

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

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Table of Contents

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Part I: Mixture Sums and Single Radionuclide Guidelines

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Dose Conversion Factor (and Related) Parameter Summary ...	2
Site-Specific Parameter Summary .....	4
Summary of Pathway Selections .....	8
Contaminated Zone and Total Dose Summary .....	9
Total Dose Components	
Time = 0.000E+00 .....	10
Time = 1.000E+00 .....	11
Time = 3.000E+00 .....	12
Time = 1.000E+01 .....	13
Time = 3.000E+01 .....	14
Time = 1.000E+02 .....	15
Time = 3.000E+02 .....	16
Time = 1.000E+03 .....	17
Dose/Source Ratios Summed Over All Pathways .....	18
Single Radionuclide Soil Guidelines .....	18
Dose Per Nuclide Summed Over All Pathways .....	19
Soil Concentration Per Nuclide .....	19

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

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)

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

## 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 &amp; area. See ETFG table in Ground Pathway of Detailed Report.

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

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

## 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+04	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)	1.130E+02	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

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

## 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)	2.600E+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	1.532E-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 <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	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 <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	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 <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	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 <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	7.614E-02	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

## 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	0.500E+00	FPLANT

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

## 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+00	FMEAT
R018	Contamination fraction of milk	-1	-1	0.500E+00	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 10,000 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 Subsurface Soil 10,000 m<sup>2</sup> 120614

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Contaminated Zone Dimensions

Initial Soil Concentrations, pCi/g

Area:	10000.00 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):	1.864E+01	1.609E+01	1.230E+01	5.777E+00	2.366E+00	2.628E-01	2.043E-03	1.383E-06
M(t):	7.457E-01	6.436E-01	4.920E-01	2.311E-01	9.465E-02	1.051E-02	8.173E-05	5.534E-08

Maximum TDOSE(t): 1.864E+01 mrem/yr at t = 0.000E+00 years

Summary : Zion Subsurface Soil 10,000 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	5.486E+00	0.2943	1.622E-06	0.0000	0.000E+00	0.0000	2.066E-01	0.0111	1.893E-01	0.0102	4.999E-02	0.0027	3.565E-04	0.0000
Cs-134	2.889E+00	0.1549	3.102E-07	0.0000	0.000E+00	0.0000	2.653E-01	0.0142	3.041E-01	0.0163	4.739E-01	0.0254	8.807E-04	0.0000
Cs-137	1.208E+00	0.0648	2.492E-07	0.0000	0.000E+00	0.0000	2.106E-01	0.0113	2.414E-01	0.0129	3.762E-01	0.0202	6.991E-04	0.0000
Ni-63	0.000E+00	0.0000	4.948E-08	0.0000	0.000E+00	0.0000	2.886E-03	0.0002	2.461E-04	0.0000	1.159E-02	0.0006	8.122E-06	0.0000
Sr-90	8.440E-03	0.0005	9.841E-06	0.0000	0.000E+00	0.0000	4.697E+00	0.2520	5.414E-01	0.0290	1.477E+00	0.0792	2.057E-03	0.0001
Total	9.591E+00	0.5145	1.207E-05	0.0000	0.000E+00	0.0000	5.383E+00	0.2887	1.276E+00	0.0685	2.388E+00	0.1281	4.001E-03	0.0002

## 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	5.932E+00	0.3182
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	3.933E+00	0.2110
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	2.037E+00	0.1093
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	1.473E-02	0.0008
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	6.726E+00	0.3608
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	1.864E+01	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 10,000 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	4.809E+00	0.2989	1.422E-06	0.0000	0.000E+00	0.0000	1.808E-01	0.0112	1.657E-01	0.0103	4.376E-02	0.0027	3.126E-04	0.0000
Cs-134	2.064E+00	0.1283	2.217E-07	0.0000	0.000E+00	0.0000	1.893E-01	0.0118	2.171E-01	0.0135	3.382E-01	0.0210	6.294E-04	0.0000
Cs-137	1.181E+00	0.0734	2.435E-07	0.0000	0.000E+00	0.0000	2.055E-01	0.0128	2.356E-01	0.0146	3.670E-01	0.0228	6.831E-04	0.0000
Ni-63	0.000E+00	0.0000	4.900E-08	0.0000	0.000E+00	0.0000	2.854E-03	0.0002	2.434E-04	0.0000	1.146E-02	0.0007	8.043E-06	0.0000
Sr-90	7.635E-03	0.0005	8.903E-06	0.0000	0.000E+00	0.0000	4.244E+00	0.2637	4.894E-01	0.0304	1.335E+00	0.0830	1.861E-03	0.0001
Total	8.062E+00	0.5010	1.084E-05	0.0000	0.000E+00	0.0000	4.822E+00	0.2997	1.108E+00	0.0689	2.096E+00	0.1302	3.494E-03	0.0002

