

Appendix A

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Gkhoury

TABLE 1
SELECTION OF EXPOSURE PATHWAYS-RESIDENTIAL SOIL
Homestake Mining Company

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Five Subdivisions	Resident	Adult/Child	Incidental Ingestion	Offsite	Quantitative	Soil is not sodded with fine silt sandy soil
						External Radiation	Offsite	Quantitative	Presence of gamma-emitting radionuclides in soil
		Particulates	Five Subdivisions	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Soil particulates can easily be emitted into air.
		Produce	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Home grown produce (vegetable gardens) observed in of some houses.
Future	Soil	Soil	Five Subdivisions	Resident	Adult/Child	Incidental Ingestion	Offsite	Quantitative	Future use of the land will continue to be residential Soil is not sodded.
						External Radiation	Offsite	Quantitative	Presence of gamma-emitting radionuclides in soil.
		Particulates	Five Subdivisions	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Soil particulates can easily be emitted into air.
		Produce	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Home grown produce (vegetable gardens) observed in the yards of some houses and is expected to continue in the future.

TABLE 1.1
SELECTION OF EXPOSURE PATHWAYS
HOMESTAKE MINING COMPANY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Ambient Air	Air	Five Subdivisions	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Potential release of Radon gas and particulates from site to downgradient neighborhood.
						Submersion	Offsite	Quantitative	Potential release of Radon gas and particulates from site to downgradient neighborhood.
Future	Ambient Air	Air	Five Subdivisions	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Future use of the land will continue to be residential Potential release of Radon gas and particulates from site to downgradient neighborhood.
						Submersion	Offsite	Quantitative	Potential release of Radon gas and particulates from site to downgradient neighborhood.

TABLE 1.2
SELECTION OF EXPOSURE PATHWAYS-RESIDENTIAL WATER
HOMESTAKE MINING COMPANY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Water	Private Well Water	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	None	Houses are connected to City of Milan Water.
						Inhalation of Volatiles	Offsite	None	Houses are connected to City of Milan Water.
Future	Water	Private Well Water	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Future use of the land will continue to be residential Potential exist for a resident to install a Private Well and use it for domestic purposes.
						Inhalation of Volatiles	Offsite	Quantitative	Potential exist for a resident to install a Private Well and use it for domestic purposes.

TABLE 1.3
SELECTION OF EXPOSURE PATHWAYS-RESIDENTIAL PRODUCE
HOMESTAKE MINING COMPANY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Produce	Home grown Vegetables &Fruits	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Vegetable and Fruit Gardens Observed in some houses.
Future	Produce	Home grown Vegetables &Fruits	Five Subdivisions	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Vegetable and Fruit Gardens Observed in some houses and expected to continue in the future.

TABLE 1.4
SELECTION OF EXPOSURE PATHWAYS
Homestake Mining Company

Scenario Timeframe	Medium	Exposure Medium	Exposure Point (1)	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Background Area	Resident	Adult/Child	Incidental Ingestion External Radiation	Offsite Offsite	None None	Exposure to background soil contaminants is used for comparison purposes to the site neighborhood
		Particulates	Background Area	Resident	Adult/Child	Inhalation	Offsite	None	
		Produce	Background Area	Resident	Adult/Child	Ingestion	Offsite	None	
Future	Soil	Soil	Background Area	Resident	Adult/Child	Incidental Ingestion External Radiation	Offsite Offsite	Quantitative Quantitative	Exposure to background soil contaminants is used for comparison purposes to the site neighborhood
		Particulates	Background Area	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Exposure to background soil contaminants is used for comparison purposes to the site neighborhood
		Produce	Background Area	Resident	Adult/Child	Ingestion	Offsite	Quantitative	Exposure to background soil contaminants is used for comparison purposes to the site neighborhood

(1) Background area is an area about 2 miles south of the Five Subdivisions site neighborhood.

TABLE 1.5
SELECTION OF EXPOSURE PATHWAYS
HOMESTAKE MINING COMPANY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point (1)	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Air	Air	Bluewater Village (Background Area)	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Background area was selected to compare levels of radon gas in the background area to the Five Subdivisions located downgradient from the HMC
						Submersion	Offsite	Quantitative	
Future	Air	Air	Bluewater Village (Background Area)	Resident	Adult/Child	Inhalation	Offsite	Quantitative	Background area was selected to compare levels of radon gas in the background area to the Five Subdivisions located downgradient from the HMC
						Submersion	Offsite	Quantitative	

(1) Bluewater Village was selected as a Background Area for radon gas evaluation only.

TABLE 1.6
SELECTION OF EXPOSURE PATHWAYS
Homestake Mining Company

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Onsite/Offsite	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Five Subdivisions	Farmer	Adult/Child	Incidental Ingestion External Radiation	Offsite Offsite	Quantitative Quantitative	Soil is not sodded with fine silt sandy soil Presence of gamma-emitting radionuclides in soil
		Particulates	Five Subdivisions	Farmer	Adult/Child	Inhalation	Offsite	Quantitative	Soil particulates can easily be emitted into air.
		Produce	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home grown produce (vegetable gardens) observed in the yards of some houses.
		Beef	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised cattle observed in the Subdivisions.
		Milk	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised cattle observed in the Subdivisions.
		Poultry	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised poultry observed in the Subdivisions.
		Eggs	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised poultry observed in the Subdivisions. Communication with Residents
Future	Soil	Soil	Five Subdivisions	Farmer	Adult/Child	Incidental Ingestion External Radiation	Offsite Offsite	Quantitative Quantitative	Future use of the land will continue to be residential Soil is not sodded. Presence of gamma-emitting radionuclides in soil
		Particulates	Five Subdivisions	Farmer	Adult/Child	Inhalation	Offsite	Quantitative	Soil particulates can easily be emitted into air.
		Produce	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home grown produce (vegetable gardens) observed in the yards of some houses and is expected to continue in the future.
		Beef	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised cattle observed in the Subdivisions.
		Milk	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised cattle observed in the Subdivisions.
		Poultry	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised poultry observed in the Subdivisions.
		Eggs	Five Subdivisions	Farmer	Adult/Child	Ingestion	Offsite	Quantitative	Home raised poultry observed in the Subdivisions. Communication with Residents

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current /Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Five Subdivisions Down gradient from Site.

Radionuclide	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Actinium-228	0.04	1.96	pCi/g				1.96		679	NO	Max.Con. < SV
Bismuth-212 +D	0.48	1.57	pCi/g	FA0087-01-01-101204	85/85		1.57	1.12	2800	NO	Max.Con. < SV
Bismuth-214	0.49	2.79	pCi/g	BV0123-01-01-101014	85/85		2.79	0.92	7950	NO	Max.Con. < SV
Cobalt-60	ND	ND	pCi/g		0/85	0.01-0.032			0.0389	NO	LDF
Cesium-137	0.01	0.12	pCi/g	BV0118-01-01-101015	85/85		0.12	0.07	4.02	NO	Max.Con. < SV
Iridium-131	ND	ND	pCi/g		0/85	3.38-27.2			63.8	NO	LDF
Potassium-40	12.70	20.70	pCi/g	BV0118-01-01-101015	85/85		20.70	17.82	0.116	NO	ANOVA
Protactinium-234m		4.80	pCi/g	BV0146-01-01-101110	81/85		4.80	1.15	13600000	NO	Max.Con. < SV
Lead-210 +D	0.70	1.18	pCi/g	BV0118-01-01-101015	4/4		1.18		0.335	NO	LDF
Lead-212	0.52	1.59	pCi/g	FA0087-01-01-101204	85/85		1.59	1.04	3550	NO	Max.Con. < SV
Lead-214	0.52	2.99	pCi/g	BV0123-01-01-101014	85/85		2.99	0.99	44800	NO	Max.Con. < SV
Radium-223 +D	0.12	0.45	pCi/g	BV0123-01-01-101014	85/85		0.45	0.27	64.6	NO	Max.Con. < SV
Radium-226 +D	0.28	6.04	pCi/g	BV0146-01-01-101110	84/85	0.284	6.04	1.74	0.0121	YES	
Radium-228 +D	0.50	1.58	pCi/g	FA0087-01-01-101204	85/85		1.58	1.11	0.0292	YES	
Thorium-227	0.01	0.32	pCi/g	BV0141-01-01-101007	75/75		0.32	0.10	105	NO	Max.Con. < SV
Thorium-228	0.48	2.63	pCi/g	BV0139-01-01-101015	56/56		2.63	1.23	23.4	NO	Max.Con. < SV
Thorium-230	0.56	3.71	pCi/g	BV0143-01-01-101012	56/56		3.71	1.10	3.46	YES	
Thorium-232	0.46	1.76	pCi/g	BV0139-01-01-101015	56/56		1.76	1.09	3.07	NO	Max.Con. < SV
Thorium-234		4.24	pCi/g	BV0146-01-01-101110	70/72		4.24	0.58	1270	NO	Max.Con. < SV
Thallium-208	0.16	0.48	pCi/g	FA0087-01-01-101204	85/85		0.48	0.34	23100	NO	Max.Con. < SV
Uranium-234	0.42	7.17	pCi/g	BV0126-01-01-101020	56/56		7.17	0.91	4.03	YES	
Uranium-235	0.01	0.37	pCi/g	BV0126-01-01-101020	85/85		0.37	0.10	3.95	NO	Max.Con. < SV
Uranium-238	0.47	6.42	pCi/g	BV0126-01-01-101020	56/56		6.42	0.95	4.48	YES	

(1) ND = Not Detected

(2) Maximum Detected Concentration was Used for Screening

(3) Average Value Concentration at Background Area.

(4) Screening Toxicity Value from PRG Radiation Table.

(5) Max. Conc.< SV = Maximum Concentration less than Screening Value; LDF = Low Detection Frequency; ANOVA =Analysis of Variance

TABLE 2.1.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current /Future
Medium: Air
Exposure Medium: Outdoor Air
Exposure Point: Five Subdivisions Down gradient from Site.

Radionuclide	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Total Radon (Rn-222 + Rn-220)	6.80E-01	2.75E+00	pCi/l	PV0009	79/79		1.36E+03	5.10E+02	2.76E-01	YES	SV<BK<Conc
Radon 222 (Rn-222)	2.50E-01	1.00E+00	pCi/l	PV0009	79/79		4.90E+02	3.70E+02	2.76E-01	YES	Max.Con. < SV
Thoron (Rn-220)	4.30E-01	1.75E+00	pCi/l				8.46E+02		2.16E+04	YES	Calculated
Uranium- nat	5.00E-05	8.30E-03	pCi/m ³	HMC5-2010	47/48	5.00E-05	8.30E-03		5.66E-04	YES	SV<Max conc.
Thorium-230	1.00E-05	7.42E-04	pCi/m ³	HMC6-2008	15/48	5.00E-05	7.42E-04		1.86E-04	YES	SV<Max conc.
Radium-226	1.00E-05	7.40E-04	pCi/m ³	HMC6-2008	16/48	5.00E-05	7.40E-04		4.56E-04	YES	SV<Max conc.

- (1) Units for radon gas was given in pCi/l and radionuclides particulates were given in pCi/m³
- (2) 95% UCL on Arithmetic mean was used for radon gas Concentration. Units are in pCi/m³
- (3) 95% UCL on arithmetic mean was used for radon in the Background Area. Units are in pCi/m³
- (4) Screening Toxicity Value from PRG Radiation Table. Units in pCi/m³
- (5) SV <BK<Conc. = Screening value less than background value less than medium concentration.

TABLE 2.1.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current /Future
Medium: Water
Exposure Medium: Private Well Water
Exposure Point: Five Subdivisions Down gradient from Site.

