-17
16.5 - 17	17	0.008	0	1	0.67	0	1	7.65E-17

Ingestion Risk 0-2
4.86E-06

Assume:

Note:

Ingestion Risk 2-16
4.37E-07

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

5.29E-06

Ingestion Risk 16-up	Total Risk
1.36E-15	5.29E-06

t surfaces)
H)
s/childrens_suppleme

Adult risk
5.80E-11

17 - 17.5	17.5	0.008	0	1	0.67	0	1	7.41E-17
17.5 - 18	18	0.008	0	1	0.67	0	1	7.18E-17
18 - 18.5	18.5	0.008	0	1	0.67	0	1	6.95E-17
18.5 - 19	19	0.008	0	1	0.67	0	1	6.74E-17
19 - 19.5	19.5	0.008	0	1	0.67	0	1	6.52E-17
19.5 - 20	20	0.008	0	1	0.67	0	1	6.32E-17
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	7.27E-17
20.5 - 21	21	0.0095	0	1	0.67	0	1	7.00E-17
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	6.74E-17
21.5 - 22	22	0.0095	0	1	0.67	0	1	6.49E-17
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	6.25E-17
22.5 - 23	23	0.0095	0	1	0.67	0	1	6.02E-17
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	5.79E-17
23.5 - 24	24	0.0095	0	1	0.67	0	1	5.58E-17
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	5.37E-17
24.5 - 25	25	0.0095	0	1	0.67	0	1	5.17E-17
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	4.98E-17
25.5 - 26	26	0.0095	0	1	0.67	0	1	4.80E-17
			Average	1.00	**Total Ingested Activity**	**2.88E+04**	**Total Risk**	**5.29E-06**
					Ingestion Risk no multipliers	**5.29E-06**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Ra-226+D	4.50E+03	0.2	32	144000	28800	584000	6.77E-10		1.95E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	28800	1	0.67	9684	1	6.56E-06
0.5 - 1	1	0.169375	19112	1	0.67	12369	1	8.37E-06
1 - 1.5	1.5	0.169375	6741	1	0.67	4363	1	2.95E-06
1.5 - 2	2	0.169375	2378	1	0.67	1539	1	1.04E-06
2 - 2.5	2.5	0.169375	839	1	0.67	543	1	3.67E-07
2.5 - 3	3	0.169375	296	1	0.67	191	1	1.30E-07
3 - 3.5	3.5	0.169375	104	1	0.67	68	1	4.57E-08
3.5 - 4	4	0.169375	37	1	0.67	24	1	1.61E-08
4 - 4.5	4.5	0.169375	13	1	0.67	8	1	5.69E-09
4.5 - 5	5	0.169375	5	1	0.67	3	1	2.01E-09
5 - 5.5	5.5	0.145625	2	1	0.67	1	1	6.08E-10
5.5 - 6	6	0.145625	1	1	0.67	0	1	2.70E-10
6 - 6.5	6.5	0.145625	0	1	0.67	0	1	1.20E-10
6.5 - 7	7	0.145625	0	1	0.67	0	1	5.31E-11
7 - 7.5	7.5	0.145625	0	1	0.67	0	1	2.35E-11
7.5 - 8	8	0.145625	0	1	0.67	0	1	1.04E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	4.63E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	2.05E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	9.10E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	4.04E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	1.79E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	7.94E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	3.52E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	1.56E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	3.80E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	3.69E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	3.57E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	3.46E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	3.36E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	3.25E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	3.15E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	3.05E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	2.96E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	2.87E-16

Ingestion Risk 0-2
1.79E-05

Assume:

Note:

Ingestion Risk 2-16
1.61E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

1.95E-05

Ingestion Risk 16-up	Total Risk
5.13E-15	1.95E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
2.15E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	2.78E-16
17.5 - 18	18	0.008	0	1	0.67	0	1	2.70E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	2.61E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	2.53E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	2.45E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	2.38E-16
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	2.74E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	2.64E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	2.54E-16
21.5 - 22	22	0.0095	0	1	0.67	0	1	2.45E-16
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	2.36E-16
22.5 - 23	23	0.0095	0	1	0.67	0	1	2.27E-16
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	2.19E-16
23.5 - 24	24	0.0095	0	1	0.67	0	1	2.11E-16
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	2.03E-16
24.5 - 25	25	0.0095	0	1	0.67	0	1	1.96E-16
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	1.89E-16
25.5 - 26	26	0.0095	0	1	0.67	0	1	1.82E-16
			Average	1.00	**Total Ingested Activity**	**2.88E+04**	**Total Risk**	**1.95E-05**
					Ingestion Risk no multipliers	**1.95E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Cs137+D	2.25E+05	0.2	32	7200000	1440000	10950	4.26E-11		6.13E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	1440000	1	0.67	484209	1	2.06E-05
0.5 - 1	1	0.169375	944813	1	0.67	611481	1	2.60E-05
1 - 1.5	1.5	0.169375	329503	1	0.67	213254	1	9.08E-06
1.5 - 2	2	0.169375	114914	1	0.67	74372	1	3.17E-06
2 - 2.5	2.5	0.169375	40076	1	0.67	25937	1	1.10E-06
2.5 - 3	3	0.169375	13977	1	0.67	9046	1	3.85E-07
3 - 3.5	3.5	0.169375	4874	1	0.67	3155	1	1.34E-07
3.5 - 4	4	0.169375	1700	1	0.67	1100	1	4.69E-08
4 - 4.5	4.5	0.169375	593	1	0.67	384	1	1.63E-08
4.5 - 5	5	0.169375	207	1	0.67	134	1	5.70E-09
5 - 5.5	5.5	0.145625	72	1	0.67	40	1	1.71E-09
5.5 - 6	6	0.145625	32	1	0.67	18	1	7.49E-10
6 - 6.5	6.5	0.145625	14	1	0.67	8	1	3.29E-10
6.5 - 7	7	0.145625	6	1	0.67	3	1	1.44E-10
7 - 7.5	7.5	0.145625	3	1	0.67	1	1	6.32E-11
7.5 - 8	8	0.145625	1	1	0.67	1	1	2.77E-11
8- 8.5	8.5	0.145625	1	1	0.67	0	1	1.21E-11
8.5 - 9	9	0.145625	0	1	0.67	0	1	5.32E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	2.33E-12
9.5 - 10	10	0.145625	0	1	0.67	0	1	1.02E-12
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	4.49E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	1.97E-13
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	8.63E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	3.78E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	9.11E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	8.73E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	8.37E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	8.02E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	7.69E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	7.36E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	7.06E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	6.76E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	6.48E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	6.21E-16

Ingestion Risk 0-2
5.58E-05

Assume:

Note:

Ingestion Risk 2-16
4.86E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

6.06E-05

Ingestion Risk 16-up	Total Risk
1.03E-14	6.06E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
5.85E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	5.95E-16
17.5 - 18	18	0.008	0	1	0.67	0	1	5.70E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	5.47E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	5.24E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	5.02E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	4.81E-16
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	5.47E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	5.21E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	4.97E-16
21.5 - 22	22	0.0095	0	1	0.67	0	1	4.73E-16
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	4.51E-16
22.5 - 23	23	0.0095	0	1	0.67	0	1	4.29E-16
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	4.09E-16
23.5 - 24	24	0.0095	0	1	0.67	0	1	3.90E-16
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	3.71E-16
24.5 - 25	25	0.0095	0	1	0.67	0	1	3.54E-16
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	3.37E-16
25.5 - 26	26	0.0095	0	1	0.67	0	1	3.21E-16
			Average	1.00	**Total Ingested Activity**	**1.42E+06**	**Total Risk**	**6.06E-05**
					Ingestion Risk no multipliers	**6.06E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Eu-152	2.25E+05	0.2	32	7200000	1440000	4942.1	1.46E-11		2.10E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	1440000	1	0.67	484209	1	7.07E-06
0.5 - 1	1	0.169375	931637	1	0.67	602953	1	8.80E-06
1 - 1.5	1.5	0.169375	320377	1	0.67	207347	1	3.03E-06
1.5 - 2	2	0.169375	110173	1	0.67	71304	1	1.04E-06
2 - 2.5	2.5	0.169375	37887	1	0.67	24520	1	3.58E-07
2.5 - 3	3	0.169375	13029	1	0.67	8432	1	1.23E-07
3 - 3.5	3.5	0.169375	4480	1	0.67	2900	1	4.23E-08
3.5 - 4	4	0.169375	1541	1	0.67	997	1	1.46E-08
4 - 4.5	4.5	0.169375	530	1	0.67	343	1	5.01E-09
4.5 - 5	5	0.169375	182	1	0.67	118	1	1.72E-09
5 - 5.5	5.5	0.145625	63	1	0.67	35	1	5.09E-10
5.5 - 6	6	0.145625	27	1	0.67	15	1	2.20E-10
6 - 6.5	6.5	0.145625	12	1	0.67	7	1	9.52E-11
6.5 - 7	7	0.145625	5	1	0.67	3	1	4.11E-11
7 - 7.5	7.5	0.145625	2	1	0.67	1	1	1.78E-11
7.5 - 8	8	0.145625	1	1	0.67	1	1	7.69E-12
8- 8.5	8.5	0.145625	0	1	0.67	0	1	3.32E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	1.44E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	6.21E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	2.69E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	1.16E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	5.02E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	2.17E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	9.39E-15
12 - 12.5	12.5	0.008	0	1	0.67	0	1	2.23E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	2.11E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	1.99E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	1.88E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	1.78E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	1.68E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	1.59E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	1.50E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	1.42E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	1.34E-16

