

Summary : Zion Subsurface Soil 0.01 m² 120614

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Dose Conversion Factor (and Related) Parameter Summary

Dose Library: Subsurface Soil DCGL 120614 Plus FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ba-137m (Source: FGR 12)	3.606E+00	3.606E+00	DCF1(1)
A-1	Co-60 (Source: FGR 12)	1.622E+01	1.622E+01	DCF1(2)
A-1	Cs-134 (Source: FGR 12)	9.472E+00	9.472E+00	DCF1(3)
A-1	Cs-137 (Source: FGR 12)	7.510E-04	7.510E-04	DCF1(4)
A-1	Ni-63 (Source: FGR 12)	0.000E+00	0.000E+00	DCF1(5)
A-1	Sr-90 (Source: FGR 12)	7.043E-04	7.043E-04	DCF1(6)
A-1	Y-90 (Source: FGR 12)	2.391E-02	2.391E-02	DCF1(7)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Co-60	2.190E-04	2.190E-04	DCF2(1)
B-1	Cs-134	4.620E-05	4.620E-05	DCF2(2)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(3)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(4)
B-1	Sr-90+D	1.308E-03	1.300E-03	DCF2(5)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Co-60	2.690E-05	2.690E-05	DCF3(1)
D-1	Cs-134	7.330E-05	7.330E-05	DCF3(2)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(3)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(4)
D-1	Sr-90+D	1.528E-04	1.420E-04	DCF3(5)
D-34	Food transfer factors:			
D-34	Co-60 , plant/soil concentration ratio, dimensionless	1.500E-01	8.000E-02	RTF(1,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.800E-02	2.000E-02	RTF(1,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-34	Cs-134 , plant/soil concentration ratio, dimensionless	7.800E-02	4.000E-02	RTF(2,1)
D-34	Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	6.500E-02	3.000E-02	RTF(2,2)
D-34	Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.400E-02	8.000E-03	RTF(2,3)
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	7.800E-02	4.000E-02	RTF(3,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	6.500E-02	3.000E-02	RTF(3,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.400E-02	8.000E-03	RTF(3,3)
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	9.200E-02	5.000E-02	RTF(4,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(4,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.200E-02	2.000E-02	RTF(4,3)
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	5.900E-01	3.000E-01	RTF(5,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(5,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.700E-03	2.000E-03	RTF(5,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(1,2)
D-5	Cs-134 , fish	2.000E+03	2.000E+03	BIOFAC(2,1)
D-5	Cs-134 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(2,2)

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Dose Conversion Factor (and Related) Parameter Summary (continued)

Dose Library: Subsurface Soil DCGL 120614 Plus FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(3,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(5,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.

*Base Case means Default.Lib w/o Associate Nuclide contributions.

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Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E-02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.100E-01	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Co-60	1.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Cs-134	1.000E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Cs-137	1.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ni-63	1.000E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Sr-90	1.000E+00	0.000E+00	---	S1(5)
R012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Cs-134	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(5)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.800E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.500E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.500E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	6.600E-02	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.880E+03	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	9.700E-01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.200E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	6.250E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.300E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	1.900E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.800E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.900E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	6.600E-02	2.000E-01	---	FCSZ

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Site-Specific Parameter Summary (continued)

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R014	Saturated zone hydraulic conductivity (m/yr)	2.880E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	3.900E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	0.000E+00	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	3.300E+00	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m ³ /yr)	2.250E+03	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	2.600E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm ³)	1.800E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	3.500E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.900E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	6.600E-02	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	9.700E-01	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	2.880E+03	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm ³ /g)	1.161E+03	1.000E+03	---	DCNUCC(1)
R016	Unsat. zone 1 (cm ³ /g)	1.161E+03	1.000E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm ³ /g)	1.161E+03	1.000E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.532E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Cs-134				
R016	Contaminated zone (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCC(2)
R016	Unsat. zone 1 (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCU(2,1)
R016	Saturated zone (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.893E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCC(3)
R016	Unsat. zone 1 (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCU(3,1)
R016	Saturated zone (cm ³ /g)	6.150E+02	4.600E+03	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.893E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm ³ /g)	6.200E+01	1.000E+03	---	DCNUCC(4)
R016	Unsat. zone 1 (cm ³ /g)	6.200E+01	1.000E+03	---	DCNUCU(4,1)
R016	Saturated zone (cm ³ /g)	6.200E+01	1.000E+03	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.868E-03	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm ³ /g)	2.300E+00	3.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm ³ /g)	2.300E+00	3.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm ³ /g)	2.300E+00	3.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.614E-02	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.350E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.500E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.490E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.240E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE (1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE (2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE (3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE (4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE (5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE (6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE (7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE (8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE (9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA (1)
R017	Ring 2	not used	2.732E-01	---	FRACA (2)
R017	Ring 3	not used	0.000E+00	---	FRACA (3)
R017	Ring 4	not used	0.000E+00	---	FRACA (4)
R017	Ring 5	not used	0.000E+00	---	FRACA (5)
R017	Ring 6	not used	0.000E+00	---	FRACA (6)
R017	Ring 7	not used	0.000E+00	---	FRACA (7)
R017	Ring 8	not used	0.000E+00	---	FRACA (8)
R017	Ring 9	not used	0.000E+00	---	FRACA (9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.120E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.140E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	2.330E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.510E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.830E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	4.780E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E-05	FPLANT