Radionuclide/Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening	Screening Toxicity Value (N/C)	Units	COPC Flag (Y/N)	Rationale for Selection or Deletion (1)
Arsenic	0.33	16.20	µg/l	VV0016	14/14	16.20	10*	µg/l	Y	Max.Con. > SV
Lead	0.19	24.20	µg/l	VV0016	14/14	24.20	15*	µg/l	Y	Max.Con. > SV
Molybdenum	0.56	8.85	µg/l	VV0016	14/14	8.85	77.7**	µg/l	N	Max.Con. < SV
Selenium [†]	7.00	66.00	µg/l	VV0016	14/14	66.00	50*	µg/l	Y	Max.Con. > SV
Radon gas	49.00	1479.00	pCi/L	FA0052	14-Aug	1479.00	300/4000***	pCi/L	N	Max.Con. < SV
Alpha	4.50	64.00	pCi/l	VV0016	14/14	64.00	15*	pCi/l	Y	Max.Con. > SV
Radium-226 +D	0.10	0.56	pCi/l	BV0191	14/14	0.56	<5*	pCi/l	Y	see foot note
Radium-228 +D	0.42	30.90	pCi/l	BV0191	14/14	30.90	<5*	pCi/l	Y	Max.Con. > SV
Thorium-227	0.05	0.03	pCi/l	FA0052	14/14	0.03	1.12^	pCi/l	N	Max.Con. < SV
Thorium-228	0.03	0.22	pCi/l	VV0041	14/14	0.22	0.949^	pCi/l	N	Max.Con. < SV
Thorium-230	0.01	0.13	pCi/l	VV0016	14/14	0.13	0.581^	pCi/l	N	Max.Con. < SV
Thorium-232	0.04	0.05	pCi/l	VV0016	14/14	0.05	0.524^	pCi/l	N	Max.Con. < SV
Uranium-234	4.10	31.40	pCi/l	VV0016	14/14	31.40	0.748	pCi/l	Y	Max.Con. > SV
Uranium-235	0.11	1.34	pCi/l	VV0016	14/14	1.34	0.76	pCi/l	Y	Max.Con. > SV
Uranium-238	2.19	22.70	pCi/l	VV0016	14/14	22.70	0.827	pCi/l	Y	Max.Con. > SV

* MCL values; The MCL for Radium 226 and Ra 228 combined is 5 pCi/L.

** Preliminary Remediation Goal (PRG) concentration associated with a non-cancer Hazard quotient of 1.

*** Proposed radon in drinking water.

^ Preliminary Remediation Goal (PRG) concentration associated with an excess cancer risk of 1×10^{-6}

(1) Max Conc < or > SV - Maximum concentration is less (<) or Greater (>) than screening value.

TABLE 2.1.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current /Future
Medium: Produce
Exposure Medium: Produce
Exposure Point: Five Subdivisions Down gradient from Site.

Radionuclide	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Arsenic	0.03	0.50	mg/Kg	BV0070	9/9	0.50			
Lead	0.03	0.70	mg/Kg	BV0070	9/9	0.70			
Molybdenum	0.45	6.29	mg/Kg	BV0070	9/9	6.29			
Cobalt-60	ND	ND	pCi/g		0/10	ND	1.18E+01	NO	LDF
Cesium-137	ND	ND	pCi/g		0/10	ND	4.85E+00	NO	LDF
Iridium-131	ND	ND	pCi/g		0/10	ND	1.84E+03	NO	LDF
Potassium-40	1.95	12.50	pCi/g	BV0111	10/10	12.50	5.09E-01	YES	Max.Con. > SV
Lead-212	0.01	0.05	pCi/g	BV0111	3/3	0.05	2.53E+05	NO	Max.Con. < SV
Lead-214	0.01	0.05	pCi/g	BV0141	2/2	0.05	4.40E+08	NO	Max.Con. < SV
Radium-226 +D	ND	ND	pCi/g		0/10	ND	2.56E-01	NO	LDF
Radium-228 +D	0.01	0.04	pCi/g	BV0141	1/10	0.04	3.40E-01	NO	LDF
Thorium-227	0.11	0.11	pCi/g	BV0041	8/10	0.11	3.07E+04	NO	Max.Con. < SV
Thorium-228	0.17	0.51	pCi/g	BV0070	10/10	0.51	3.84E+02	NO	Max.Con. < SV
Thorium-230	0.02	0.40	pCi/g	BV0070	10/10	0.40	4.40E+01	NO	Max.Con. < SV
Thorium-232	0.03	0.18	pCi/g	BV0070	10/10	0.18	3.94E+01	NO	Max.Con. < SV
Thallium-208	0.00	0.03	pCi/g	BV0070	3/3	0.03		NO	LDF
Uranium-234	0.09	1.81	pCi/g	BV0070	10/10	1.81	2.19E+01	NO	Max.Con. < SV
Uranium-235	0.02	0.10	pCi/g	BV0070	10/10	0.10	2.22E+01	NO	Max.Con. < SV
Uranium-238	0.04	1.50	pCi/g	BV0070	10/10	1.50	1.73E+01	NO	Max.Con. < SV

(1) ND = Not Detected

(2) Maximum Detected Concentration was Used for Screening

(3) Screening Toxicity Value from PRG Radiation Table. N/C = Noncancer/Cancer

(4) Max. Conc.< SV = Maximum Concentration less than Screening Value; LDF = Low Detection Frequency;

TABLE 3.1.RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Five Subdivisions

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (1)	Rationale (2)
Radium-226 +D	pCi/g	2.04	1.83	2.5E+00	Chebyshev	6.0E+00	2.5E+00	pCi/g	95 % UCL	95% UCL < Max
Radium-228 +D	pCi/g	0.98	0.97	1.0E+00	Student - t	1.6E+00	1.0E+00	pCi/g	95 % UCL	95% UCL < Max
Thorium-230	pCi/g	1.42	1.26	1.6E+00	Gamma UCL	3.7E+00	1.6E+00	pCi/g	95 % UCL	95% UCL < Max
Uranium-234	pCi/g	1.33	1.08	1.5E+00	Gamma UCL	7.2E+00	1.5E+00	pCi/g	95 % UCL	95% UCL < Max
Uranium-238 +D	pCi/g	1.37	1.09	1.6E+00	Gamma UCL	6.4E+00	1.6E+00	pCi/g	95 % UCL	95% UCL < Max

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than maximum detected value.

TABLE 3.1.2 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Background (Area South of Subdivisions)

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale
Radium-226 +D	pCi/g	1.7	1.74	1.81E+00	Student - t	2.00E+00	1.8E+00	pCi/g	95 % UCL	95% UCL < Max
Radium-228 +D	pCi/g	1.08	1.11	1.14E+00	Student - t	1.26E+00	1.1E+00	pCi/g	95 % UCL	95% UCL < Max
Thorium-230	pCi/g	1.1	1.05	1.39E+00	Student - t	1.56E+00	1.4E+00	pCi/g	95 % UCL	95% UCL < Max
Uranium-234	pCi/g	0.91	0.88	1.14E+00	Student - t	1.22E+00	1.1E+00	pCi/g	95 % UCL	95% UCL < Max
Uranium-238 +D	pCi/g	0.95	0.89	1.15E+00	Student - t	1.21E+00	1.2E+00	pCi/g	95 % UCL	95% UCL < Max

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than Maximum Dected Value.

TABLE 3.1.3 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Air
Exposure Medium: Outdoor Air
Exposure Point: Five Subdivisions

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale -3
Radon gas	pCi/l	1.29E+00	1.24E+00	1.36E+00	H-UCL	2.75E+00	1.4E+00	pCi/l	95% UCL	UCL < Max
Radon-222 (Rn-222)	pCi/l	4.70E-01	4.50E-01	4.90E-01	Student's -t	1.00E+00	4.9E-01	pCi/l	95% UCL	UCL < Max
Thoron (Rn-220) ¹	pCi/l	0.78	0.79	8.70E-01		1.75E+00	8.7E-01	pCi/l		By Subtraction
Uranium- nat	pCi/m ³	1.37E-03	8.32E-04	2.42E-03	Chebyshev	8.30E-03	2.42E-03	pCi/m ³	95% UCL	UCL < Max
Thorium-230	pCi/m ³	4.81E-05	3.00E-05	1.14E-04	Chebyshev	7.42E-04	1.14E-04	pCi/m ³	95% UCL	UCL < Max
Radium-226	pCi/m ³	5.79E-05	5.00E-05	1.23E-04	Chebyshev	7.40E-04	1.23E-04	pCi/m ³	95% UCL	UCL < Max

Footnote Instructions:

¹ Thoron was calculated as radon gas - Rn-220

(2) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(3) UCL < Max. = 95% Upper Confidence Level is less than Maximum Dctected Value.

TABLE 3.1.4 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Air
Exposure Medium: Outdoor Air
Exposure Point: Background (Bluewater Village)

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale -3
Radon gas	pCi/l	0.46	0.42	5.10E-01	Student's -t	1.25E+00	5.1E-01	pCi/l	95% UCL	UCL < Max
Radon-222 (Rn-222)	pCi/l	0.33	0.3	3.70E-01	Student's -t	9.00E-01	3.7E-01	pCi/l	95% UCL	UCL < Max
Thoron (Rn-220) ¹	pCi/l	0.13	0.12	1.40E-01		3.50E-01	1.4E-01	pCi/l		By Subtraction

¹ Thoron was calculated as radon gas - Rn-220

(2) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(3) UCL < Max. = 95% Upper Confidence Level is less than Maximum Detected Value.

TABLE 3.1.5 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Private Well Waters
Exposure Point: Five Subdivisions

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (1)	Rationale (2)
Alpha	pCi/l	22.15	17	3.0E+01	Student's -t	6.4E+01	3.0E+01	pCi/l	95 % UCL	95% UCL < Max
Radium-226 +D	pCi/l	0.25	0.22	3.2E-01	Student's -t	5.6E-01	3.2E-01	pCi/l	95 % UCL	95% UCL < Max
Radium-228 +D	pCi/l	2.23	0.43	1.1E+01	Chebyshev	3.1E+01	1.1E+01	pCi/l	95 % UCL	95% UCL < Max
Thorium-230	pCi/l	0.04	0.042	6.0E-02	Student's -t	1.3E-01	6.0E-02	pCi/l	95 % UCL	95% UCL < Max
Uranium-234	pCi/l	15.86	15.8	2.0E+01	Student's -t	3.1E+01	2.0E+01	pCi/l	95 % UCL	95% UCL < Max
Uranium-235	pCi/l	0.57	0.55	7.6E-01	Student's -t	1.3E+00	7.6E-01	pCi/l	95 % UCL	95% UCL < Max
Uranium-238 +D	pCi/l	10.1	9.35	1.3E+01	Student's -t	2.3E+01	1.3E+01	pCi/l	95 % UCL	95% UCL < Max
Radon	pCi/l	388	218	9.5E+02	Chebyshev	1.5E+03	9.5E+02	pCi/l	95 % UCL	95% UCL < Max

(1) 95% UCL = 95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than Maximum Detected Value.

TABLE 3.1. 6 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Produce
Exposure Medium: Produce
Exposure Point: Five Subdivisions

Radionuclide of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (1)	Rationale (2)
Potassium 40	pCi/g	4.86	3.59	7.4E+00	Gamma UCL	1.3E+01	7.4E+00	pCi/g	95 % UCL	95% UCL < Max
Thorium-230	pCi/g	0.178	0.129	2.6E-01	Student's -t	4.0E-01	2.6E-01	pCi/g	95 % UCL	95% UCL < Max
Uranium-234	pCi/g	0.48	0.37	9.1E-01	Gamma UCL	1.8E+00	9.1E-01	pCi/g	95 % UCL	95% UCL < Max
Uranium-238 +D	pCi/g	0.39	0.23	7.7E-01	Gamma UCL	1.5E+00	7.7E-01	pCi/g	95 % UCL	95% UCL < Max

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than maximum detected value.