## 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	5.200E+00	0.3231
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	2.809E+00	0.1746
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	1.989E+00	0.1236
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	1.457E-02	0.0009
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	6.078E+00	0.3777
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	1.609E+01	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 10,000 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	3.696E+00	0.3005	1.093E-06	0.0000	0.000E+00	0.0000	1.385E-01	0.0113	1.270E-01	0.0103	3.354E-02	0.0027	2.402E-04	0.0000
Cs-134	1.054E+00	0.0857	1.132E-07	0.0000	0.000E+00	0.0000	9.640E-02	0.0078	1.106E-01	0.0090	1.723E-01	0.0140	3.214E-04	0.0000
Cs-137	1.127E+00	0.0916	2.324E-07	0.0000	0.000E+00	0.0000	1.955E-01	0.0159	2.243E-01	0.0182	3.494E-01	0.0284	6.520E-04	0.0001
Ni-63	0.000E+00	0.0000	4.805E-08	0.0000	0.000E+00	0.0000	2.790E-03	0.0002	2.381E-04	0.0000	1.121E-02	0.0009	7.887E-06	0.0000
Sr-90	6.248E-03	0.0005	7.286E-06	0.0000	0.000E+00	0.0000	3.463E+00	0.2815	3.994E-01	0.0325	1.089E+00	0.0886	1.523E-03	0.0001
Total	5.883E+00	0.4783	8.772E-06	0.0000	0.000E+00	0.0000	3.896E+00	0.3168	8.616E-01	0.0700	1.656E+00	0.1346	2.744E-03	0.0002

## 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	3.995E+00	0.3248
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	1.434E+00	0.1166
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	1.897E+00	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	1.425E-02	0.0012
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	4.959E+00	0.4032
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	1.230E+01	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 10,000 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	1.471E+00	0.2546	4.348E-07	0.0000	0.000E+00	0.0000	5.454E-02	0.0094	5.008E-02	0.0087	1.321E-02	0.0023	9.558E-05	0.0000
Cs-134	1.003E-01	0.0174	1.078E-08	0.0000	0.000E+00	0.0000	9.079E-03	0.0016	1.044E-02	0.0018	1.624E-02	0.0028	3.059E-05	0.0000
Cs-137	9.576E-01	0.1658	1.975E-07	0.0000	0.000E+00	0.0000	1.644E-01	0.0285	1.890E-01	0.0327	2.941E-01	0.0509	5.540E-04	0.0001
Ni-63	0.000E+00	0.0000	4.486E-08	0.0000	0.000E+00	0.0000	2.578E-03	0.0004	2.205E-04	0.0000	1.037E-02	0.0018	7.365E-06	0.0000
Sr-90	3.098E-03	0.0005	3.613E-06	0.0000	0.000E+00	0.0000	1.699E+00	0.2941	1.960E-01	0.0339	5.345E-01	0.0925	7.550E-04	0.0001
Total	2.532E+00	0.4383	4.301E-06	0.0000	0.000E+00	0.0000	1.929E+00	0.3340	4.458E-01	0.0772	8.685E-01	0.1503	1.443E-03	0.0002

## 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	1.589E+00	0.2750
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	1.361E-01	0.0236
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	1.606E+00	0.2780
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	1.317E-02	0.0023
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	2.433E+00	0.4212
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	5.777E+00	1.0000

\*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 10,000 m<sup>2</sup> 120614