Ingestion Risk 0-2
1.89E-05

Assume:

Note:

Ingestion Risk 2-16
1.59E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

2.05E-05

Ingestion Risk 16-up	Total Risk
2.02E-15	2.05E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
1.68E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	1.27E-16
17.5 - 18	18	0.008	0	1	0.67	0	1	1.20E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	1.13E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	1.07E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	1.01E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	9.53E-17
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	1.07E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	1.00E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	9.44E-17
21.5 - 22	22	0.0095	0	1	0.67	0	1	8.87E-17
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	8.33E-17
22.5 - 23	23	0.0095	0	1	0.67	0	1	7.82E-17
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	7.35E-17
23.5 - 24	24	0.0095	0	1	0.67	0	1	6.90E-17
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	6.48E-17
24.5 - 25	25	0.0095	0	1	0.67	0	1	6.09E-17
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	5.72E-17
25.5 - 26	26	0.0095	0	1	0.67	0	1	5.37E-17
			Average	1.00	**Total Ingested Activity**	**1.40E+06**	**Total Risk**	**2.05E-05**
					Ingestion Risk no multipliers	**2.05E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Eu-154	2.25E+05	0.2	32	7200000	1440000	3135.35	2.54E-11		3.66E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	1440000	1	0.67	484209	1	1.23E-05
0.5 - 1	1	0.169375	917996	1	0.67	594125	1	1.51E-05
1 - 1.5	1.5	0.169375	311064	1	0.67	201320	1	5.11E-06
1.5 - 2	2	0.169375	105405	1	0.67	68218	1	1.73E-06
2 - 2.5	2.5	0.169375	35716	1	0.67	23116	1	5.87E-07
2.5 - 3	3	0.169375	12103	1	0.67	7833	1	1.99E-07
3 - 3.5	3.5	0.169375	4101	1	0.67	2654	1	6.74E-08
3.5 - 4	4	0.169375	1390	1	0.67	899	1	2.28E-08
4 - 4.5	4.5	0.169375	471	1	0.67	305	1	7.74E-09
4.5 - 5	5	0.169375	160	1	0.67	103	1	2.62E-09
5 - 5.5	5.5	0.145625	54	1	0.67	30	1	7.64E-10
5.5 - 6	6	0.145625	23	1	0.67	13	1	3.26E-10
6 - 6.5	6.5	0.145625	10	1	0.67	5	1	1.39E-10
6.5 - 7	7	0.145625	4	1	0.67	2	1	5.91E-11
7 - 7.5	7.5	0.145625	2	1	0.67	1	1	2.52E-11
7.5 - 8	8	0.145625	1	1	0.67	0	1	1.07E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	4.57E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	1.95E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	8.29E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	3.53E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	1.50E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	6.41E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	2.73E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	1.16E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	2.72E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	2.53E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	2.36E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	2.20E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	2.05E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	1.91E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	1.77E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	1.65E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	1.54E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	1.43E-16

Ingestion Risk 0-2
3.25E-05

Assume:

Note:

Ingestion Risk 2-16
2.62E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

3.51E-05

Ingestion Risk 16-up	Total Risk
1.97E-15	3.51E-05

t surfaces)
H)
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Adult risk
2.42E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	1.33E-16
17.5 - 18	18	0.008	0	1	0.67	0	1	1.24E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	1.16E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	1.08E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	1.00E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	9.33E-17
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	1.03E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	9.55E-17
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	8.84E-17
21.5 - 22	22	0.0095	0	1	0.67	0	1	8.18E-17
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	7.57E-17
22.5 - 23	23	0.0095	0	1	0.67	0	1	7.01E-17
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	6.49E-17
23.5 - 24	24	0.0095	0	1	0.67	0	1	6.00E-17
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	5.56E-17
24.5 - 25	25	0.0095	0	1	0.67	0	1	5.14E-17
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	4.76E-17
25.5 - 26	26	0.0095	0	1	0.67	0	1	4.41E-17
			Average	1.00	**Total Ingested Activity**	**1.38E+06**	**Total Risk**	**3.51E-05**
					Ingestion Risk no multipliers	**3.51E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Sr-90/Y-90	4.50E+04	0.2	32	1440000	288000	10585	1.35E-10		3.89E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	288000	1	0.67	96842	1	1.31E-05
0.5 - 1	1	0.169375	188887	1	0.67	122247	1	1.65E-05
1 - 1.5	1.5	0.169375	65848	1	0.67	42617	1	5.75E-06
1.5 - 2	2	0.169375	22955	1	0.67	14857	1	2.01E-06
2 - 2.5	2.5	0.169375	8003	1	0.67	5179	1	6.99E-07
2.5 - 3	3	0.169375	2790	1	0.67	1806	1	2.44E-07
3 - 3.5	3.5	0.169375	973	1	0.67	629	1	8.50E-08
3.5 - 4	4	0.169375	339	1	0.67	219	1	2.96E-08
4 - 4.5	4.5	0.169375	118	1	0.67	76	1	1.03E-08
4.5 - 5	5	0.169375	41	1	0.67	27	1	3.60E-09
5 - 5.5	5.5	0.145625	14	1	0.67	8	1	1.08E-09
5.5 - 6	6	0.145625	6	1	0.67	4	1	4.73E-10
6 - 6.5	6.5	0.145625	3	1	0.67	2	1	2.07E-10
6.5 - 7	7	0.145625	1	1	0.67	1	1	9.08E-11
7 - 7.5	7.5	0.145625	1	1	0.67	0	1	3.98E-11
7.5 - 8	8	0.145625	0	1	0.67	0	1	1.75E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	7.65E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	3.35E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	1.47E-12
9.5 - 10	10	0.145625	0	1	0.67	0	1	6.44E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	2.82E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	1.24E-13
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	5.42E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	2.38E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	5.72E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	5.48E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	5.25E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	5.03E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	4.82E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	4.61E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	4.42E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	4.23E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	4.06E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	3.89E-16

Ingestion Risk 0-2
3.53E-05

Assume:

Note:

Ingestion Risk 2-16
3.08E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

3.84E-05

Ingestion Risk 16-up	Total Risk
6.40E-15	3.84E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
3.69E-10

17 - 17.5	17.5	0.008	0	1	0.67	0	1	3.72E-16
17.5 - 18	18	0.008	0	1	0.67	0	1	3.56E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	3.41E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	3.27E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	3.13E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	3.00E-16
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	3.41E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	3.25E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	3.10E-16
21.5 - 22	22	0.0095	0	1	0.67	0	1	2.95E-16
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	2.81E-16
22.5 - 23	23	0.0095	0	1	0.67	0	1	2.67E-16
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	2.55E-16
23.5 - 24	24	0.0095	0	1	0.67	0	1	2.42E-16
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	2.31E-16
24.5 - 25	25	0.0095	0	1	0.67	0	1	2.20E-16
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	2.09E-16
25.5 - 26	26	0.0095	0	1	0.67	0	1	1.99E-16
			Average	1.00	**Total Ingested Activity**	**2.85E+05**	**Total Risk**	**3.84E-05**
					Ingestion Risk no multipliers	**3.84E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
H-3	2.25E+05	0.2	32	7200000	1440000	4489.5	8.99E-14		1.29E-07