TABLE 3.1.7 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Five Subdivisions

Chemical of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (1)	Rationale (2)
Arsenic	mg/Kg	4.5	4.33	4.8E+00	Student's-t	1.1E+01	4.8E+00	mg/Kg	95 % UCL	95% UCL < Max
Lead	mg/Kg	12.75	12.15	1.5E+01	Chebyshev	2.8E+01	1.5E+01	mg/Kg	95 % UCL	95% UCL < Max
Molybdenum	mg/Kg	0.72	0.66	7.8E-01	Gamma UCL	1.7E+00	7.8E-01	mg/Kg	95 % UCL	95% UCL < Max
Selenium	mg/Kg	0.61	0.53	7.1E-01	Gamma UCL	2.2E+00	7.1E-01	mg/Kg	95 % UCL	95% UCL < Max
Vanadium	mg/Kg	23.95	23.49	2.6E+01	Student's-t	3.9E+01	2.6E+01	mg/Kg	95 % UCL	95% UCL < Max
Uranium, Total	mg/Kg	2.47	1.62	3.3E+00	Chebyshev	1.9E+01		mg/Kg	95 % UCL	95% UCL < Max

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than maximum detected value.

TABLE 3.1.8 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Background (Area South of Subdivisions)

Chemical of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (2)	Rationale
Arsenic	mg/Kg	1.7	1.74	5.01E+00	Student - t	5.52E+00	5.01E+00	mg/Kg	95 % UCL	95% UCL < Max
Lead	mg/Kg	1.08	1.11	1.19E+01	Student - t	1.42E+01	1.19E+01	mg/Kg	95 % UCL	95% UCL < Max
Molybdenum	mg/Kg	1.1	1.05	4.50E-01	Gamma UCL	6.20E-01	4.50E-01	mg/Kg	95 % UCL	95% UCL < Max
Selenium	mg/Kg	0.91	0.88	8.00E-01	Student - t	2.03E+00	8.00E-01	mg/Kg	95 % UCL	95% UCL < Max
Vanadium	mg/Kg	0.95	0.89	2.99E+01	Student - t	3.65E+01	2.99E+01	mg/Kg	95 % UCL	95% UCL < Max
Uranium, Total	mg/Kg	1.42	1.62					mg/Kg		

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than Maximum Dected Value.

TABLE 3.1.9 RME
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Private Well Waters
Exposure Point: Five Subdivisions

Chemical of Potential Concern	Units	Arithmetic Mean	Median	95% UCL	95% UCL Basis (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic (1)	Rationale (2)
Arsenic	µg/l	2.86	2.3	5.3E+00	Gamma UCL	1.6E+01	5.3E+00	µg/l	95 % UCL	95% UCL < Max
Lead	µg/l	4.7	0.64	1.4E+01	Chebyshev	2.4E+01	1.4E+01	µg/l	95 % UCL	95% UCL < Max
Molybdenum	µg/l	2.43	1.49	3.9E+00	Gamma UCL	8.9E+00	3.9E+00	µg/l	95 % UCL	95% UCL < Max
Selenium*	µg/l	33.1	32	4.0E+01	Student's-t	6.6E+01	4.0E+01	µg/l	95 % UCL	95% UCL < Max

(1) 95% UCL =95% Upper Confidence Level on Arithmetic Mean.

(2) UCL < Max. = 95% Upper Confidence Level is less than Maximum Detected Value.

* Selenium data obtained from HMC 2011 Annual Report Table B.4-4 Water Quality Analysis for the Subdivision Alluvial Wells.

TABLE 4.1 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Residential	Adult/Child	Five Subdivisions	C_s	UCL or max. detected conc. in soil	Site Specific	pCi/g	See Table 3.1	See Appendix B Scenario 1 Pathway R-1
				ED_{r-a}	Exposure Duration Resident Adult	24	years	(1)	
				ED_{r-c}	Exposure Duration Resident Child	6	years	(1)	
				IRS_a	Soil Intake Rate Adult	100	mg/day	(1)	
				IRS_c	Soil Intake Rate Child	200	mg/day	(1)	
				ED_r	Resident Exposure Duration	30	years	(1)	
				t_r	Time Resident	30	years	(1)	
External Radiation	Residential	Adult/Child	Five Subdivision	λ	lambda decay constant	Isotopic Specific			See Appendix B Scenario 1 Pathway R-2
				C_s	UCL or max. detected conc. in soil	Site Specific	pCi/g	See Table 3.1	
				ACF	Area Correction Factor	Isotopic Specific	m^{-3}	(1)	
				EF_r	Exposure Frequency- Resident	350	day/year	(1)	
				ED_r	Exposure Duration - Resident	30	years	(1)	
				ET_{r-o}	Exposure Time- Outdoor resident	0.073	hr/hr	(1)	
				ET_{r-i}	Expousre Time- indoor resident	0.684	hr/hr	(1)	
				GSF_i	Gamma Shielding Factor-indoor	0.4	unitless	(1)	
				t_r	time-resident	30	years	(1)	
				λ	Lambda dca constant	isotopic specific			

(1) Preliminary Remediation Goals for Radionuclides <http://epa-prgs.ornl.gov/radionuclides/>

TABLE 4.1.1 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation	Residential	Five Subdivisions	C _s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Pathway R-3
			IFA _{r-adj}	age-adjusted soil inhalation factor-resident	18	m3/day	(1)	
			EF _r	exposure frequency-resident	350	day/yr	(1)	
			ED _r	exposure duration-resident	30	year	(1)	
			PEF	particulate emission factor	1.36E+09	m3/kg	(1)	
			ET _r	exposure time-resident	24	hr/day	(1)	
			IRA _{r-c}	inhalation rate-resident child	10	m3/day	(1)	
			IRA _{r-a}	inhalation rate-resident adult	20	m3/day	(1)	
			ED _{r-a}	exposure duration-resident adult	24	year	(1)	
			ED _{r-c}	exposure duration-resident child	6	year	(1)	
			T _r	time-resident	30	year	(1)	
			λ	Lambda decay constant	Isotopic-specific		(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Produce
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Produce	Residential	Adult/Child	Five Subdivisions	C _s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Scenario 1 Pathway R-5
				IFF _{r-adj}	age-adjusted fruit ingestion-resident	17.5	kg/yr	(1)	
				IFV _{r-adj}	age-adjusted vegetables ingestion-resident	9.1	kg/yr	(1)	
				EF _r	exposure frequency-resident	350	day/yr	(1)	
				ED _r	exposure duration-resident	30	yr	(1)	
				TF _p	Soil to plant transfer factor	Isotope- specific	day/kg	(1)	
				CPF _r	Contaminated Plant Fraction-resident	0.25	unitless	(1)	
				IRF _{r-c}	Ingestion of fruit rate-resident child	5.4	kg/yr	(1)	
				IRF _{r-a}	Ingestion of fruit rate-resident adult	20.5	kg/yr	(1)	
				IRV _{r-c}	Ingestion of vegetable rate-resident child	3.8	kg/yr	(1)	
				IRV _{r-a}	ingestion of vegetable rate-resident adult	10.4	kg/yr	(1)	
				ED _{r-a}	exposure duration-resident adult	24	yr	(1)	
				ED _{r-c}	exposure duration-resident child	6	yr	(1)	
				T _r	time-resident	30	yr	(1)	
				λ	lambda decay constant	Isotopic-specific	1/yr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.3 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Air
Exposure Medium: Air
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation	Residential	Five Subdivisions	C _s	UCL or maximum detected concentration in air.	Site-specific	pCi/m ³	See Table 3.1.3 (1)	See Appendix B Scenario 1 Pathway R-6
			IFA _{r-adj}	age-adjusted inhalation factor-resident	18	m ³ /day		
			EF _r	exposure frequency-resident	350	day/yr		
			ED _r	exposure duration-resident	30	year		
			ET _r	exposure time-resident	24	hr/day		
			IRA _{r-c}	inhalation rate-resident child	10	m3/day		
			IRA _{r-a}	inhalation rate-resident adult	20	m3/day		
			ED _{r-a}	exposure duration-resident adult	24	year		
			ED _{r-c}	exposure duration-resident child	6	year		

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.4 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Private Well Water
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Residential	Adult/Child	Five Subdivisions	C_w	Contaminant concentration in water	Site-specific	pCi/l	See Table	See Appendix B Scenario Pathway R-4
				IFW_{r-adj}	Age-adjusted water ingestion factor - resident	1.8	L/day	(1)	
				EF_r	Exposure frequency-resident	350	day/yr	(1)	
				ED_r	Exposure duration-resident	30	year	(1)	
				IRW_{r-c}	Water intake rate - resident child	1	L/day	(1)	
				IRW_{r-a}	Water intake rate - resident adult	2	L/day	(1)	
				ED_{r-a}	Exposure duration-resident adult	24	year	(1)	
				ED_{r-c}	Exposure duration-resident child	6	year	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.4 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Water
Exposure Medium: Private Well Water
Exposure Point: Five Subdivisions
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation	Residential	Adult/Child	Five Subdivisions	C_w	Contaminant concentration in water	Site-specific	pCi/l	See Table	See Appendix B Scenario 1 Pathway R-5
				IFW_{r-adj}	resident	18	m ³ /day	(1)	
				EF_r	Exposure frequency-resident	350	day/yr	(1)	
				ED_r	Exposure duration-resident	30	year	(1)	
				IRA_{r-c}	Air Inhalation rate - resident child	10	L/day	(1)	
				IRA_{r-a}	Air inhalation rate - resident adult	20	L/day	(1)	
				ED_{r-a}	Exposure duration-resident adult	24	year	(1)	
				ED_{r-c}	Exposure duration-resident child	6	year	(1)	
				K	Andelman Volatilization Factor	0.5	L/m ³	(1)	
				ET_r	Exposure Time	24	hr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C_s	UCL or max. detected conc. in soil	Site Specific	pCi/g	See Table 3.1	See Appendix B Scenario 1 Pathway R-1
				$ED_{f,a}$	Exposure Duration Farmer Adult	34	years	(1)	
				$ED_{f,c}$	Exposure Duration Farmer Child	6	years	(1)	
				IRS_a	Soil Intake Rate Adult	100	mg/day	(1)	
				IRS_c	Soil Intake Rate Child	200	mg/day	(1)	
				ED_f	Farmer Exposure Duration	40	years	(1)	
				t_f	Time Farmer	40	years	(1)	
				λ	lambda decay constant	Isotopic Specific			
External Radiation	Farmer	Adult/Child	Five Subdivision	C_s	UCL or max. detected conc. in soil	Site Specific	pCi/g	See Table 3.1	See Appendix B Scenario 1 Pathway R-2
				ACF	Area Correction Factor	Isotopic Specific	m^{-2}	(1)	
				EF_f	Exposure Frequency- Farmer	350	day/year	(1)	
				ED_f	Exposure Duration - Farmer	40	years	(1)	
				$ET_{f,o}$	Exposure Time- Outdoor farmer	0.507	hr/hr	(1)	
				$ET_{f,i}$	Exposure Time- indoor farmer	0.417	hr/hr	(1)	
				GSF_i	Gamma Shielding Factor-indoor	0.4	unitless	(1)	
				t_f	time-farmer	40	years	(1)	
				λ	Lambda decay constant	isotopic specific			

(1) Preliminary Remediation Goals for Radionuclides <http://epa-prgs.crnl.gov/radionuclides/>