File : C:\RESRAD\_FAMILY\RESRAD\7.0\USERFILES\ZION SUBSURFACE SOIL DCGL.RAD

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	1.057E-01	0.0447	3.125E-08	0.0000	0.000E+00	0.0000	3.800E-03	0.0016	3.503E-03	0.0015	9.223E-04	0.0004	6.869E-06	0.0000
Cs-134	1.211E-04	0.0001	1.300E-11	0.0000	0.000E+00	0.0000	1.062E-05	0.0000	1.230E-05	0.0000	1.907E-05	0.0000	3.692E-08	0.0000
Cs-137	6.013E-01	0.2541	1.240E-07	0.0000	0.000E+00	0.0000	1.001E-01	0.0423	1.159E-01	0.0490	1.797E-01	0.0759	3.479E-04	0.0001
Ni-63	0.000E+00	0.0000	3.688E-08	0.0000	0.000E+00	0.0000	2.055E-03	0.0009	1.768E-04	0.0001	8.289E-03	0.0035	6.055E-06	0.0000
Sr-90	4.175E-04	0.0002	4.868E-07	0.0000	0.000E+00	0.0000	2.219E-01	0.0938	2.564E-02	0.0108	6.987E-02	0.0295	1.017E-04	0.0000
<b>Total</b>	<b>7.075E-01</b>	<b>0.2990</b>	<b>6.790E-07</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>3.279E-01</b>	<b>0.1386</b>	<b>1.452E-01</b>	<b>0.0614</b>	<b>2.588E-01</b>	<b>0.1094</b>	<b>4.626E-04</b>	<b>0.0002</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+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	1.139E-01	0.0481
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	1.631E-04	0.0001
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	9.973E-01	0.4215
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	1.053E-02	0.0044
Sr-90	7.908E-01	0.3342	0.000E+00	0.0000	0.000E+00	0.0000	3.815E-02	0.0161	3.351E-02	0.0142	6.385E-02	0.0270	1.244E+00	0.5259
<b>Total</b>	<b>7.908E-01</b>	<b>0.3342</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>3.815E-02</b>	<b>0.0161</b>	<b>3.351E-02</b>	<b>0.0142</b>	<b>6.385E-02</b>	<b>0.0270</b>	<b>2.366E+00</b>	<b>1.0000</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+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	1.052E-05	0.0000	3.109E-12	0.0000	0.000E+00	0.0000	3.365E-07	0.0000	3.152E-07	0.0000	8.229E-08	0.0000	6.835E-10	0.0000
Cs-134	7.396E-15	0.0000	7.942E-22	0.0000	0.000E+00	0.0000	5.774E-16	0.0000	6.871E-16	0.0000	1.051E-15	0.0000	2.255E-18	0.0000
Cs-137	1.180E-01	0.4490	2.433E-08	0.0000	0.000E+00	0.0000	1.748E-02	0.0665	2.080E-02	0.0791	3.180E-02	0.1210	6.825E-05	0.0003
Ni-63	0.000E+00	0.0000	1.858E-08	0.0000	0.000E+00	0.0000	9.214E-04	0.0035	8.120E-05	0.0003	3.761E-03	0.0143	3.051E-06	0.0000
Sr-90	3.749E-07	0.0000	4.372E-10	0.0000	0.000E+00	0.0000	1.774E-04	0.0007	2.058E-05	0.0001	5.596E-05	0.0002	9.137E-08	0.0000
Total	1.180E-01	0.4490	4.336E-08	0.0000	0.000E+00	0.0000	1.857E-02	0.0707	2.090E-02	0.0795	3.562E-02	0.1356	7.140E-05	0.0003

## 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	1.125E-05	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	9.713E-15	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	1.881E-01	0.7159
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	4.767E-03	0.0181
Sr-90	5.922E-02	0.2254	0.000E+00	0.0000	0.000E+00	0.0000	2.885E-03	0.0110	2.570E-03	0.0098	4.946E-03	0.0188	6.987E-02	0.2659
Total	5.922E-02	0.2254	0.000E+00	0.0000	0.000E+00	0.0000	2.885E-03	0.0110	2.570E-03	0.0098	4.946E-03	0.0188	2.628E-01	1.0000

\*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 = 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	3.863E-17	0.0000	1.143E-23	0.0000	0.000E+00	0.0000	7.998E-19	0.0000	8.085E-19	0.0000	2.029E-19	0.0000	2.512E-21	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	1.124E-03	0.5502	2.319E-10	0.0000	0.000E+00	0.0000	1.077E-04	0.0527	1.454E-04	0.0712	2.093E-04	0.1024	6.505E-07	0.0003
Ni-63	0.000E+00	0.0000	2.622E-09	0.0000	0.000E+00	0.0000	8.407E-05	0.0411	8.284E-06	0.0041	3.633E-04	0.1778	4.304E-07	0.0002
Sr-90	7.399E-16	0.0000	8.628E-19	0.0000	0.000E+00	0.0000	2.264E-13	0.0000	2.686E-14	0.0000	7.214E-14	0.0000	1.803E-16	0.0000
Total	1.124E-03	0.5502	2.853E-09	0.0000	0.000E+00	0.0000	1.918E-04	0.0939	1.537E-04	0.0752	5.726E-04	0.2802	1.081E-06	0.0005