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of meat	-1	-1	0.500E-06	FMEAT
R018	Contamination fraction of milk	-1	-1	0.500E-06	FMILK
R019	Livestock fodder intake for meat (kg/day)	2.830E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	6.520E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.060E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	6.000E+01	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	4.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	2.300E-01	1.500E-01	---	DM
R019	Depth of roots (m)	1.220E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	1.750E+00	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	2.900E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.900E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	2.460E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	1.230E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.200E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	3.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	3.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	3.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	3.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	5.800E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	3.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	3.300E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	1.000E+00	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)

Summary : Zion Subsurface Soil 0.01 m² 120614

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm ³)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	512	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	17	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	suppressed
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Summary : Zion Subsurface Soil 0.01 m² 120614

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area:	0.01 square meters	Co-60	1.000E+00
Thickness:	1.00 meters	Cs-134	1.000E+00
Cover Depth:	0.00 meters	Cs-137	1.000E+00
		Ni-63	1.000E+00
		Sr-90	1.000E+00

Total Dose TDOSE(t), mrem/yr

Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.031E-02	8.664E-03	6.320E-03	2.727E-03	7.895E-04	1.289E-04	1.229E-06	1.903E-12
M(t):	4.125E-04	3.466E-04	2.528E-04	1.091E-04	3.158E-05	5.157E-06	4.917E-08	7.614E-14