TABLE 4.1.1 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Inhalation	Farmer	Five Subdivisions	C_s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table 3.1 (1)	See Appendix B Scenario Pathway R-3
			IFA_{i-adj}	age-adjusted soil inhalation factor-farmer	18.5	m ³ /day		
			Eff	exposure frequency-farmer	350	day/yr		
			ED_f	exposure duration-farmer	40	year		
			PEF	particulate emission factor	1.36E+09	m ³ /kg		
			ET_f	exposure time-farmer	24	hr/day		
			IRA_{i-c}	inhalation rate-farmer child	10	m ³ /day		
			IRA_{i-a}	inhalation rate-farmer adult	20	m ³ /day		
			ED_{f-a}	exposure duration-farmer adult	34	year		
			ED_{i-c}	exposure duration-farmer child	6	year		
			T_f	time-farmer	40	year		
			λ	Lambda decay constant	Isotopic-specific		(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Produce
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C_s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Scenario Pathway R-5
				IFF_{f-adj}	age-adjusted fruit ingestion-farmer	18.235	kg/yr	(1)	
				IFV_{f-adj}	age-adjusted vegetables ingestion-farmer	9.41	kg/yr	(1)	
				EF_f	exposure frequency-farmer	350	day/yr	(1)	
				ED_f	exposure duration-farmer	40	yr	(1)	
				TF_p	Soil to plant transfer factor	Isotope-specific	day/kg	(1)	
				CPF_f	Contaminated Plant Fraction-farmer	1	unitless	(1)	
				IRF_{f-c}	Ingestion of fruit rate-farmer child	5.4	kg/yr	(1)	
				IRF_{f-a}	Ingestion of fruit rate-farmer adult	20.5	kg/yr	(1)	
				IRV_{f-c}	Ingestion of vegetable rate-farmer child	3.8	kg/yr	(1)	
				IRV_{f-a}	ingestion of vegetable rate-farmer adult	10.4	kg/yr	(1)	
				ED_{f-a}	exposure duration-farmer adult	34	yr	(1)	
				ED_{f-c}	exposure duration-farmer child	6	yr	(1)	
				T_f	time-farmer	40	yr	(1)	
				λ	lambda decay constant	Isotopic-specific	1/yr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Beef
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C _s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Scenario Pathway R-5
				IFB _{f,adj}	age-adjusted beef ingestion-farmer	43.375	kg/yr	(1)	
				EF _f	exposure frequency-farmer	350	day/yr	(1)	
				ED _f	exposure duration-farmer	40	yr	(1)	
				TF _p	Soil to plant transfer factor	Isotope-specific	pCi/g-plant per pCi/g-soil	(1)	
				CPF _f	Contaminated Plant Fraction-farmer	1	unitless	(1)	
				IRB _{f-c}	beef ingestion rate-farmer child	4.7	kg/yr	(1)	
				IRB _{f-a}	beef ingestion rate-farmer adult	50.2	kg/yr	(1)	
				FI _{beef}	beef fodder intake rate	11.77	kg/day		
				FI _{beef-s}	beef soil intake rate	0.39	kg/day	(1)	
				K _d	soil to water partition coefficient	Isotopic-specific	L/kg	(1)	
				σ	Total soil porosity	0.5	L water/L pore space	(1)	
				S	Fraction water content	0.3	L water/L pore space	(1)	
				P	Soil bulk density	1.5	kg/L soil	(1)	
				DF _w	Dilution factor for drinking water	1	unitless	(1)	
				TF _{beef}	Beef transfer factor	Isotopic-specific	day/kg	(1)	
				FI _{beef-w}	beef water intake rate	53	L/day	(1)	
				ED _{f-a}	exposure duration-farmer adult	34	yr	(1)	
				ED _{f-c}	exposure duration-farmer child	6	yr	(1)	
				T _f	time-farmer	40	yr	(1)	
				λ	lambda decay constant	Isotopic-specific	1/yr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Milk
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C _s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Pathway R-6
				IFD _{f,adj}	age-adjusted milk ingestion-farmer	205.275	kg/yr	(1)	
				EF _f	exposure frequency-farmer	350	day/yr	(1)	
				ED _f	exposure duration-farmer	40	yr	(1)	
				TF _p	Soil to plant transfer factor	Isotope-	day/kg	(1)	
				CPF _f	Contaminated Plant Fraction-farmer	1	unitless	(1)	
				IRD _{f,c}	milk ingestion rate-farmer child	96.9	kg/yr	(1)	
				IRD _{f,a}	milk ingestion rate-farmer adult	224.4	kg/yr	(1)	
				FI _{dairy}	dairy fodder intake rate	16.9	kg/dag		
				FI _{dairy-s}	dairy soil intake rate	0.41	kg/day	(1)	
				K _d	soil to water partition coefficient	Isotopic-	L/kg	(1)	
				σ	Total soil porosity	0.5	ater/L pore s	(1)	
				S	Fraction water content	0.3	ater/L pore s	(1)	
				P	Soil bulk density	1.5	kg/L soil	(1)	
				DF _w	Dilution factor for drinking water	1	unitless	(1)	
				TF _{dairy}	dairy transfer factor	Isotopic-	day/kg	(1)	
				FI _{dairy-W}	dairy water intake rate	92	L/day	(1)	
				ED _{f-a}	exposure duration-farmer adult	34	yr	(1)	
				ED _{f,c}	exposure duration-farmer child	6	yr	(1)	
				T _f	time-farmer	40	yr	(1)	
				λ	lambda decay constant	Isotopic-	1/yr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Poultry
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C _s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table (1)	See Appendix B Scenario 2 Pathway R-7
				IFP _{f-adj}	age-adjusted poultry ingestion rate-farmer	31.18	kg/yr		
				EF _f	exposure frequency-farmer	350	day/yr		
				ED _f	exposure duration-farmer	40	yr		
				TF _p	Soil to plant transfer factor	Isotope- specific	pCi/g-plant per pCi/g-soil		
				IRP _{f-c}	poultry ingestion rate-farmer child	5	kg/yr		
				IRP _{f-a}	poultry ingestion rate-farmer adult	35.8	kg/yr		
				FI _{po}	poultry intake rate	0.2	kg/dag		
				FI _{po-s}	poultry soil intake rate	0.022	kg/day		
				TF _{po}	poultry transfer factor	Isotopic-specific	day/kg		
				ED _{f-a}	exposure duration-farmer adult	34	yr		
				ED _{f-c}	exposure duration-farmer child	6	yr		
				T _f	time-farmer	40	yr		
				λ	lambda decay constant	Isotopic-specific	1/yr		

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 4.1.2 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Eggs
Exposure Point: Five Subdivisions
Receptor Population: Farmer
Receptor Age: Adult/Child

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name (1)
Ingestion	Farmer	Adult/Child	Five Subdivisions	C_s	UCL or maximum detected concentration in soil	Site-specific	pCi/g	See Table	See Appendix B Scenario Pathway R-8
				$IFE_{f,adj}$	age-adjusted egg ingestion rate-farmer	31.01	kg/yr	(1)	
				EF_f	exposure frequency-farmer	350	day/yr	(1)	
				ED_f	exposure duration-farmer	40	yr	(1)	
				TF_p	Soil to plant transfer factor	Isotope-specific	pCi/g-plant per pCi/g-soil	(1)	
				IRE_{f-c}	egg ingestion rate-farmer child	2.3	kg/yr	(1)	
				IRE_{f-a}	egg ingestion rate-farmer adult	14.9	kg/yr	(1)	
				Fi_{po}	poultry intake rate	0.2	kg/dag	(1)	
				FI_{po-s}	poultry soil intake rate	0.022	kg/day	(1)	
				TF_e	egg transfer factor	Isotopic-specific	day/kg	(1)	
				ED_{f-a}	exposure duration-farmer adult	34	yr	(1)	
				ED_{f-c}	exposure duration-farmer child	6	yr	(1)	
				T_f	time-farmer	40	yr	(1)	
				λ	lambda decay constant	Isotopic-specific	1/yr	(1)	

(1) US EPA (Oct. 2000): Soil Screening Guidance for Radionuclides: Technical Background Document. ORIA/Superfund Washington, DC. EPA/540-R-00-006

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
HOMESTAKE MINING COMPANY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal	Dermal Absorption	Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)	
		Value	Units					Source(s)	Date(s) Last Revised (MM/DD/YYYY)
				(1)	(2)		(3)		
Arsenic	Chronic	3.00E-04	mg/kg-day	1	0.03	Skin: increased hyperpigmentation keratosis and possibly vascular complications.	3/1	IRIS**	2/1/1993
Lead	Chronic	No RfD*				Infants and Children: CNS - delays in physical or mental development. Significant deficits in attention span and learning Adults: Kidney problems; High blood pressure.		IRIS	07/08/04
Molybdenum	Chronic	5E-03	mg/kg-day	1	0.03	Kidney- Gout like disease , increased uric acid levels in blood.	30/1	IRIS	08/01/93
Selenium	Chronic	5E-03	mg/kg-day	1	0.03	Liver dysfunction- prolonged clotting time. Hair or finger nail loss; Circulatory problems- lowered hemoglobin levels	3/1	IRIS	09/01/91
Vanadium***	Chronic	5E-03	mg/kg-day	1	0.03	Hair- decreased hair cystine	100/1	IRIS	12/01/96
Uranium, Total^	Chronic	3E-03	mg/kg-day	1	0.03	Kidney- Nephrotoxic	1000/1	IRIS	10/01/89

* inadequate data to develop an RfD. Lead is evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) model.

(1) oral absorption is assumed to be 100%

(2) metal absorption through the dermal route of intake is assumed to be 3%

(3) Uncertainty (UF) and Modifying factors (MF):

A UF of 10 is used to account for variation in the general population to protect sensitive subpopulations (e.g. Elderly, children).

A UF of 10 is used when a NOAEL derived from a subchronic instead of a chronic study is used as the basis for a chronic RfD.

A UF of 10 is used when extrapolating from animals to humans. This factor is intended to account for the interspecies variability between humans and other mammals.

A UF of 10 is used when a LOAEL is used instead of a NOAEL. This factor is intended to account for the uncertainty associated with extrapolating from LOAELs to NOAELs.

A MF ranging from 1 to 10 is included to reflect a qualitative professional assessment of additional uncertainties in the critical study. The default value for the MF is 1.

** IRIS = Integrated Risk Information System.

*** adjusted from vanadium pentoxide based on Molecular weights.

^ Soluble salt of uranium

TABLE 6.1
CANCER TOXICITY DATA -- ORAL
HOMESTAKE MINING COMPANY

Radionuclide/Chemical of Potential Concern (1)	Oral Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	1.50E+00	(mg/kg-day) ⁻¹	A	IRIS	4/10/1998
Radium-226 +D	7.30E-10	risk/pCi	A	HEAST	4/16/2001
Radium-228 +D	2.29E-09	risk/pCi	A	HEAST	4/16/2001
Thorium-230	2.02E-10	risk/pCi	A	HEAST	4/16/2001
Uranium-234	1.58E-10	risk/pCi	A	HEAST	4/16/2001
Uranium-238 +D	2.10E-10	risk/pCi	A	HEAST	4/16/2001

(1) Risk from decay products (+D) included as appropriate.

HEAST = Health Effects Assessment Summary Tables: Table 4. Annual Update, 11/01/1995. Environmental Criteria and Assessment Office,
Office of Research and Development, Cincinnati, OH. Updated as of April 16, 2001

CSF = Cancer Slope Factor

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
Homestake Mining Company

Radionuclide of Potential Concern	Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Lead-210	2.77E-09	risk/pCi	A	HEAST	
Radium-226 +D	1.16E-08	risk/pCi	A	HEAST	
Radium-228 +D	5.23E-09	risk/pCi	A	HEAST	
Thorium-230	2.85E-08	risk/pCi	A	HEAST	
Uranium-234	1.14E-08	risk/pCi	A	HEAST	
Uranium-238 +D	9.35E-09	risk/pCi	A	HEAST	

(1) Risk from decay products (+D) included as appropriate.

HEAST= Health Effects Assessment Summary Tables

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
HOMESTAKE MINING COMPANY

Radionuclide/Chemical of Potential Concern (1)	Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk /Inhalation CSF	
	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Arsenic	4.30E-03	per $\mu\text{g}/\text{m}^3$	A	IRIS	4/10/1998
Radon gas	1.80E-11	risk/pCi	A	HEAST	4/16/2001
Radon-222 (Rn-222 +D)	1.80E-11	risk/pCi	A	HEAST	4/16/2001
Thoron (Rn-220) ²	-	risk/pCi	A	HEAST	4/16/2001
Uranium- 238 +D	9.35E-09	risk/pCi	A	HEAST	4/16/2001
Thorium-230	2.85E-08	risk/pCi	A	HEAST	4/16/2001
Radium-226+D	1.16E-08	risk/pCi	A	HEAST	4/16/2001

(1) Risk from decay products (+D) included as appropriate.

