

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 120614

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## Dose Conversion Factor (and Related) Parameter Summary

Dose Library: Surface Soil DCGL 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: Surface Soil DCGL 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 &amp; 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)	3.000E+00	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	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)	2.000E+00	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)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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 <sup>3</sup> /yr)	2.250E+03	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	3.450E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm <sup>3</sup> )	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 <sup>3</sup> /g)	1.161E+03	1.000E+03	---	DCNUCC(1)
R016	Unsat. zone 1 (cm <sup>3</sup> /g)	1.161E+03	1.000E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm <sup>3</sup> /g)	1.161E+03	1.000E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.022E-03	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 <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCC(2)
R016	Unsat. zone 1 (cm <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCU(2,1)
R016	Saturated zone (cm <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.929E-03	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 <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCC(3)
R016	Unsat. zone 1 (cm <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCU(3,1)
R016	Saturated zone (cm <sup>3</sup> /g)	6.150E+02	4.600E+03	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.929E-03	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 <sup>3</sup> /g)	6.200E+01	1.000E+03	---	DCNUCC(4)
R016	Unsat. zone 1 (cm <sup>3</sup> /g)	6.200E+01	1.000E+03	---	DCNUCU(4,1)
R016	Saturated zone (cm <sup>3</sup> /g)	6.200E+01	1.000E+03	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.912E-02	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 <sup>3</sup> /g)	2.300E+00	3.000E+01	---	DCNUCC(5)
R016	Unsat. zone 1 (cm <sup>3</sup> /g)	2.300E+00	3.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm <sup>3</sup> /g)	2.300E+00	3.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.076E-01	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 <sup>3</sup> /yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m <sup>3</sup> )	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	0.150E-02	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	0.150E-03	FMEAT
R018	Contamination fraction of milk	-1	-1	0.150E-03	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)	1.500E-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 Surface Soil 3.0 m<sup>2</sup> 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 <sup>3</sup> )	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 Surface Soil 3.0 m^2 120614

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area:	3.00 square meters	Co-60	1.000E+00
Thickness:	0.15 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):	1.819E+00	1.513E+00	1.083E+00	4.414E-01	1.050E-01	2.352E-10	0.000E+00	4.010E-10
M(t):	7.278E-02	6.053E-02	4.334E-02	1.766E-02	4.201E-03	9.408E-12	0.000E+00	1.604E-11