Maximum TDOSE(t): 1.031E-02 mrem/yr at t = 0.000E+00 years

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	5.776E-03	0.5600	3.501E-07	0.0000	0.000E+00	0.0000	2.066E-06	0.0002	1.893E-07	0.0000	4.999E-08	0.0000	3.565E-09	0.0000
Cs-134	3.150E-03	0.3055	6.695E-08	0.0000	0.000E+00	0.0000	2.653E-06	0.0003	3.041E-07	0.0000	4.738E-07	0.0000	8.807E-09	0.0000
Cs-137	1.318E-03	0.1278	5.380E-08	0.0000	0.000E+00	0.0000	2.106E-06	0.0002	2.414E-07	0.0000	3.761E-07	0.0000	6.991E-09	0.0000
Ni-63	0.000E+00	0.0000	1.068E-08	0.0000	0.000E+00	0.0000	2.886E-08	0.0000	2.461E-10	0.0000	1.159E-08	0.0000	8.122E-11	0.0000
Sr-90	9.106E-06	0.0009	2.124E-06	0.0002	0.000E+00	0.0000	4.697E-05	0.0046	5.414E-07	0.0001	1.477E-06	0.0001	2.057E-08	0.0000
Total	1.025E-02	0.9942	2.606E-06	0.0003	0.000E+00	0.0000	5.383E-05	0.0052	1.276E-06	0.0001	2.388E-06	0.0002	4.001E-08	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.778E-03	0.5603
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.154E-03	0.3058
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.321E-03	0.1281
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.146E-08	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.024E-05	0.0058
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.031E-02	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	5.063E-03	0.5844	3.069E-07	0.0000	0.000E+00	0.0000	1.808E-06	0.0002	1.657E-07	0.0000	4.376E-08	0.0000	3.126E-09	0.0000
Cs-134	2.251E-03	0.2598	4.784E-08	0.0000	0.000E+00	0.0000	1.893E-06	0.0002	2.170E-07	0.0000	3.382E-07	0.0000	6.294E-09	0.0000
Cs-137	1.288E-03	0.1486	5.256E-08	0.0000	0.000E+00	0.0000	2.055E-06	0.0002	2.356E-07	0.0000	3.670E-07	0.0000	6.831E-09	0.0000
Ni-63	0.000E+00	0.0000	1.057E-08	0.0000	0.000E+00	0.0000	2.854E-08	0.0000	2.434E-10	0.0000	1.146E-08	0.0000	8.043E-11	0.0000
Sr-90	8.238E-06	0.0010	1.922E-06	0.0002	0.000E+00	0.0000	4.244E-05	0.0049	4.894E-07	0.0001	1.335E-06	0.0002	1.861E-08	0.0000
Total	8.610E-03	0.9938	2.339E-06	0.0003	0.000E+00	0.0000	4.822E-05	0.0056	1.108E-06	0.0001	2.095E-06	0.0002	3.494E-08	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.066E-03	0.5847
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.254E-03	0.2601
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.290E-03	0.1489
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.090E-08	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.444E-05	0.0063
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.664E-03	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	3.891E-03	0.6157	2.359E-07	0.0000	0.000E+00	0.0000	1.385E-06	0.0002	1.270E-07	0.0000	3.354E-08	0.0000	2.402E-09	0.0000
Cs-134	1.150E-03	0.1819	2.443E-08	0.0000	0.000E+00	0.0000	9.640E-07	0.0002	1.106E-07	0.0000	1.722E-07	0.0000	3.214E-09	0.0000
Cs-137	1.229E-03	0.1945	5.017E-08	0.0000	0.000E+00	0.0000	1.955E-06	0.0003	2.243E-07	0.0000	3.494E-07	0.0001	6.520E-09	0.0000
Ni-63	0.000E+00	0.0000	1.037E-08	0.0000	0.000E+00	0.0000	2.790E-08	0.0000	2.381E-10	0.0000	1.121E-08	0.0000	7.887E-11	0.0000
Sr-90	6.742E-06	0.0011	1.573E-06	0.0002	0.000E+00	0.0000	3.463E-05	0.0055	3.994E-07	0.0001	1.089E-06	0.0002	1.523E-08	0.0000
Total	6.277E-03	0.9931	1.893E-06	0.0003	0.000E+00	0.0000	3.896E-05	0.0062	8.615E-07	0.0001	1.656E-06	0.0003	2.744E-08	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.893E-03	0.6160
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.151E-03	0.1821
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E-03	0.1949
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.980E-08	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.444E-05	0.0070
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.320E-03	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	1.548E-03	0.5678	9.385E-08	0.0000	0.000E+00	0.0000	5.454E-07	0.0002	5.007E-08	0.0000	1.321E-08	0.0000	9.558E-10	0.0000
Cs-134	1.094E-04	0.0401	2.326E-09	0.0000	0.000E+00	0.0000	9.079E-08	0.0000	1.044E-08	0.0000	1.624E-08	0.0000	3.059E-10	0.0000
Cs-137	1.044E-03	0.3830	4.263E-08	0.0000	0.000E+00	0.0000	1.644E-06	0.0006	1.890E-07	0.0001	2.941E-07	0.0001	5.540E-09	0.0000
Ni-63	0.000E+00	0.0000	9.683E-09	0.0000	0.000E+00	0.0000	2.578E-08	0.0000	2.204E-10	0.0000	1.037E-08	0.0000	7.365E-11	0.0000
Sr-90	3.343E-06	0.0012	7.797E-07	0.0003	0.000E+00	0.0000	1.699E-05	0.0062	1.960E-07	0.0001	5.345E-07	0.0002	7.550E-09	0.0000
Total	2.705E-03	0.9921	9.282E-07	0.0003	0.000E+00	0.0000	1.929E-05	0.0071	4.458E-07	0.0002	8.684E-07	0.0003	1.443E-08	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.549E-03	0.5680
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.096E-04	0.0402
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.046E-03	0.3838
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.612E-08	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.185E-05	0.0080
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.727E-03	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	1.113E-04	0.1409	6.744E-09	0.0000	0.000E+00	0.0000	3.800E-08	0.0000	3.503E-09	0.0000	9.223E-10	0.0000	6.869E-11	0.0000
Cs-134	1.321E-07	0.0002	2.807E-12	0.0000	0.000E+00	0.0000	1.062E-10	0.0000	1.230E-11	0.0000	1.907E-11	0.0000	3.692E-13	0.0000
Cs-137	6.558E-04	0.8306	2.677E-08	0.0000	0.000E+00	0.0000	1.001E-06	0.0013	1.159E-07	0.0001	1.796E-07	0.0002	3.479E-09	0.0000
Ni-63	0.000E+00	0.0000	7.960E-09	0.0000	0.000E+00	0.0000	2.055E-08	0.0000	1.768E-10	0.0000	8.289E-09	0.0000	6.055E-11	0.0000
Sr-90	4.504E-07	0.0006	1.051E-07	0.0001	0.000E+00	0.0000	2.219E-06	0.0028	2.563E-08	0.0000	6.987E-08	0.0001	1.017E-09	0.0000
Total	7.676E-04	0.9723	1.465E-07	0.0002	0.000E+00	0.0000	3.279E-06	0.0042	1.452E-07	0.0002	2.587E-07	0.0003	4.626E-09	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)