² Thoron gas an isotope of Radon gas (Rn-220)

HEAST = Health Effects Assessment Summary Tables: able 4. Annual Update, 11/01/1995. Environmental Criteria and Assessment Office,
Office of Research and Development, Cincinnati, OH. Updated as of April 16, 2001

CSF = Cancer Slope Factor

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.3
CANCER TOXICITY DATA -- FOOD INGESTION
HOMESTAKE MINING COMPANY

Radionuclide of Potential Concern (1)	Oral Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Source(s)	Date(s) (MM/DD/YY)
Radium-226 +D	5.15E-10	risk/pCi	A	HEAST	04/16/01
Radium-228 +D	1.43E-09	risk/pCi	A	HEAST	04/16/01
Thorium-230	1.19E-10	risk/pCi	A	HEAST	04/16/01
Uranium-234	9.55E-11	risk/pCi	A	HEAST	04/16/01
Uranium-238 +D	1.21E-10	risk/pCi	A	HEAST	04/16/01

(1) Risk from decay products (+D) included as appropriate.

HEAST = Health Effects Assessment Summary Tables: Table 4. Annual Update, 11/01/1995. Environmental Criteria and Assessment Office,
Office of Research and Development, Cincinnati, OH. Updated as of April 16, 2001

CSF = Cancer Slope Factor

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.4
CANCER TOXICITY DATA -- AIR SUBMERSION EXTERNAL EXPOSURE(RADIATION)
HOMESTAKE MINING COMPANY

Radionuclide of Potential Concern (1)	Cancer Slope Factor		Source(s)	Date(s) (MM/DD/YYYY)
	Value	Units		
Radon gas	7.85E-09	risk/yr per pCi/m ³	HEAST	
Radon-222 (Rn-222 +D)	7.85E-09	risk/yr per pCi/m ³	HEAST	4/16/2001
Thoron (Rn-220) ²	1.61E-12	risk/yr per pCi/m ³	HEAST	4/16/2001
Uranium- 238 +D	1.22E-10	risk/yr per pCi/m ³	HEAST	4/16/2001
Thorium-230	1.31E-12	risk/yr per pCi/m ³	HEAST	4/16/2001
Radium-226+D	7.87E-09	risk/yr per pCi/m ³	HEAST	4/16/2001

(1) Risk from decay products (+D) included as appropriate.

² Thoron gas an isotope of Radon gas (Rn-220)

HEAST = Health Effects Assessment Summary Tables: able 4. Annual Update, 11/01/1995. Environmental Criteria and Assessment Office,
Office of Research and Development, Cincinnati, OH. Updated as of April 16, 2001

CSF = Cancer Slope Factor

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.4
CANCER TOXICITY DATA -- EXTERNAL (RADIATION)
Site Name

Radionuclide of Potential Concern	Cancer Slope Factor		Source(s)	Date(s) (MM/DD/YYYY)
	Value	Units		
Lead-210	1.4E-09	risk/yr per pCi/g	HEAST	
Radium-226 +D	8.5E-06	risk/yr per pCi/g	HEAST	
Radium-228 +D	1.2E-05	risk/yr per pCi/g	HEAST	
Thorium-230	8.2E-10	risk/yr per pCi/g	HEAST	
Uranium-234	2.5E-10	risk/yr per pCi/g	HEAST	
Uranium-238 +D	1.1E-07	risk/yr per pCi/g	HEAST	

(1) Risk from decay products (+D) included as appropriate.

HEAST= Health Effects Assessment Summary Tables

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

TABLE 6.5
CANCER TOXICITY DATA -- EXTERNAL EXPOSURE(RADIATION)
HOMESTAKE MINING COMPANY

Radionuclide of Potential Concern (1)	Cancer Slope Factor		Source(s)	Date(s) (MM/DD/YYYY)
	Value	Units		
Radon gas	8.48E-06	risk/yr per pCi/g	HEAST	
Radon-222 (Rn-222 +D)	8.48E-06	risk/yr per pCi/g	HEAST	4/16/2001
Thoron (Rn-220) ²	1.71E-09	risk/yr per pCi/g	HEAST	4/16/2001
Uranium- 238 +D	1.14E-07	risk/yr per pCi/g	HEAST	4/16/2001
Thorium-230	8.19E-10	risk/yr per pCi/g	HEAST	4/16/2001
Radium-226+D	8.49E-06	risk/yr per pCi/g	HEAST	4/16/2001

(1) Risk from decay products (+D) included as appropriate.

² Thoron gas an isotope of Radon gas (Rn-220)

HEAST = Health Effects Assessment Summary Tables: able 4. Annual Update, 11/01/1995. Environmental Criteria and Assessment Office,
Office of Research and Development, Cincinnati, OH. Updated as of April 16, 2001

CSF = Cancer Slope Factor

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

Weight of Evidence:

Known/Likely

Cannot be Determined

Not Likely

Table 7.1.8 RME
Calculations of Chemical Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk
						Value	Units	Value	Units	
Background	Soil	Ingestion	Arsenic	5.01E+00	mg/Kg	7.82E-06	mg/Kg-day	1.50E+00	(mg/kg-day) ⁻¹	1.17E-05
			Lead	1.19E+01	mg/Kg					
			Molybdenum	4.50E-01	mg/Kg	7.03E-07	mg/Kg-day			
			Selenium	8.00E-01	mg/Kg	1.25E-06	mg/Kg-day			
			Vanadium	2.99E+01	mg/Kg	4.66E-05	mg/Kg-day			
			Uranium, Total	1.42E+00	mg/Kg	2.22E-06	mg/Kg-day			
		Exp. Route Total								1.2E-05
	Soil	Inhalation of Particulates	Arsenic	5.01E+00	mg/Kg	1.51E-06	µg/m ³	4.30E-03	(µg/m ³) ⁻¹	6.51E-09
			Lead	1.19E+01	mg/Kg					
			Molybdenum	4.50E-01	mg/Kg	1.36E-07	µg/m ³			
			Selenium	8.00E-01	mg/Kg	2.42E-07	µg/m ³			
			Vanadium	2.99E+01	mg/Kg	9.03E-06	µg/m ³			
			Uranium, Total	1.42E+00	mg/Kg	4.29E-07	µg/m ³			
		Exp. Route Total								6.5E-09
	Soil	Dermal Contact	Arsenic	5.01E+00	mg/Kg	7.43E-07	mg/Kg-day	1.50E+00	(mg/kg-day) ⁻¹	1.11E-06
			Lead	1.19E+01	mg/Kg					
			Molybdenum	4.50E-01	mg/Kg					
			Selenium	8.00E-01	mg/Kg					
			Vanadium	2.99E+01	mg/Kg					
			Uranium, Total	1.42E+00	mg/Kg					
		Exp. Route Total								1.1E-06
Exposure Total										1.3E-05
Total of Receptor Risks Across All Soil Exposue Routes										1.3E-05

Table 7.1.1 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivisions	Soil	Ingestion	Radium-226 +D	2.50E+00	pCi/g	3.13E+03	pCi	7.30E-10	risk/pCi	2.28E-06	
			Radium-228 +D	1.00E+00	pCi/g	3.39E+02	pCi	2.29E-09	risk/pCi	7.77E-07	
			Thorium 230	1.60E+00	pCi/g	2.02E+03	pCi	2.02E-10	risk/pCi	4.07E-07	
			Uranium-234	1.50E+00	pCi/g	1.89E+03	pCi	1.58E-10	risk/pCi	2.99E-07	
			Uranium-238 +D	1.60E+00	pCi/g	2.02E+03	pCi	2.10E-10	risk/pCi	4.23E-07	
		Exp. Route Total									4.2E-06
		External	Radium-226 +D	2.50E+00	pCi/g	2.23E+01	(pCi-yr)/g	8.49E-06	risk/yr per pCi/g	1.89E-04	
			Radium-228 +D	1.00E+00	pCi/g	2.41E+00	(pCi-yr)/g	1.23E-05	risk/yr per pCi/g	2.97E-05	
			Thorium 230	1.60E+00	pCi/g	1.43E+01	(pCi-yr)/g	8.19E-10	risk/yr per pCi/g	1.17E-08	
			Uranium-234	1.50E+00	pCi/g	1.49E+01	(pCi-yr)/g	2.52E-10	risk/yr per pCi/g	3.76E-09	
			Uranium-238 +D	1.60E+00	pCi/g	1.43E+01	(pCi-yr)/g	1.14E-07	risk/yr per pCi/g	1.63E-06	
		Exp. Route Total									2.2E-04
	Soil	Inhalation of Particulates	Radium-226 +D	2.50E+00	pCi/g	1.20E-01	pCi	1.16E-08	risk/pCi	1.39E-09	
			Radium-228 +D	1.00E+00	pCi/g	1.29E-02	pCi	5.23E-09	risk/pCi	6.77E-11	
			Thorium 230	1.60E+00	pCi/g	7.70E-02	pCi	2.85E-08	risk/pCi	2.19E-09	
			Uranium-234	1.50E+00	pCi/g	7.22E-02	pCi	1.14E-08	risk/pCi	8.23E-10	
			Uranium-238 +D	1.60E+00	pCi/g	7.70E-02	pCi	9.35E-09	risk/pCi	7.20E-10	
		Exp. Route Total									5.2E-09
	Soil	Ingestion of Produce	Radium-226 +D	2.50E+00	pCi/g	1.98E+04	pCi	5.15E-10	risk/pCi	1.02E-05	
			Radium-228 +D	1.00E+00	pCi/g	2.14E+03	pCi	1.43E-09	risk/pCi	3.07E-06	
			Thorium 230	1.60E+00	pCi/g	3.06E+02	pCi	1.19E-10	risk/pCi	3.64E-08	
			Uranium-234	1.50E+00	pCi/g	7.47E+02	pCi	9.55E-11	risk/pCi	7.13E-08	
			Uranium-238 +D	1.60E+00	pCi/g	7.64E+02	pCi	1.21E-10	risk/pCi	9.25E-08	
		Exp. Route Total									1.3E-05
Exposure Total										2.4E-04	
Total of Receptor Risks Across All Soil Exposue Routes										2.4E-04	

Table 7.1.2 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations							
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk			
						Value	Units	Value	Units				
Five Subdivision	Air	Inhalation Air									4.8E-03		
			Radon gas	1.4E+00	pCi/l	2.7E+08	pCi	1.80E-11	Risk/pCi				
			Radon-222 (Rn-222)	4.9E-01	pCi/l	9.3E+07	pCi	1.80E-11	Risk/pCi	1.7E-03			
			Thoron (Rn-220) ¹	8.7E-01	pCi/l	1.6E+08	pCi	0.00E+00	Risk/pCi	0.0E+00			
			Uranium- nat	2.42E-03	pCi/m ³	4.6E+02	pCi	9.35E-09	Risk/pCi	4.3E-06			
			Thorium-230	1.14E-04	pCi/m ³	2.2E+01	pCi	2.85E-08	Risk/pCi	6.1E-07			
			Radium-226	1.23E-04	pCi/m ³	2.3E+01	pCi	1.16E-08	Risk/pCi	2.7E-07			
			Exp. Route Total									1.7E-03	3.2E-04
		Submersion	Radon gas	1.4E+00	pCi/l	4.0E+04	yr-pCi/m ³	7.85E-09	risk/yr per pCi/m ³				
			Radon-222 (Rn-222)	4.9E-01	pCi/l	1.4E+04	yr-pCi/m ³	7.85E-09	risk/yr per pCi/m ³	1.1E-04			
			Thoron (Rn-220) ¹	8.7E-01	pCi/l	2.5E+04	yr-pCi/m ³	1.61E-12	risk/yr per pCi/m ³	4.0E-08			
			Uranium- nat	2.42E-03	pCi/m ³	7.0E-02	yr-pCi/m ³	1.22E-10	risk/yr per pCi/m ³	8.5E-12			
			Thorium-230	1.14E-04	pCi/m ³	3.3E-03	yr-pCi/m ³	1.31E-12	risk/yr per pCi/m ³	4.3E-15			
			Radium-226	1.23E-04	pCi/m ³	3.5E-03	yr-pCi/m ³	7.87E-09	risk/yr per pCi/m ³	2.8E-11			
	Exp. Route Total									1.1E-04			
Exposure Point Total										1.8E-03			