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	1440000	1	0.67	484209	1	4.35E-08
0.5 - 1	1	0.169375	929236	1	0.67	601399	1	5.41E-08
1 - 1.5	1.5	0.169375	318728	1	0.67	206280	1	1.85E-08
1.5 - 2	2	0.169375	109324	1	0.67	70754	1	6.36E-09
2 - 2.5	2.5	0.169375	37498	1	0.67	24269	1	2.18E-09
2.5 - 3	3	0.169375	12862	1	0.67	8324	1	7.48E-10
3 - 3.5	3.5	0.169375	4412	1	0.67	2855	1	2.57E-10
3.5 - 4	4	0.169375	1513	1	0.67	979	1	8.80E-11
4 - 4.5	4.5	0.169375	519	1	0.67	336	1	3.02E-11
4.5 - 5	5	0.169375	178	1	0.67	115	1	1.04E-11
5 - 5.5	5.5	0.145625	61	1	0.67	34	1	3.05E-12
5.5 - 6	6	0.145625	26	1	0.67	15	1	1.32E-12
6 - 6.5	6.5	0.145625	11	1	0.67	6	1	5.68E-13
6.5 - 7	7	0.145625	5	1	0.67	3	1	2.45E-13
7 - 7.5	7.5	0.145625	2	1	0.67	1	1	1.06E-13
7.5 - 8	8	0.145625	1	1	0.67	1	1	4.56E-14
8- 8.5	8.5	0.145625	0	1	0.67	0	1	1.96E-14
8.5 - 9	9	0.145625	0	1	0.67	0	1	8.47E-15
9 -9.5	9.5	0.145625	0	1	0.67	0	1	3.65E-15
9.5 - 10	10	0.145625	0	1	0.67	0	1	1.58E-15
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	6.79E-16
10.5 - 11	11	0.145625	0	1	0.67	0	1	2.93E-16
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	1.26E-16
11.5 - 12	12	0.145625	0	1	0.67	0	1	5.45E-17
12 - 12.5	12.5	0.008	0	1	0.67	0	1	1.29E-18
12.5 - 13	13	0.008	0	1	0.67	0	1	1.22E-18
13 - 13.5	13.5	0.008	0	1	0.67	0	1	1.15E-18
13.5 - 14	14	0.008	0	1	0.67	0	1	1.08E-18
14 - 14.5	14.5	0.008	0	1	0.67	0	1	1.02E-18
14.5 - 15	15	0.008	0	1	0.67	0	1	9.60E-19
15 - 15.5	15.5	0.008	0	1	0.67	0	1	9.05E-19
15.5 - 16	16	0.008	0	1	0.67	0	1	8.53E-19
16 - 16.5	16.5	0.008	0	1	0.67	0	1	8.03E-19
16.5 - 17	17	0.008	0	1	0.67	0	1	7.57E-19

Ingestion Risk 0-2
1.16E-07

Assume:

Note:

Ingestion Risk 2-16
9.68E-09

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

1.26E-07

Ingestion Risk 16-up	Total Risk
1.12E-17	1.26E-07

t surfaces)
H)
s/childrens_suppleme

Adult risk
9.99E-13

17 - 17.5	17.5	0.008	0	1	0.67	0	1	7.14E-19
17.5 - 18	18	0.008	0	1	0.67	0	1	6.73E-19
18 - 18.5	18.5	0.008	0	1	0.67	0	1	6.34E-19
18.5 - 19	19	0.008	0	1	0.67	0	1	5.98E-19
19 - 19.5	19.5	0.008	0	1	0.67	0	1	5.63E-19
19.5 - 20	20	0.008	0	1	0.67	0	1	5.31E-19
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	5.94E-19
20.5 - 21	21	0.0095	0	1	0.67	0	1	5.57E-19
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	5.22E-19
21.5 - 22	22	0.0095	0	1	0.67	0	1	4.89E-19
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	4.58E-19
22.5 - 23	23	0.0095	0	1	0.67	0	1	4.29E-19
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	4.02E-19
23.5 - 24	24	0.0095	0	1	0.67	0	1	3.77E-19
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	3.53E-19
24.5 - 25	25	0.0095	0	1	0.67	0	1	3.31E-19
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	3.10E-19
25.5 - 26	26	0.0095	0	1	0.67	0	1	2.90E-19
			Average	1.00	**Total Ingested Activity**	**1.40E+06**	**Total Risk**	**1.26E-07**
					Ingestion Risk no multipliers	**1.26E-07**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Pu-239	4.50E+03	0.2	32	144000	28800	8796500	2.28E-10		6.57E-06