Maximum TDOSE(t): 1.819E+00 mrem/yr at t = 0.000E+00 years

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	1.002E+00	0.5509	6.641E-07	0.0000	0.000E+00	0.0000	9.255E-05	0.0001	1.452E-05	0.0000	2.986E-06	0.0000	1.064E-06	0.0000
Cs-134	5.728E-01	0.3149	1.270E-07	0.0000	0.000E+00	0.0000	1.189E-04	0.0001	3.033E-05	0.0000	3.412E-05	0.0000	2.628E-06	0.0000
Cs-137	2.406E-01	0.1323	1.020E-07	0.0000	0.000E+00	0.0000	9.433E-05	0.0001	2.407E-05	0.0000	2.708E-05	0.0000	2.085E-06	0.0000
Ni-63	0.000E+00	0.0000	2.010E-08	0.0000	0.000E+00	0.0000	1.284E-06	0.0000	2.273E-08	0.0000	7.860E-07	0.0000	2.405E-08	0.0000
Sr-90	1.400E-03	0.0008	3.287E-06	0.0000	0.000E+00	0.0000	1.739E-03	0.0010	2.467E-05	0.0000	6.139E-05	0.0000	5.007E-06	0.0000
Total	1.817E+00	0.9987	4.200E-06	0.0000	0.000E+00	0.0000	2.046E-03	0.0011	9.362E-05	0.0001	1.264E-04	0.0001	1.081E-05	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	1.002E+00	0.5509
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	5.730E-01	0.3150
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	2.408E-01	0.1323
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	2.137E-06	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	3.233E-03	0.0018
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	1.819E+00	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	8.718E-01	0.5761	5.759E-07	0.0000	0.000E+00	0.0000	8.025E-05	0.0001	1.259E-05	0.0000	2.590E-06	0.0000	9.225E-07	0.0000
Cs-134	4.061E-01	0.2683	8.969E-08	0.0000	0.000E+00	0.0000	8.396E-05	0.0001	2.143E-05	0.0000	2.410E-05	0.0000	1.856E-06	0.0000
Cs-137	2.332E-01	0.1541	9.850E-08	0.0000	0.000E+00	0.0000	9.109E-05	0.0001	2.325E-05	0.0000	2.615E-05	0.0000	2.014E-06	0.0000
Ni-63	0.000E+00	0.0000	1.939E-08	0.0000	0.000E+00	0.0000	1.238E-06	0.0000	2.192E-08	0.0000	7.583E-07	0.0000	2.320E-08	0.0000
Sr-90	8.180E-04	0.0005	1.912E-06	0.0000	0.000E+00	0.0000	1.013E-03	0.0007	1.443E-05	0.0000	3.594E-05	0.0000	2.912E-06	0.0000
Total	1.512E+00	0.9990	2.696E-06	0.0000	0.000E+00	0.0000	1.270E-03	0.0008	7.172E-05	0.0000	8.954E-05	0.0001	7.727E-06	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	8.719E-01	0.5761
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	4.062E-01	0.2684
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	2.334E-01	0.1542
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	2.061E-06	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	1.886E-03	0.0012
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	1.513E+00	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	6.595E-01	0.6087	4.328E-07	0.0000	0.000E+00	0.0000	6.032E-05	0.0001	9.464E-06	0.0000	1.946E-06	0.0000	6.934E-07	0.0000
Cs-134	2.040E-01	0.1883	4.473E-08	0.0000	0.000E+00	0.0000	4.187E-05	0.0000	1.068E-05	0.0000	1.202E-05	0.0000	9.255E-07	0.0000
Cs-137	2.191E-01	0.2022	9.181E-08	0.0000	0.000E+00	0.0000	8.490E-05	0.0001	2.167E-05	0.0000	2.437E-05	0.0000	1.877E-06	0.0000
Ni-63	0.000E+00	0.0000	1.803E-08	0.0000	0.000E+00	0.0000	1.152E-06	0.0000	2.039E-08	0.0000	7.052E-07	0.0000	2.157E-08	0.0000
Sr-90	2.793E-04	0.0003	6.469E-07	0.0000	0.000E+00	0.0000	3.427E-04	0.0003	4.882E-06	0.0000	1.216E-05	0.0000	9.852E-07	0.0000
Total	1.083E+00	0.9994	1.234E-06	0.0000	0.000E+00	0.0000	5.310E-04	0.0005	4.672E-05	0.0000	5.120E-05	0.0000	4.502E-06	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	6.595E-01	0.6087
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	2.041E-01	0.1884
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	2.192E-01	0.2023