Table 7.1.3 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations						
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk		
						Value	Units	Value	Units			
Background	Soil	Ingestion	Radium-226 +D	1.80E+00	pCi/g	2.25E+03	pCi	7.30E-10	risk/pCi	1.64E-06		
			Radium-228 +D	1.10E+00	pCi/g	3.73E+02	pCi	2.29E-09	risk/pCi	8.54E-07		
			Thorium 230	1.40E+00	pCi/g	1.76E+03	pCi	2.02E-10	risk/pCi	3.56E-07		
			Uranium-234	1.10E+00	pCi/g	1.39E+03	pCi	1.58E-10	risk/pCi	2.19E-07		
			Uranium-238 +D	1.20E+00	pCi/g	1.51E+03	pCi	2.10E-10	risk/pCi	3.18E-07		
		Exp. Route Total										3.4E-06
		External	Radium-226 +D	1.80E+00	pCi/g	1.60E+01	(pCi+yr)/g	8.49E-06	risk/yr per pCi/g	1.36E-04		
			Radium-228 +D	1.10E+00	pCi/g	2.65E+00	(pCi+yr)/g	1.23E-05	risk/yr per pCi/g	3.26E-05		
			Thorium 230	1.40E+00	pCi/g	1.25E+01	(pCi+yr)/g	8.19E-10	risk/yr per pCi/g	1.03E-08		
			Uranium-234	1.10E+00	pCi/g	1.09E+01	(pCi+yr)/g	2.52E-10	risk/yr per pCi/g	2.76E-09		
			Uranium-238 +D	1.20E+00	pCi/g	1.08E+01	(pCi+yr)/g	1.14E-07	risk/yr per pCi/g	1.23E-06		
		Exp. Route Total										1.7E-04
	Soil	Inhalation of Particulates	Radium-226 +D	1.80E+00	pCi/g	8.60E-02	pCi	1.16E-08	risk/pCi	9.98E-10		
			Radium-228 +D	1.10E+00	pCi/g	1.42E-02	pCi	5.23E-09	risk/pCi	7.45E-11		
			Thorium 230	1.40E+00	pCi/g	6.73E-02	pCi	2.85E-08	risk/pCi	1.92E-09		
			Uranium-234	1.10E+00	pCi/g	5.29E-02	pCi	1.14E-08	risk/pCi	6.03E-10		
			Uranium-238 +D	1.20E+00	pCi/g	5.77E-02	pCi	9.35E-09	risk/pCi	5.40E-10		
		Exp. Route Total										4.1E-09
	Soil	Ingestion of Produce	Radium-226 +D	1.80E+00	pCi/g	1.42E+04	pCi	5.15E-10	risk/pCi	7.34E-06		
			Radium-228 +D	1.10E+00	pCi/g	2.36E+03	pCi	1.43E-09	risk/pCi	3.37E-06		
			Thorium 230	1.40E+00	pCi/g	2.67E+02	pCi	1.19E-10	risk/pCi	3.18E-08		
			Uranium-234	1.10E+00	pCi/g	5.48E+02	pCi	9.55E-11	risk/pCi	5.23E-08		
			Uranium-238 +D	1.20E+00	pCi/g	5.73E+02	pCi	1.21E-10	risk/pCi	6.93E-08		
		Exp. Route Total										1.1E-05
Exposure Total											1.8E-04	
Total of Receptor Risks Across All Soil Exposue Routes											1.8E-04	

Table 7.1.4 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Background	Air	Inhalation Air	Radon gas	5.1E-01	pCi/l	9.6E+07	pCi	1.80E-11	Risk/pCi	1.7E-03	
			Radon-222 (Rn-222)	3.7E-01	pCi/l	7.0E+07	pCi	1.80E-11	Risk/pCi		1.3E-03
			Thoron (Rn-220) ¹	1.4E-01	pCi/l	2.7E+07	pCi	0.00E+00	Risk/pCi		0.0E+00
		Exp. Route Total							1.3E-03	1.2E-04	
		Submersion	Radon gas	5.1E-01	pCi/l	1.5E+04	yr-pCi/m ³	7.85E-09	risk/yr per pCi/m ³		8.4E-05
			Radon-222 (Rn-222)	3.7E-01	pCi/l	1.1E+04	yr-pCi/m ³	7.85E-09	risk/yr per pCi/m ³		
			Thoron (Rn-220) ¹	1.4E-01	pCi/l	4.0E+03	yr-pCi/m ³	1.61E-12	risk/yr per pCi/m ³		
		Exp. Route Total							8.4E-05		
		Exposure Point Total									1.3E-03

Table 7.1.5 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivision	Water	Ingestion	Radium-226+D	3.2E-01	pCi/l	6.1E+03	pCi	3.86E-10	Risk/pCi	2.33E-06	
			Radium-228+D	1.1E+01	pCi/l	2.1E+05	pCi	1.04E-09	Risk/pCi	2.2E-04	
			Thorium-230	6.0E-02	pCi/l	1.1E+03	pCi	9.10E-11	Risk/pCi	1.0E-07	
			Uranium-234	2.0E+01	pCi/l	3.8E+05	pCi	7.07E-11	Risk/pCi	2.7E-05	
			Uranium-235	7.6E-01	pCi/l	1.4E+04	pCi	6.96E-11	Risk/pCi	1.0E-06	
			Uranium-238+D	1.3E+01	pCi/l	2.5E+05	pCi	8.71E-11	Risk/pCi	2.1E-05	
		Exp. Route Total						2.7E-04			
		Inhalation	Radium-226+D	3.2E-01	pCi/l	3.0E+04	pCi	1.16E-08	Risk/pCi	3.5E-04	
			Radon 222+D	9.5E+02	pCi/l	9.0E+07	pCi	1.80E-11	Risk/pCi	1.6E-03	
		Exp. Route Total						2.0E-03			
Exposure Point Total						2.2E-03					

Table 7.1.6 RME
Calculations of Chemical Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivisions	Soil	Ingestion	Arsenic	4.80E+00	mg/Kg	7.51E-06	mg/Kg-day	1.50E+00	(mg/kg-day) ⁻¹	1.13E-05	
			Lead	1.50E+01	mg/Kg						
			Molybdenum	7.80E-01	mg/Kg	1.22E-06	mg/Kg-day				
			Selenium	0,71	mg/Kg	1.11E+00	mg/Kg-day				
			Vanadium	2.60E+01	mg/Kg	4.07E-05	mg/Kg-day				
			Uranium, Total	3.30E+00	mg/Kg	5.17E-05	mg/Kg-day				
		Exp. Route Total									1.1E-05
	Soil	Inhalation of Particulates	Arsenic	4.80E+00	mg/Kg	1.45E-06	µg/m ³	4.30E-03	(µg/m ³) ⁻¹	6.24E-09	
			Lead	1.50E+01	mg/Kg						
			Molybdenum	7.80E-01	mg/Kg	2.36E-07	µg/m ³				
			Selenium	0,71	mg/Kg	2.15E-07	µg/m ³				
			Vanadium	2.60E+01	mg/Kg	7.86E-06	µg/m ³				
			Uranium, Total	3.30E+00	mg/Kg	9.98E-06	µg/m ³				
		Exp. Route Total									6.2E-09
	Soil	Dermal Contact	Arsenic	4.80E+00	mg/Kg	7.12E-07	mg/Kg-day	1.50E+00	(mg/kg-day) ⁻¹	1.07E-06	
			Lead	1.50E+01	mg/Kg						
			Molybdenum	7.80E-01	mg/Kg						
			Selenium	0,71	mg/Kg						
			Vanadium	2.60E+01	mg/Kg						
			Uranium, Total	3.30E+00	mg/Kg						
		Exp. Route Total									1.1E-06
Exposure Total										1.2E-05	
Total of Receptor Risks Across All Soil Exposue Routes										1.2E-05	

Table 7.1.7 RME
Calculations of Chemical Non-Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Risk Calculations				
				Value	Units	Intake/Exposure Concentration		RfD/RfC		HQ
						Value	Units	Value	Units	
Five Subdivisions	Soil	Ingestion	Arsenic	4.80E+00	mg/Kg	1.75E-05	mg/Kg-day	3.00E-04	(mg/kg-day)	5.84E-02
			Lead	1.50E+01	mg/Kg					
			Molybdenum	7.80E-01	mg/Kg	2.85E-06	mg/Kg-day	5.00E-03	(mg/kg-day)	5.70E-04
			Selenium	0,71	mg/Kg	2.59E-06	mg/Kg-day	5.00E-03	(mg/kg-day)	5.19E-04
			Vanadium	2.60E+01	mg/Kg	9.50E-05	mg/Kg-day	5.04E-03	(mg/kg-day)	1.88E-02
			Uranium, Total	3.30E+00	mg/Kg	1.21E-05	mg/Kg-day	3.0E-03	(mg/kg-day)	4.02E-03
		Exp. Route Total								
	Soil	Inhalation of Particulates	Arsenic	4.80E+00	mg/Kg	3.39E-09	mg/m ³	1.50E-05	(mg/m ³)	2.26E-04
			Lead	1.50E+01	mg/Kg					
			Molybdenum	7.80E-01	mg/Kg	5.50E-10	mg/m ³			
			Selenium	0,71	mg/Kg	5.01E-10	mg/m ³	2.00E-02	(mg/m ³)	2.50E-08
			Vanadium	2.60E+01	mg/Kg	1.83E-08	mg/m ³			
			Uranium, Total	3.30E+00	mg/Kg	2.33E-08	mg/m ³			
		Exp. Route Total								
	Soil	Dermal Contact	Arsenic	4.80E+00	mg/Kg	1.66E-06	mg/Kg-day	3.00E-04	(mg/kg-day)	5.54E-03
			Lead	1.50E+01	mg/Kg	–		–		–
			Molybdenum	7.80E-01	mg/Kg	2.70E-07	mg/Kg-day	5.00E-03	(mg/kg-day)	5.40E-05
			Selenium	0,71	mg/Kg	2.46E-07	mg/Kg-day	5.00E-03	(mg/kg-day)	4.92E-05
			Vanadium	2.60E+01	mg/Kg	9.00E-06	mg/Kg-day	5.04E-03	(mg/kg-day)	1.79E-03
			Uranium, Total	3.30E+00	mg/Kg	1.14E-06	mg/Kg-day	3.0E-03	(mg/kg-day)	3.81E-04
		Exp. Route Total								
Exposure Total					Hazard Index (HI)					9.0E-02
Total of Receptor Non-Cancer Risks Across All Soil Exposue Routes										9.0E-02