## 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	4.044E-17	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	1.587E-03	0.7768
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	4.560E-04	0.2232
Sr-90	7.924E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.860E-12	0.0000	3.438E-12	0.0000	6.618E-12	0.0000	9.348E-11	0.0000
Total	7.924E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.860E-12	0.0000	3.438E-12	0.0000	6.618E-12	0.0000	2.043E-03	1.0000

\*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	6.780E-07	0.4901	0.000E+00	0.0000	0.000E+00	0.0000	2.737E-08	0.0198	1.817E-08	0.0131	6.599E-07	0.4770	1.383E-06	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>6.780E-07</b>	<b>0.4901</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>0.000E+00</b>	<b>0.0000</b>	<b>2.737E-08</b>	<b>0.0198</b>	<b>1.817E-08</b>	<b>0.0131</b>	<b>6.599E-07</b>	<b>0.4770</b>	<b>1.383E-06</b>	<b>1.0000</b>

\*Sum of all water independent and dependent pathways.

Summary : Zion Subsurface Soil 10,000 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	5.932E+00	5.200E+00	3.995E+00	1.589E+00	1.139E-01	1.125E-05	4.044E-17	0.000E+00
Cs-134	Cs-134	1.000E+00	3.933E+00	2.809E+00	1.434E+00	1.361E-01	1.631E-04	9.713E-15	4.905E-44	0.000E+00
Cs-137+D	Cs-137+D	1.000E+00	2.037E+00	1.989E+00	1.897E+00	1.606E+00	9.973E-01	1.881E-01	1.587E-03	0.000E+00
Ni-63	Ni-63	1.000E+00	1.473E-02	1.457E-02	1.425E-02	1.317E-02	1.053E-02	4.767E-03	4.560E-04	1.383E-06
Sr-90+D	Sr-90+D	1.000E+00	6.726E+00	6.078E+00	4.959E+00	2.433E+00	1.244E+00	6.987E-02	9.348E-11	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		4.214E+00	4.808E+00	6.257E+00	1.574E+01	2.195E+02	2.222E+06	*1.113E+15	*1.113E+15
Cs-134		6.357E+00	8.899E+00	1.744E+01	1.836E+02	1.532E+05	*1.283E+15	*1.283E+15	*1.283E+15
Cs-137		1.227E+01	1.257E+01	1.318E+01	1.557E+01	2.507E+01	1.329E+02	1.575E+04	*8.593E+13
Ni-63		1.697E+03	1.716E+03	1.755E+03	1.898E+03	2.375E+03	5.244E+03	5.482E+04	1.807E+07
Sr-90		3.717E+00	4.113E+00	5.041E+00	1.027E+01	2.009E+01	3.578E+02	2.674E+11	*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	5.932E+00	4.214E+00	5.932E+00	4.214E+00
Cs-134	1.000E+00	0.000E+00	3.933E+00	6.357E+00	3.933E+00	6.357E+00
Cs-137	1.000E+00	0.000E+00	2.037E+00	1.227E+01	2.037E+00	1.227E+01
Ni-63	1.000E+00	0.000E+00	1.473E-02	1.697E+03	1.473E-02	1.697E+03
Sr-90	1.000E+00	0.000E+00	6.726E+00	3.717E+00	6.726E+00	3.717E+00

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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	5.932E+00	5.200E+00	3.995E+00	1.589E+00	1.139E-01	1.125E-05	4.044E-17	0.000E+00	
Cs-134	Cs-134	1.000E+00	3.933E+00	2.809E+00	1.434E+00	1.361E-01	1.631E-04	9.713E-15	0.000E+00	0.000E+00	
Cs-137	Cs-137	1.000E+00	2.037E+00	1.989E+00	1.897E+00	1.606E+00	9.973E-01	1.881E-01	1.587E-03	0.000E+00	
Ni-63	Ni-63	1.000E+00	1.473E-02	1.457E-02	1.425E-02	1.317E-02	1.053E-02	4.767E-03	4.560E-04	1.383E-06	
Sr-90	Sr-90	1.000E+00	6.726E+00	6.078E+00	4.959E+00	2.433E+00	1.244E+00	6.987E-02	9.348E-11	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 = 1.75 seconds