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	28800	1	0.67	9684	1	2.21E-06
0.5 - 1	1	0.169375	19116	1	0.67	12372	1	2.82E-06
1 - 1.5	1.5	0.169375	6744	1	0.67	4365	1	9.95E-07
1.5 - 2	2	0.169375	2379	1	0.67	1540	1	3.51E-07
2 - 2.5	2.5	0.169375	839	1	0.67	543	1	1.24E-07
2.5 - 3	3	0.169375	296	1	0.67	192	1	4.37E-08
3 - 3.5	3.5	0.169375	104	1	0.67	68	1	1.54E-08
3.5 - 4	4	0.169375	37	1	0.67	24	1	5.44E-09
4 - 4.5	4.5	0.169375	13	1	0.67	8	1	1.92E-09
4.5 - 5	5	0.169375	5	1	0.67	3	1	6.77E-10
5 - 5.5	5.5	0.145625	2	1	0.67	1	1	2.05E-10
5.5 - 6	6	0.145625	1	1	0.67	0	1	9.11E-11
6 - 6.5	6.5	0.145625	0	1	0.67	0	1	4.04E-11
6.5 - 7	7	0.145625	0	1	0.67	0	1	1.79E-11
7 - 7.5	7.5	0.145625	0	1	0.67	0	1	7.95E-12
7.5 - 8	8	0.145625	0	1	0.67	0	1	3.53E-12
8- 8.5	8.5	0.145625	0	1	0.67	0	1	1.56E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	6.94E-13
9 -9.5	9.5	0.145625	0	1	0.67	0	1	3.08E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	1.36E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	6.05E-14
10.5 - 11	11	0.145625	0	1	0.67	0	1	2.68E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	1.19E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	5.28E-15
12 - 12.5	12.5	0.008	0	1	0.67	0	1	1.29E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	1.25E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	1.21E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	1.17E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	1.14E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	1.10E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	1.07E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	1.04E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	1.00E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	9.73E-17

Ingestion Risk 0-2
6.02E-06

Assume:

Note:

Ingestion Risk 2-16
5.42E-07

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

6.57E-06

Ingestion Risk 16-up	Total Risk
1.74E-15	6.57E-06

t surfaces)
H)
s/childrens_suppleme

Adult risk
7.26E-11

17 - 17.5	17.5	0.008	0	1	0.67	0	1	9.43E-17
17.5 - 18	18	0.008	0	1	0.67	0	1	9.14E-17
18 - 18.5	18.5	0.008	0	1	0.67	0	1	8.86E-17
18.5 - 19	19	0.008	0	1	0.67	0	1	8.59E-17
19 - 19.5	19.5	0.008	0	1	0.67	0	1	8.33E-17
19.5 - 20	20	0.008	0	1	0.67	0	1	8.07E-17
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	9.30E-17
20.5 - 21	21	0.0095	0	1	0.67	0	1	8.96E-17
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	8.63E-17
21.5 - 22	22	0.0095	0	1	0.67	0	1	8.32E-17
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	8.02E-17
22.5 - 23	23	0.0095	0	1	0.67	0	1	7.73E-17
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	7.45E-17
23.5 - 24	24	0.0095	0	1	0.67	0	1	7.18E-17
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	6.91E-17
24.5 - 25	25	0.0095	0	1	0.67	0	1	6.66E-17
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	6.42E-17
25.5 - 26	26	0.0095	0	1	0.67	0	1	6.19E-17
			Average	1.00	**Total Ingested Activity**	**2.88E+04**	**Total Risk**	**6.57E-06**
					Ingestion Risk no multipliers	**6.57E-06**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)	
U-235	2.20E+04	0.2	32	704000	140800	2.555E+11	1.48E-10	