Table 7.1.9 RME
Calculations of Chemical Non-Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Risk Calculations				
				Value	Units	Intake/Exposure Concentration		RfD/RfC		HQ
						Value	Units	Value	Units	
Background	Soil	Ingestion	Arsenic	5.01E+00	mg/Kg	1.83E-05	mg/Kg-day	3.00E-04	(mg/kg-day)	6.09E-02
			Lead	1.19E+01	mg/Kg					
			Molybdenum	4.50E-01	mg/Kg	1.64E-06	mg/Kg-day	5.00E-03	(mg/kg-day)	3.28E-04
			Selenium	8.00E-01	mg/Kg	2.92E-06	mg/Kg-day	5.00E-03	(mg/kg-day)	5.83E-04
			Vanadium	2.99E+01	mg/Kg	1.10E-04	mg/Kg-day	5.04E-03	(mg/kg-day)	2.16E-02
			Uranium, Total	1.42E+00	mg/Kg	5.20E-06	mg/Kg-day	3.0E-03	(mg/kg-day)	1.72E-03
		Exp. Route Total								
	Soil	Inhalation of Particulates	Arsenic	5.01E+00	mg/Kg	3.53E-09	mg/m ³	1.50E-05	(mg/m ³)	2.35E-04
			Lead	1.19E+01	mg/Kg					
			Molybdenum	4.50E-01	mg/Kg	3.20E-10	mg/m ³			
			Selenium	8.00E-01	mg/Kg	5.64E-10	mg/m ³	2.00E-02	(mg/m ³)	2.82E-08
			Vanadium	2.99E+01	mg/Kg	2.11E-08	mg/m ³			
			Uranium, Total	1.42E+00	mg/Kg	1.00E-09	mg/m ³			
		Exp. Route Total								
	Soil	Dermal Contact	Arsenic	5.01E+00	mg/Kg	1.73E-06	mg/Kg-day	3.00E-04	(mg/kg-day)	5.78E-03
			Lead	1.19E+01	mg/Kg	–		–		–
			Molybdenum	4.50E-01	mg/Kg	1.56E-07	mg/Kg-day	5.00E-03	(mg/kg-day)	3.12E-05
			Selenium	8.00E-01	mg/Kg	2.77E-07	mg/Kg-day	5.00E-03	(mg/kg-day)	5.54E-05
			Vanadium	2.99E+01	mg/Kg	1.00E-05	mg/Kg-day	5.04E-03	(mg/kg-day)	2.05E-03
			Uranium, Total	1.42E+00	mg/Kg	4.92E-07	mg/Kg-day	3.00E-03	(mg/kg-day)	1.64E-04
		Exp. Route Total								
Exposure Total						Hazard Index (HI)				9.3E-02
Total of Receptor Non-Cancer Risks Across All Soil Exposue Routes										9.3E-02

Table 7.2.1 RME
Calculations of Chemical Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Ault/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivision	Water	Ingestion	Arsenic	5.3E+00	µg/l	7.9E-05	mg/Kg-day	1.50E+00	(mg/Kg-day) ⁻¹	1.18E-04	
		Exp. Route Total									1.2E-04
		Dermal	Arsenic	5.3E+00	µg/l	4.2E-07	mg/Kg-day	1.50E+00	(mg/Kg-day) ⁻¹	6.4E-07	
		Exp. Route Total									6.4E-07
		Exposure Point Total									1.2E-04

Table 7.2.2 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Agriculture/Farmer
Receptor Age: Adult/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivisions	Soil	Ingestion	Radium-226 +C	2.50E+00	pCi/g	3.99E+03	pCi	7.30E-10	risk/pCi	2.91E-06	
			Radium-228 +C	1.00E+00	pCi/g	3.31E+02	pCi	2.29E-09	risk/pCi	7.59E-07	
			Thorium 230	1.60E+00	pCi/g	2.58E+03	pCi	2.02E-10	risk/pCi	5.20E-07	
			Uranium-234	1.50E+00	pCi/g	2.41E+03	pCi	1.58E-10	risk/pCi	3.82E-07	
			Uranium-238 +C	1.60E+00	pCi/g	2.58E+03	pCi	2.10E-10	risk/pCi	5.41E-07	
		Exp. Route Total							5.1E-06		
		External	Radium-226 +C	2.50E+00	pCi/g	2.96E+01	(pCi-yr)/g	8.49E-06	risk/yr per pCi/g	2.51E-04	
			Radium-228 +C	1.00E+00	pCi/g	2.46E+00	(pCi-yr)/g	1.23E-05	risk/yr per pCi/g	3.02E-05	
			Thorium 230	1.60E+00	pCi/g	1.91E+01	(pCi-yr)/g	8.19E-10	risk/yr per pCi/g	1.57E-08	
			Uranium-234	1.50E+00	pCi/g	1.79E+01	(pCi-yr)/g	2.52E-10	risk/yr per pCi/g	4.52E-09	
			Uranium-238 +C	1.60E+00	pCi/g	1.91E+01	(pCi-yr)/g	1.14E-07	risk/yr per pCi/g	2.18E-06	
		Exp. Route Total							2.8E-04		
	Soil	Inhalation of Particulates	Radium-226 +C	2.50E+00	pCi/g	1.63E-01	pCi	1.16E-08	risk/pCi	1.90E-09	
			Radium-228 +C	1.00E+00	pCi/g	1.36E-02	pCi	5.23E-09	risk/pCi	7.09E-11	
			Thorium 230	1.60E+00	pCi/g	1.05E-01	pCi	2.85E-08	risk/pCi	3.01E-09	
			Uranium-234	1.50E+00	pCi/g	9.89E-02	pCi	1.14E-08	risk/pCi	1.13E-09	
			Uranium-238 +C	1.60E+00	pCi/g	1.05E-01	pCi	9.35E-09	risk/pCi	9.86E-10	
		Exp. Route Total							7.1E-09		
		Soil	Ingestion of Produce	Radium-226 +C	2.50E+00	pCi/g	1.10E+05	pCi	5.15E-10	risk/pCi	5.65E-05
				Radium-228 +C	1.00E+00	pCi/g	9.10E+03	pCi	1.43E-09	risk/pCi	1.30E-05
				Thorium 230	1.60E+00	pCi/g	1.77E+03	pCi	1.19E-10	risk/pCi	2.11E-07
				Uranium-234	1.50E+00	pCi/g	4.15E+03	pCi	9.55E-11	risk/pCi	3.96E-07
				Uranium-238 +C	1.60E+00	pCi/g	4.42E+03	pCi	1.21E-10	risk/pCi	5.35E-07
		Exp. Route Total							7.1E-05		
Exposure Total									3.6E-04		
Total of Receptor Risks Across All Soil Exposure Routes									3.6E-04		

Table 7.2.2 RME (Contd.)
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Agriculture/Farmer
Receptor Age: Adult/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Cancer	EPC		Cancer Risk Calculations					
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	
						Value	Units	Value	Units		
Five Subdivisions	Soil	Ingestion of Beef	Radium-226 +C	2.50E+00	pCi/g	7.72E+04	pCi	5.15E-10	risk/pCi	3.98E-05	
			Radium-228 +C	1.00E+00	pCi/g	6.41E+03	pCi	1.43E-09	risk/pCi	9.17E-06	
			Thorium 230	1.60E+00	pCi/g	8.43E+02	pCi	1.19E-10	risk/pCi	1.00E-07	
			Uranium-234	1.50E+00	pCi/g	9.42E+04	pCi	9.55E-11	risk/pCi	8.99E-06	
			Uranium-238 +C	1.60E+00	pCi/g	1.00E+05	pCi	1.21E-10	risk/pCi	1.22E-05	
			Exp. Route Total							7.0E-05	
		Ingestion of Milk	Radium-226 +C	2.50E+00	pCi/g	6.26E+05	pCi	5.15E-10	risk/pCi	3.22E-04	
			Radium-228 +C	1.00E+00	pCi/g	5.20E+04	pCi	1.43E-09	risk/pCi	7.43E-05	
			Thorium 230	1.60E+00	pCi/g	3.29E+02	pCi	1.19E-10	risk/pCi	3.91E-08	
			Uranium-234	1.50E+00	pCi/g	1.36E+06	pCi	9.55E-11	risk/pCi	1.30E-04	
			Uranium-238	1.60E+00	pCi/g	1.45E+06	pCi	1.21E-10	risk/pCi	1.26E-04	
			Exp. Route Total							6.5E-04	
	Soil	Ingestion of Poultry	Radium-226 +C	2.50E+00	pCi/g	-	pCi	5.15E-10	risk/pCi	-	
			Radium-228 +C	1.00E+00	pCi/g	-	pCi	1.43E-09	risk/pCi	-	
			Thorium 230	1.60E+00	pCi/g	-	pCi	1.19E-10	risk/pCi	-	
			Uranium-234	1.50E+00	pCi/g	4.21E+04	pCi	9.55E-11	risk/pCi	4.02E-06	
			Uranium-238 +C	1.60E+00	pCi/g	4.49E+04	pCi	1.21E-10	risk/pCi	5.43E-06	
			Exp. Route Total							9.5E-06	
		Ingestion of eggs	Radium-226 +C	2.50E+00	pCi/g	-	pCi	5.15E-10	risk/pCi	-	
			Radium-228 +C	1.00E+00	pCi/g	-	pCi	1.43E-09	risk/pCi	-	
			Thorium 230	1.60E+00	pCi/g	-	pCi	1.19E-10	risk/pCi	-	
			Uranium-234	1.50E+00	pCi/g	1.76E+04	pCi	9.55E-11	risk/pCi	1.68E-06	
			Uranium-238 +C	1.60E+00	pCi/g	1.87E+04	pCi	1.21E-10	risk/pCi	2.27E-06	
			Exp. Route Total							4.0E-06	
Exposure Total						7.4E-04					
Total of Receptor Risks Across All Soil Exposure Routes						1.1E-03					

Table 7.2.3 RME
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Agriculture/Farmer
Receptor Age: Adult/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Concern	EPC		Cancer Risk Calculations						Cancer Risk	
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Units			
						Value	Units	Value	Units				
Background	Soil	Ingestion	Radium-226 +D	1.80E+00	pCi/g	2.87E+03	pCi	7.30E-10	risk/pCi	2.10E-06			
			Radium-228 +D	1.10E+00	pCi/g	3.64E+02	pCi	2.29E-09	risk/pCi	8.34E-07			
			Thorium 230	1.40E+00	pCi/g	2.25E+03	pCi	2.02E-10	risk/pCi	4.55E-07			
			Uranium-234	1.10E+00	pCi/g	1.77E+03	pCi	1.58E-10	risk/pCi	2.80E-07			
			Uranium-238 +C	1.20E+00	pCi/g	1.93E+03	pCi	2.10E-10	risk/pCi	4.06E-07			
		Exp. Route Total										4.1E-06	
		External	Radium-226 +D	1.80E+00	pCi/g	2.13E+01	(pCi-yr)/g	8.49E-06	risk/yr per pCi/g	1.81E-04			
			Radium-228 +D	1.10E+00	pCi/g	2.70E+00	(pCi-yr)/g	1.23E-05	risk/yr per pCi/g	3.33E-05			
			Thorium 230	1.40E+00	pCi/g	1.67E+01	(pCi-yr)/g	8.19E-10	risk/yr per pCi/g	1.37E-08			
			Uranium-234	1.10E+00	pCi/g	1.31E+01	(pCi-yr)/g	2.52E-10	risk/yr per pCi/g	3.31E-09			
			Uranium-238 +C	1.20E+00	pCi/g	1.43E+01	(pCi-yr)/g	1.14E-07	risk/yr per pCi/g	1.63E-06			
		Exp. Route Total										2.2E-04	
	Soil	Inhalation of Particulates	Radium-226 +D	1.80E+00	pCi/g	1.18E-01	pCi	1.16E-08	risk/pCi	1.36E-09			
			Radium-228 +D	1.10E+00	pCi/g	1.48E-02	pCi	5.23E-09	risk/pCi	7.80E-11			
			Thorium 230	1.40E+00	pCi/g	8.23E-02	pCi	2.85E-08	risk/pCi	2.63E-09			
			Uranium-234	1.10E+00	pCi/g	7.25E-02	pCi	1.14E-08	risk/pCi	8.27E-10			
			Uranium-238 +C	1.20E+00	pCi/g	7.91E-02	pCi	9.35E-09	risk/pCi	7.40E-10			
		Exp. Route Total										5.6E-09	
	Soil	Ingestion of Produce	Radium-226 +D	1.80E+00	pCi/g	7.88E+04	pCi	5.15E-10	risk/pCi	4.00E-05			
			Radium-228 +D	1.10E+00	pCi/g	1.00E+04	pCi	1.43E-09	risk/pCi	1.43E-05			
			Thorium 230	1.40E+00	pCi/g	1.20E+03	pCi	1.13E-10	risk/pCi	1.84E-07			
			Uranium-234	1.10E+00	pCi/g	3.04E+03	pCi	9.55E-11	risk/pCi	2.90E-07			
			Uranium-238 +C	1.20E+00	pCi/g	3.32E+03	pCi	1.21E-10	risk/pCi	4.01E-07			
		Exp. Route Total										5.6E-05	
Exposure Total											2.8E-04		
Total of Receptor Risks Across All Soil Exposure Routes											2.8E-04		