As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.113E-04	0.1410
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.322E-07	0.0002
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.571E-04	0.8323
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.703E-08	0.0000
Sr-90	1.807E-05	0.0229	0.000E+00	0.0000	0.000E+00	0.0000	8.801E-12	0.0000	7.840E-13	0.0000	1.509E-12	0.0000	2.094E-05	0.0265
Total	1.807E-05	0.0229	0.000E+00	0.0000	0.000E+00	0.0000	8.801E-12	0.0000	7.840E-13	0.0000	1.509E-12	0.0000	7.895E-04	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	1.107E-08	0.0001	6.711E-13	0.0000	0.000E+00	0.0000	3.365E-12	0.0000	3.152E-13	0.0000	8.229E-14	0.0000	6.835E-15	0.0000
Cs-134	8.065E-18	0.0000	1.714E-22	0.0000	0.000E+00	0.0000	5.773E-21	0.0000	6.870E-22	0.0000	1.051E-21	0.0000	2.255E-23	0.0000
Cs-137	1.287E-04	0.9978	5.252E-09	0.0000	0.000E+00	0.0000	1.748E-07	0.0014	2.079E-08	0.0002	3.180E-08	0.0002	6.825E-10	0.0000
Ni-63	0.000E+00	0.0000	4.011E-09	0.0000	0.000E+00	0.0000	9.214E-09	0.0001	8.120E-11	0.0000	3.761E-09	0.0000	3.051E-11	0.0000
Sr-90	4.045E-10	0.0000	9.436E-11	0.0000	0.000E+00	0.0000	1.774E-09	0.0000	2.058E-11	0.0000	5.596E-11	0.0000	9.137E-13	0.0000
Total	1.287E-04	0.9979	9.358E-09	0.0001	0.000E+00	0.0000	1.857E-07	0.0014	2.090E-08	0.0002	3.562E-08	0.0003	7.140E-10	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.108E-08	0.0001
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.073E-18	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.289E-04	0.9997
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.710E-08	0.0001
Sr-90	1.452E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.072E-15	0.0000	6.300E-16	0.0000	1.213E-15	0.0000	1.687E-08	0.0001
Total	1.452E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.072E-15	0.0000	6.300E-16	0.0000	1.213E-15	0.0000	1.289E-04	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	4.067E-20	0.0000	2.466E-24	0.0000	0.000E+00	0.0000	7.998E-24	0.0000	8.084E-25	0.0000	2.029E-25	0.0000	2.512E-26	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	1.226E-06	0.9973	5.005E-11	0.0000	0.000E+00	0.0000	1.077E-09	0.0009	1.454E-10	0.0001	2.093E-10	0.0002	6.505E-12	0.0000
Ni-63	0.000E+00	0.0000	5.658E-10	0.0005	0.000E+00	0.0000	8.406E-10	0.0007	8.284E-12	0.0000	3.632E-10	0.0003	4.304E-12	0.0000
Sr-90	7.984E-19	0.0000	1.862E-19	0.0000	0.000E+00	0.0000	2.264E-18	0.0000	2.686E-20	0.0000	7.214E-20	0.0000	1.803E-21	0.0000
Total	1.226E-06	0.9973	6.159E-10	0.0005	0.000E+00	0.0000	1.918E-09	0.0016	1.537E-10	0.0001	5.725E-10	0.0005	1.081E-11	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.068E-20	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.9986
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.782E-09	0.0014
Sr-90	1.901E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.262E-24	0.0000	8.251E-25	0.0000	1.588E-24	0.0000	2.236E-17	0.0000
Total	1.901E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.262E-24	0.0000	8.251E-25	0.0000	1.588E-24	0.0000	1.229E-06	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio- Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.903E-12	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.683E-19	0.0000	5.103E-20	0.0000	1.853E-18	0.0000	1.903E-12	1.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.903E-12	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.683E-19	0.0000	5.103E-20	0.0000	1.853E-18	0.0000	1.903E-12	1.0000