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	140800	1	0.67	47345	1	7.01E-06
0.5 - 1	1	0.169375	93455	1	0.67	60484	1	8.95E-06
1 - 1.5	1.5	0.169375	32971	1	0.67	21339	1	3.16E-06
1.5 - 2	2	0.169375	11632	1	0.67	7528	1	1.11E-06
2 - 2.5	2.5	0.169375	4104	1	0.67	2656	1	3.93E-07
2.5 - 3	3	0.169375	1448	1	0.67	937	1	1.39E-07
3 - 3.5	3.5	0.169375	511	1	0.67	331	1	4.89E-08
3.5 - 4	4	0.169375	180	1	0.67	117	1	1.73E-08
4 - 4.5	4.5	0.169375	64	1	0.67	41	1	6.09E-09
4.5 - 5	5	0.169375	22	1	0.67	15	1	2.15E-09
5 - 5.5	5.5	0.145625	8	1	0.67	4	1	6.52E-10
5.5 - 6	6	0.145625	4	1	0.67	2	1	2.89E-10
6 - 6.5	6.5	0.145625	2	1	0.67	1	1	1.28E-10
6.5 - 7	7	0.145625	1	1	0.67	0	1	5.69E-11
7 - 7.5	7.5	0.145625	0	1	0.67	0	1	2.52E-11
7.5 - 8	8	0.145625	0	1	0.67	0	1	1.12E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	4.96E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	2.20E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	9.76E-13
9.5 - 10	10	0.145625	0	1	0.67	0	1	4.33E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	1.92E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	8.52E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	3.78E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	1.68E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	4.08E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	3.96E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	3.84E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	3.72E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	3.61E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	3.50E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	3.39E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	3.29E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	3.19E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	3.09E-16
17 - 17.5	17.5	0.008	0	1	0.67	0	1	2.99E-16

Risk if total removable activity ingested time zero
2.08E-05

Ingestion Risk 0-2
1.91E-05

Assume:

Note:

Ingestion Risk 2-16
1.72E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

2.08E-05

Ingestion Risk 16-up	Total Risk
5.53E-15	2.08E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
2.30E-10

17.5 - 18	18	0.008	0	1	0.67	0	1	2.90E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	2.81E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	2.73E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	2.64E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	2.56E-16
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	2.95E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	2.84E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	2.74E-16
21.5 - 22	22	0.0095	0	1	0.67	0	1	2.64E-16
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	2.55E-16
22.5 - 23	23	0.0095	0	1	0.67	0	1	2.45E-16
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	2.36E-16
23.5 - 24	24	0.0095	0	1	0.67	0	1	2.28E-16
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	2.20E-16
24.5 - 25	25	0.0095	0	1	0.67	0	1	2.12E-16
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	2.04E-16
25.5 - 26	26	0.0095	0	1	0.67	0	1	1.97E-16
			Average	1.00	**Total Ingested Activity**	**1.41E+05**	**Total Risk**	**2.08E-05**
					Ingestion Risk no multipliers	**2.08E-05**		

Radionuclide	Initial Surface Activity (pCi/m^2)	Removable Fraction	Contaminated Surface Area (m2)	Total Surface Activity (pCi)	Removable Activity (pCi)	Half-life (days)	Slope Factor (Risk/pCi)		Risk if total removable activity ingested time zero
Th-232+D	1.64E+03	0.2	32	52480	10496	5.11E+12	2.17E-09		2.28E-05