Table 7.2.3 RME (Contd.)
Calculations of Radiological Cancer Risk
Reasonable Maximum Exposure
Homestake Mining Company

Scenario Timeframe: Current/Future
Receptor Population: Agriculture/Farmer
Receptor Age: Adult/Child

Exposure Point	Exposure Medium	Exposure Route	Radionuclide of Potential Cancer	EPC		Cancer Risk Calculations						Cancer Risk	
				Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Units			
						Value	Units	Value	Units				
Background	Soil	Ingestion of Beef	Radium-226 +D	1.80E+00	pCi/g	5.56E+04	pCi	5.15E-10	risk/pCi	2.86E-05			
			Radium-228 +D	1.10E+00	pCi/g	7.05E+03	pCi	1.43E-09	risk/pCi	1.01E-05			
			Thorium 230	1.40E+00	pCi/g	7.38E+02	pCi	1.19E-10	risk/pCi	8.78E-05			
			Uranium-234	1.10E+00	pCi/g	6.91E+04	pCi	9.55E-11	risk/pCi	6.59E-05			
			Uranium-238 +C	1.20E+00	pCi/g	7.53E+04	pCi	1.21E-10	risk/pCi	9.12E-05			
		Exp. Route Total										1.4E-04	
		Ingestion of Milk	Radium-226 +D	1.80E+00	pCi/g	4.51E+05	pCi	5.15E-10	risk/pCi	2.32E-04			
			Radium-228 +D	1.10E+00	pCi/g	5.72E+04	pCi	1.43E-09	risk/pCi	8.18E-05			
			Thorium 230	1.40E+00	pCi/g	2.88E+02	pCi	1.19E-10	risk/pCi	3.42E-08			
			Uranium-234	1.10E+00	pCi/g	1.00E+06	pCi	9.55E-11	risk/pCi	9.55E-05			
			Uranium-238 +C	1.20E+00	pCi/g	1.09E+06	pCi	1.21E-10	risk/pCi	1.32E-04			
		Exp. Route Total										5.4E-04	
	Soil	Ingestion of Poultry	Radium-226 +D	1.80E+00	pCi/g	-	pCi	5.15E-10	risk/pCi	-			
			Radium-228 +D	1.10E+00	pCi/g	-	pCi	1.43E-09	risk/pCi	-			
			Thorium 230	1.40E+00	pCi/g	-	pCi	1.19E-10	risk/pCi	-			
			Uranium-234	1.10E+00	pCi/g	3.09E+04	pCi	9.55E-11	risk/pCi	2.90E-05			
			Uranium-238 +C	1.20E+00	pCi/g	3.37E+04	pCi	1.21E-10	risk/pCi	4.07E-05			
		Exp. Route Total										7.0E-05	
	Soil	Ingestion of Eggs	Radium-226 +D	1.80E+00	pCi/g	-	pCi	5.15E-10	risk/pCi	-			
			Radium-228 +D	1.10E+00	pCi/g	-	pCi	1.43E-09	risk/pCi	-			
			Thorium 230	1.40E+00	pCi/g	-	pCi	1.19E-10	risk/pCi	-			
			Uranium-234	1.10E+00	pCi/g	1.29E+04	pCi	9.55E-11	risk/pCi	1.23E-05			
			Uranium-238 +C	1.20E+00	pCi/g	1.41E+04	pCi	1.21E-10	risk/pCi	1.70E-05			
		Exp. Route Total										2.9E-05	
Exposure Total												6.9E-04	
Total of Receptor Risks Across All Soil Exposure Routes												9.7E-04	

TABLE 7.2.2 RME
CALCULATION OF CHEMICAL NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-Cancer Hazard Calculations						
					Value	Units	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient		
							Value	Units	Value	Units			
Water	Private Well Water	Five Subdivisions	Ingestion	Arsenic	5.29E+00	µg/l	1.8E-04	mg/Kg-day	3.0E-04	mg/Kg-day	6.1E-01		
				Lead	1.38E+01	µg/l			NA				
				Molybdenum	3.92E+00	µg/l	1.4E-04	mg/Kg-day	5.0E-03	mg/Kg-day	2.7E-02		
				Selenium	3.95E+01	µg/l	1.4E-03	mg/Kg-day	5.0E-03	mg/Kg-day	2.7E-01		
				Vanadium	ND	µg/l			5.0E-03	mg/Kg-day			
				Uranium, Total	1.33E+01	µg/l	4.6E-04	mg/Kg-day	3.0E-03	mg/Kg-day	1.5E-01		
			Exp. Route Total										1.1E+00
			Dermal	Arsenic	5.29E+00	µg/l	9.9E-07	mg/Kg-day	3.0E-04	mg/Kg-day	3.3E-03		
				Lead	1.38E+01	µg/l			NA				
				Molybdenum	3.92E+00	µg/l	7.3E-07	mg/Kg-day	5.0E-03	mg/Kg-day	1.5E-04		
				Selenium	3.95E+01	µg/l	7.4E-06	mg/Kg-day	5.0E-03	mg/Kg-day	1.5E-03		
				Vanadium	ND	µg/l			5.0E-03	mg/Kg-day			
				Uranium, Total	1.33E+01	µg/l	2.5E-06	mg/Kg-day	3.0E-03	mg/Kg-day	8.3E-04		
			Exp. Route Total										5.8E-03
		Exposure Point Total											1.1E+00
		Exposure Medium Total											1.1E+00

TABLE 8.1RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Point	Exposure Medium		Chemical	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Five Subdivisions	Soil		Arsenic	1.13E-05	6.24E-09	1.07E-06	1.24E-05	Skin	5.84E-02	2.26E-04	5.54E-03	6.42E-02	
			Molybdenum				Kidney	5.70E-04		–	5.70E-04		
			Selenium				Liver	5.19E-04	2.50E-08	–	5.19E-04		
			Vanadium				Skin/Hair	1.88E-02		–	1.88E-02		
	Uranium, Total				Kidney	4.02E-02		–	4.02E-02				
			Chemical Total				1.2E-05					1.24E-01	
	Exposure Medium Total					1.2E-05						1.24E-01	
Receptor Total												1.24E-01	
	Private Well ¹ Water		Arsenic	1.18E-04		6.4E-07	1.2E-04	Skin	6.1E-01		3.3E-03	6.2E-01	
			Molybdenum				Kidney	2.7E-02		1.5E-04	2.7E-02		
			Selenium				Liver	2.7E-01		1.5E-03	2.8E-01		
	Vanadium				Skin/Hair								
Uranium, Total				Kidney	1.5E-01		8.3E-04	1.5E-01					
	Exposure Medium Total						1.2E-04					1.1	
Exposure Point Total													1.1E+00
Receptor Total							1.2E-04	Receptor HI Total					1.2E+00

¹ All residents are connected to Milan municipal water. This is the additional risk if a resident in the future decides to dig a well and use it for domestic purposes

Total Organ 1 HI Across All Media	6.79E-01
Total Organ 2 HI Across All Media	2.23E-01

TABLE 8.2 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe:
Receptor Population:
Receptor Age:

Exposure Point	Exposure Medium	Radionuclide of Concern	Carcinogenic Risk							
			Ingestion	Inhalation of Particulates	Inhalation of Air (Outdoor/Indoor)	Submersion Air	Ingestion of Produce	External (Radiation)	Exposure Routes Total	
Five Subdivisions	Soil	Radium-226 +D	2.28E-06	1.39E-09			1.02E-05	1.89E-04	2.01E-04	
		Radium-228 +D	7.77E-07	6.77E-11			3.07E-06	2.97E-05	3.35E-05	
		Thorium 230	4.07E-07	2.19E-09			3.64E-08	1.17E-08	4.57E-07	
		Uranium-234	2.99E-07	8.23E-10			7.13E-08	3.76E-09	3.75E-07	
		Uranium-238 +D	4.23E-07	7.20E-10			9.25E-08	1.63E-06	2.15E-06	
		Radionuclide Total	4.2E-06	5.2E-09			1.3E-05	2.2E-04	2.4E-04	
	Exposure Medium Total									2.4E-04
	Outdoor Air	Radon-222 (Rn-222)			1.7E-03	1.1E-04			1.7E-03	
		Thoron (Rn-220) ¹			0.0E+00	4.0E-08			0.0E+00	
		Uranium- nat			4.3E-06	8.5E-12			4.3E-06	
		Thorium-230			6.1E-07	4.3E-15			6.1E-07	
		Radium-226			2.7E-07	2.8E-11			2.7E-07	
	Radionuclide Total				1.7E-03				1.7E-03	
	Exposure Medium Total									1.7E-03
Receptor Total									1.9E-03	
	Private Well ¹ Water	Radium-226+D	2.33E-06		3.5E-04				3.5E-04	
		Radium-228+D	2.2E-04						2.2E-04	
		Thorium-230	1.0E-07						1.0E-07	
		Uranium-234	2.7E-05						2.7E-05	
		Uranium-235	1.0E-06						1.0E-06	
		Uranium-238+D	2.1E-05						2.1E-05	
		Radon 222+D			1.6E-03				1.6E-03	
		Radionuclide Total	3E-04		2.0E-03				2.2E-03	
	Exposure Medium Total									2.2E-03
Receptor Total									4.2E-03	
Receptor Risk Total									4.2E-03	

¹ All residents are connected to Milan municipal water. This is the additional risk if a resident in the future decides to dig a well and use it for domestic purposes

TABLE 8.3 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Adult/Child

Exposure Point	Exposure Medium		Chemical	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Background	Soil		Arsenic	1.17E-05	6.51E-09	1.11E-06	1.28E-05	Skin	6.09E-02	2.35E-04	5.78E-03	6.69E-02
			Molybdenum				Kidney	3.28E-04		—	3.28E-04	
			Selenium				Liver	5.83E-04	2.82E-08	—	5.83E-04	
			Vanadium				Skin/Hair	2.16E-02		—	2.16E-02	
			Uranium, Total				Kidney	1.72E-03		—	1.72E-03	
		Chemical Total				1.3E-05					9.11E-02	
	Exposure Medium Total				1.3E-05					9.11E-02		
Exposure Point Total											9.1E-02	

Total Organ 1 HI Across All Media 8.85E-02
Total Organ 2 HI Across All Media 2.05E-03

TABLE 8.4 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURE
HOMESTAKE MINING COMPANY

Scenario Timeframe: Current/Future
Receptor Population: Residential
Receptor Age: Child/Adult

Exposure Point	Exposure Medium	Radionuclide of Concern	Carcinogenic Risk							
			Ingestion	Inhalation of Particulates	Inhalation of Air	Submersion Air	Ingestion of Produce	External (Radiation)	Exposure Routes Total	
Five Subdivisions	Soil	Radium-226 +D	1.64E-06	9.98E-10			1.02E-05	1.36E-04	1.48E-04	
		Radium-228 +D	8.54E-07	7.45E-11			3.07E-06	3.26E-05	3.65E-05	
		Thorium 230	3.56E-07	1.92E-09			3.64E-08	1.03E-08	4.05E-07	
		Uranium-234	2.19E-07	6.03E-10			7.13E-08	2.76E-09	2.94E-07	
		Uranium-238 +D	3.18E-07	5.40E-10			9.25E-08	1.23E-06	1.64E-06	
		Radionuclide Total	3.4E-06	4.1E-09			1.3E-05	1.7E-04	1.9E-04	
		Exposure Medium Total								1.9E-04
	Outdoor Air	Radon-222 (Rn-222)			1.3E-03	8.4E-05			1.3E-03	
		Thoron (Rn-220) ¹			0.0E+00	6.5E-09			6.5E-09	
	Radionuclide Total			1.3E-03				1.3E-03		
	Exposure Medium Total								1.3E-03	
Receptor Total									1.5E-03	

Scenario Timeframe:
 Receptor Population:
 Receptor Age:

¹ All residents are connected to Milan municipal water. This is the additional risk if a resident in the future decides to dig a well and use it for domestic purposes