*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 0.01 m² 120614

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Dose/Source Ratios Summed Over All Pathways
 Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g)							
			0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Co-60	Co-60	1.000E+00	5.778E-03	5.066E-03	3.893E-03	1.549E-03	1.113E-04	1.108E-08	4.068E-20	0.000E+00
Cs-134	Cs-134	1.000E+00	3.154E-03	2.254E-03	1.151E-03	1.096E-04	1.322E-07	8.073E-18	0.000E+00	0.000E+00
Cs-137+D	Cs-137+D	1.000E+00	1.321E-03	1.290E-03	1.232E-03	1.046E-03	6.571E-04	1.289E-04	1.228E-06	0.000E+00
Ni-63	Ni-63	1.000E+00	5.146E-08	5.090E-08	4.980E-08	4.612E-08	3.703E-08	1.710E-08	1.782E-09	1.903E-12
Sr-90+D	Sr-90+D	1.000E+00	6.024E-05	5.444E-05	4.444E-05	2.185E-05	2.094E-05	1.687E-08	2.236E-17	0.000E+00

The DSR includes contributions from associated (half-life ≤ 30 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
 Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide (i)	t =	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Co-60		4.327E+03	4.935E+03	6.422E+03	1.614E+04	2.246E+05	2.257E+09	*1.113E+15	*1.113E+15
Cs-134		7.928E+03	1.109E+04	2.172E+04	2.282E+05	1.891E+08	*1.283E+15	*1.283E+15	*1.283E+15
Cs-137		1.893E+04	1.938E+04	2.030E+04	2.389E+04	3.805E+04	1.940E+05	2.037E+07	*8.593E+13
Ni-63		4.858E+08	4.911E+08	5.020E+08	5.420E+08	6.751E+08	1.462E+09	1.403E+10	1.313E+13
Sr-90		4.150E+05	4.592E+05	5.625E+05	1.144E+06	1.194E+06	1.482E+09	*1.366E+14	*1.366E+14

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
 and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
 at tmin = time of minimum single radionuclide soil guideline
 and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Co-60	1.000E+00	0.000E+00	5.778E-03	4.327E+03	5.778E-03	4.327E+03
Cs-134	1.000E+00	0.000E+00	3.154E-03	7.928E+03	3.154E-03	7.928E+03
Cs-137	1.000E+00	0.000E+00	1.321E-03	1.893E+04	1.321E-03	1.893E+04
Ni-63	1.000E+00	0.000E+00	5.146E-08	4.858E+08	5.146E-08	4.858E+08
Sr-90	1.000E+00	0.000E+00	6.024E-05	4.150E+05	6.024E-05	4.150E+05

Summary : Zion Subsurface Soil 0.01 m² 120614

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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	
Co-60	Co-60	1.000E+00	5.778E-03	5.066E-03	3.893E-03	1.549E-03	1.113E-04	1.108E-08	4.068E-20	0.000E+00	
Cs-134	Cs-134	1.000E+00	3.154E-03	2.254E-03	1.151E-03	1.096E-04	1.322E-07	8.073E-18	0.000E+00	0.000E+00	
Cs-137	Cs-137	1.000E+00	1.321E-03	1.290E-03	1.232E-03	1.046E-03	6.571E-04	1.289E-04	1.228E-06	0.000E+00	
Ni-63	Ni-63	1.000E+00	5.146E-08	5.090E-08	4.980E-08	4.612E-08	3.703E-08	1.710E-08	1.782E-09	1.903E-12	
Sr-90	Sr-90	1.000E+00	6.024E-05	5.444E-05	4.444E-05	2.185E-05	2.094E-05	1.687E-08	2.236E-17	0.000E+00	

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g								
			t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	
Co-60	Co-60	1.000E+00	1.000E+00	8.766E-01	6.737E-01	2.681E-01	1.927E-02	1.917E-06	7.044E-18	0.000E+00	
Cs-134	Cs-134	1.000E+00	1.000E+00	7.146E-01	3.650E-01	3.474E-02	4.193E-05	2.560E-15	1.682E-44	0.000E+00	
Cs-137	Cs-137	1.000E+00	1.000E+00	9.770E-01	9.326E-01	7.924E-01	4.976E-01	9.763E-02	9.304E-04	7.864E-11	
Ni-63	Ni-63	1.000E+00	1.000E+00	9.903E-01	9.710E-01	9.067E-01	7.454E-01	3.756E-01	5.299E-02	5.587E-05	
Sr-90	Sr-90	1.000E+00	1.000E+00	9.046E-01	7.403E-01	3.671E-01	4.946E-02	4.442E-05	8.767E-14	2.943E-44	

THF(i) is the thread fraction of the parent nuclide.

RESRAD.EXE execution time = 1.61 seconds