Evaluation Time	Receptor Age	Ingestion Rate fraction of total from table EFH 5-33	Removable Activity at Beginning of Evaluation Time (pCi)	Fraction Time Indoors	Fraction Time AWAKE In Source Room	Ingested Activity (pCi)	Slope factor or other multiplier	Risk per interval
0 - 0.5	0.5	0.088	10496	1	0.67	3529	1	7.66E-06
0.5 - 1	1	0.169375	6967	1	0.67	4509	1	9.78E-06
1 - 1.5	1.5	0.169375	2458	1	0.67	1591	1	3.45E-06
1.5 - 2	2	0.169375	867	1	0.67	561	1	1.22E-06
2 - 2.5	2.5	0.169375	306	1	0.67	198	1	4.30E-07
2.5 - 3	3	0.169375	108	1	0.67	70	1	1.52E-07
3 - 3.5	3.5	0.169375	38	1	0.67	25	1	5.35E-08
3.5 - 4	4	0.169375	13	1	0.67	9	1	1.89E-08
4 - 4.5	4.5	0.169375	5	1	0.67	3	1	6.66E-09
4.5 - 5	5	0.169375	2	1	0.67	1	1	2.35E-09
5 - 5.5	5.5	0.145625	1	1	0.67	0	1	7.12E-10
5.5 - 6	6	0.145625	0	1	0.67	0	1	3.16E-10
6 - 6.5	6.5	0.145625	0	1	0.67	0	1	1.40E-10
6.5 - 7	7	0.145625	0	1	0.67	0	1	6.22E-11
7 - 7.5	7.5	0.145625	0	1	0.67	0	1	2.76E-11
7.5 - 8	8	0.145625	0	1	0.67	0	1	1.22E-11
8- 8.5	8.5	0.145625	0	1	0.67	0	1	5.42E-12
8.5 - 9	9	0.145625	0	1	0.67	0	1	2.41E-12
9 -9.5	9.5	0.145625	0	1	0.67	0	1	1.07E-12
9.5 - 10	10	0.145625	0	1	0.67	0	1	4.73E-13
10 - 10.5	10.5	0.145625	0	1	0.67	0	1	2.10E-13
10.5 - 11	11	0.145625	0	1	0.67	0	1	9.31E-14
11 - 11.5	11.5	0.145625	0	1	0.67	0	1	4.13E-14
11.5 - 12	12	0.145625	0	1	0.67	0	1	1.83E-14
12 - 12.5	12.5	0.008	0	1	0.67	0	1	4.46E-16
12.5 - 13	13	0.008	0	1	0.67	0	1	4.33E-16
13 - 13.5	13.5	0.008	0	1	0.67	0	1	4.20E-16
13.5 - 14	14	0.008	0	1	0.67	0	1	4.07E-16
14 - 14.5	14.5	0.008	0	1	0.67	0	1	3.94E-16
14.5 - 15	15	0.008	0	1	0.67	0	1	3.82E-16
15 - 15.5	15.5	0.008	0	1	0.67	0	1	3.71E-16
15.5 - 16	16	0.008	0	1	0.67	0	1	3.59E-16
16 - 16.5	16.5	0.008	0	1	0.67	0	1	3.48E-16
16.5 - 17	17	0.008	0	1	0.67	0	1	3.38E-16
17 - 17.5	17.5	0.008	0	1	0.67	0	1	3.27E-16

Ingestion Risk 0-2
2.09E-05

Assume:

Note:

Ingestion Risk 2-16
1.88E-06

BPRG default Fin = 1 and ingestion Fi=0.67
EFH Table 5-33 95th values for dusts corected for BPRG default time on hard and soft surfaces (assumes transfer to sof
Dusts assumed equal to removable activity (note that dusts are assumed to be 100% removable for ingestion in the EF
Slope factor multiplier based on 2005 EPA guidance (https://www.epa.gov/sites/production/files/2013-09/document

Adult worker ingestion risk likely negligible.
Column H, Slope factor or other multiplier for use as needed to adjust risk
0 in Column G are decimals
0-6 risk

2.28E-05

Ingestion Risk 16-up	Total Risk
6.05E-15	2.28E-05

t surfaces)
H)
s/childrens_suppleme

Adult risk
2.52E-10

17.5 - 18	18	0.008	0	1	0.67	0	1	3.17E-16
18 - 18.5	18.5	0.008	0	1	0.67	0	1	3.08E-16
18.5 - 19	19	0.008	0	1	0.67	0	1	2.98E-16
19 - 19.5	19.5	0.008	0	1	0.67	0	1	2.89E-16
19.5 - 20	20	0.008	0	1	0.67	0	1	2.80E-16
20 - 20.5	20.5	0.0095	0	1	0.67	0	1	3.23E-16
20.5 - 21	21	0.0095	0	1	0.67	0	1	3.11E-16
21 - 21.5	21.5	0.0095	0	1	0.67	0	1	3.00E-16
21.5 - 22	22	0.0095	0	1	0.67	0	1	2.89E-16
22 - 22.5	22.5	0.0095	0	1	0.67	0	1	2.78E-16
22.5 - 23	23	0.0095	0	1	0.67	0	1	2.68E-16
23 - 23.5	23.5	0.0095	0	1	0.67	0	1	2.58E-16
23.5 - 24	24	0.0095	0	1	0.67	0	1	2.49E-16
24 - 24.5	24.5	0.0095	0	1	0.67	0	1	2.40E-16
24.5 - 25	25	0.0095	0	1	0.67	0	1	2.31E-16
25 - 25.5	25.5	0.0095	0	1	0.67	0	1	2.23E-16
25.5 - 26	26	0.0095	0	1	0.67	0	1	2.15E-16
			Average	1.00	**Total Ingested Activity**	**1.05E+04**	**Total Risk**	**2.28E-05**
					Ingestion Risk no multipliers	**2.28E-05**		