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	1.917E-06	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	6.407E-04	0.0006
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	1.083E+00	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	2.475E-01	0.5608	1.588E-07	0.0000	0.000E+00	0.0000	2.213E-05	0.0001	3.472E-06	0.0000	7.140E-07	0.0000	2.543E-07	0.0000
Cs-134	1.830E-02	0.0414	3.904E-09	0.0000	0.000E+00	0.0000	3.654E-06	0.0000	9.326E-07	0.0000	1.049E-06	0.0000	8.077E-08	0.0000
Cs-137	1.754E-01	0.3974	7.153E-08	0.0000	0.000E+00	0.0000	6.615E-05	0.0001	1.688E-05	0.0000	1.899E-05	0.0000	1.462E-06	0.0000
Ni-63	0.000E+00	0.0000	1.394E-08	0.0000	0.000E+00	0.0000	8.902E-07	0.0000	1.576E-08	0.0000	5.451E-07	0.0000	1.667E-08	0.0000
Sr-90	6.482E-06	0.0000	1.451E-08	0.0000	0.000E+00	0.0000	7.690E-06	0.0000	1.096E-07	0.0000	2.728E-07	0.0000	2.210E-08	0.0000
Total	4.413E-01	0.9997	2.626E-07	0.0000	0.000E+00	0.0000	1.005E-04	0.0002	2.141E-05	0.0000	2.157E-05	0.0000	1.836E-06	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	2.476E-01	0.5608
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	1.830E-02	0.0415
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	1.755E-01	0.3977
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	1.482E-06	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	1.459E-05	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	4.414E-01	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	1.459E-02	0.1390	8.708E-09	0.0000	0.000E+00	0.0000	1.214E-06	0.0000	1.905E-07	0.0000	3.917E-08	0.0000	1.395E-08	0.0000
Cs-134	1.808E-05	0.0002	3.541E-12	0.0000	0.000E+00	0.0000	3.315E-09	0.0000	8.460E-10	0.0000	9.518E-10	0.0000	7.326E-11	0.0000
Cs-137	9.036E-02	0.8604	3.375E-08	0.0000	0.000E+00	0.0000	3.122E-05	0.0003	7.967E-06	0.0001	8.964E-06	0.0001	6.900E-07	0.0000
Ni-63	0.000E+00	0.0000	6.428E-09	0.0000	0.000E+00	0.0000	4.106E-07	0.0000	7.269E-09	0.0000	2.515E-07	0.0000	7.691E-09	0.0000
Sr-90	1.354E-10	0.0000	2.715E-13	0.0000	0.000E+00	0.0000	1.439E-10	0.0000	2.050E-12	0.0000	5.106E-12	0.0000	4.136E-13	0.0000
Total	1.050E-01	0.9995	4.889E-08	0.0000	0.000E+00	0.0000	3.285E-05	0.0003	8.166E-06	0.0001	9.255E-06	0.0001	7.117E-07	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	1.459E-02	0.1390
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	1.808E-05	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	9.041E-02	0.8609
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	6.835E-07	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	2.871E-10	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	1.050E-01	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	2.115E-15	0.0000	8.100E-22	0.0000	0.000E+00	0.0000	1.135E-15	0.0000	1.110E-15	0.0000	3.149E-16	0.0000	1.298E-21	0.0000
Cs-134	1.527E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.990E-24	0.0000	2.172E-24	0.0000	3.837E-24	0.0000	4.372E-30	0.0000
Cs-137	2.162E-11	0.0919	5.563E-18	0.0000	0.000E+00	0.0000	5.173E-11	0.2199	5.723E-11	0.2433	1.011E-10	0.4299	1.137E-16	0.0000
Ni-63	0.000E+00	0.0000	9.788E-19	0.0000	0.000E+00	0.0000	6.287E-13	0.0027	5.351E-14	0.0002	2.812E-12	0.0120	1.171E-18	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
<b>Total</b>	<b>2.162E-11</b>	<b>0.0919</b>	<b>6.543E-18</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>5.236E-11</b>	<b>0.2226</b>	<b>5.729E-11</b>	<b>0.2436</b>	<b>1.039E-10</b>	<b>0.4419</b>	<b>1.149E-16</b>	<b>0.0000</b>

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	4.676E-15	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	9.526E-24	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	2.317E-10	0.9851
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	3.494E-12	0.0149
Sr-90	7.075E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.033E-21	0.0000	9.414E-23	0.0000	1.829E-22	0.0000	7.076E-18	0.0000
<b>Total</b>	<b>7.075E-18</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>1.033E-21</b>	<b>0.0000</b>	<b>9.414E-23</b>	<b>0.0000</b>	<b>1.829E-22</b>	<b>0.0000</b>	<b>2.352E-10</b>	<b>1.0000</b>

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m^2 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	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
<b>Total</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>

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	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
<b>Total</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>

\*Sum of all water independent and dependent pathways.



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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
<b>Total</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>

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	4.008E-10	0.9996	0.000E+00	0.0000	0.000E+00	0.0000	4.834E-14	0.0001	3.185E-15	0.0000	1.151E-13	0.0003	4.010E-10	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
<b>Total</b>	<b>4.008E-10</b>	<b>0.9996</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>4.834E-14</b>	<b>0.0001</b>	<b>3.185E-15</b>	<b>0.0000</b>	<b>1.151E-13</b>	<b>0.0003</b>	<b>4.010E-10</b>	<b>1.0000</b>

\*Sum of all water independent and dependent pathways.

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	1.002E+00	8.719E-01	6.595E-01	2.476E-01	1.459E-02	4.676E-15	0.000E+00	0.000E+00
Cs-134	Cs-134	1.000E+00	5.730E-01	4.062E-01	2.041E-01	1.830E-02	1.808E-05	9.526E-24	0.000E+00	0.000E+00
Cs-137+D	Cs-137+D	1.000E+00	2.408E-01	2.334E-01	2.192E-01	1.755E-01	9.041E-02	2.317E-10	0.000E+00	0.000E+00
Ni-63	Ni-63	1.000E+00	2.137E-06	2.061E-06	1.917E-06	1.482E-06	6.835E-07	3.494E-12	0.000E+00	4.010E-10
Sr-90+D	Sr-90+D	1.000E+00	3.233E-03	1.886E-03	6.407E-04	1.459E-05	2.871E-10	7.076E-18	0.000E+00	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		2.494E+01	2.867E+01	3.791E+01	1.010E+02	1.713E+03	*1.113E+15	*1.113E+15	*1.113E+15
Cs-134		4.363E+01	6.154E+01	1.225E+02	1.366E+03	1.383E+06	*1.283E+15	*1.283E+15	*1.283E+15
Cs-137		1.038E+02	1.071E+02	1.141E+02	1.424E+02	2.765E+02	1.079E+11	*8.593E+13	*8.593E+13
Ni-63		1.170E+07	1.213E+07	1.304E+07	1.687E+07	3.658E+07	7.156E+12	*5.586E+13	6.235E+10
Sr-90		7.734E+03	1.325E+04	3.902E+04	1.713E+06	8.707E+10	*1.366E+14	*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	1.002E+00	2.494E+01	1.002E+00	2.494E+01
Cs-134	1.000E+00	0.000E+00	5.730E-01	4.363E+01	5.730E-01	4.363E+01
Cs-137	1.000E+00	0.000E+00	2.408E-01	1.038E+02	2.408E-01	1.038E+02
Ni-63	1.000E+00	0.000E+00	2.137E-06	1.170E+07	2.137E-06	1.170E+07
Sr-90	1.000E+00	37.97 ± 0.08	3.716E-03	6.728E+03	3.233E-03	7.734E+03

Summary : Zion Surface Soil 3.0 m<sup>2</sup> 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	1.002E+00	8.719E-01	6.595E-01	2.476E-01	1.459E-02	4.676E-15	0.000E+00	0.000E+00	
Cs-134	Cs-134	1.000E+00	5.730E-01	4.062E-01	2.041E-01	1.830E-02	1.808E-05	9.526E-24	0.000E+00	0.000E+00	
Cs-137	Cs-137	1.000E+00	2.408E-01	2.334E-01	2.192E-01	1.755E-01	9.041E-02	2.317E-10	0.000E+00	0.000E+00	
Ni-63	Ni-63	1.000E+00	2.137E-06	2.061E-06	1.917E-06	1.482E-06	6.835E-07	3.494E-12	0.000E+00	4.010E-10	
Sr-90	Sr-90	1.000E+00	3.233E-03	1.886E-03	6.407E-04	1.459E-05	2.871E-10	7.076E-18	0.000E+00	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	8.759E-01	6.720E-01	2.658E-01	1.877E-02	1.758E-06	5.429E-18	0.000E+00	
Cs-134	Cs-134	1.000E+00	1.000E+00	7.135E-01	3.632E-01	3.418E-02	3.991E-05	2.173E-15	9.809E-45	0.000E+00	
Cs-137	Cs-137	1.000E+00	1.000E+00	9.754E-01	9.280E-01	7.795E-01	4.737E-01	8.286E-02	5.690E-04	1.527E-11	
Ni-63	Ni-63	1.000E+00	1.000E+00	9.743E-01	9.248E-01	7.707E-01	4.578E-01	7.395E-02	4.044E-04	4.889E-12	
Sr-90	Sr-90	1.000E+00	1.000E+00	5.876E-01	2.029E-01	4.908E-03	1.182E-07	8.114E-24	0.000E+00	0.000E+00	

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

RESRAD.EXE execution time = 1.50 seconds