Appendix B

RESRAD Physical Parameters and Activity Estimates

Table B-1
Activity Estimates for Dose Modeling and Physical Parameters
Decommissioning Plan
Retention Pond and Adjacent Area
Kaiser Aluminum & Chemical Corporation
Tulsa, Oklahoma

PRINCIPAL RADIONUCLIDE CONCENTRATIONS
Residual Conc. (Th-232+Th-228) pCi/g = **14.9**

Radionuclide	Assumed Ratio to Parent	Contaminated Soil Activity (pCi/g)	Amendment Activity (pCi/g)	Contaminated Zone Activity After Amendment (pCi/g)	Native Soil Background Activity (pCi/g)	Model Input Activity (pCi/g)
Th-232 pCi/g	1	7.45	NA [2]	7.45 [2]	1.1 [4]	6.35
Ra-228 pCi/g	1	7.45	NA	7.45	1.1	6.35
Th-228 pCi/g	1	7.45	NA	7.45	1.1	6.35
Th-230 pCi/g (to Th-232)	3.5 [1]	26.08	NA	26.08	1.1	24.98
Ra-226 pCi/g	0.0235	1.69	NA	1.69	1.1	0.59
Pb-210 pCi/g	0.0123	1.41	NA	1.41	1.1	0.31

DIMENSIONS OF CONTAMINATED ZONE

Parameter	Meter Units	Feet Units	Inputs for Dual Simulation 1A (meter units)	Inputs for Dual Simulation 1B (meter units)	Inputs for Dual Simulation 2 (meter units)	Inputs for Industrial Scenario
Volume of contaminated soil	124,072	4,381,080	2,211	663	124,072	124,072
Footprint	37,432	402,930	667	200	37,432	37,432
Thickness (with additive)	3.31	10.9	3.31	3.31	3.31	3.31
Sandstone proportion	0	–	–	–	–	–
Residual proportion	1	–	–	–	–	–
Cover thickness	3.05	10.0	3.95	0.95	3.05	3.05
Total thickness to 698'	6.36	20.9	–	–	–	–
Diameter of circular footprint	218.31	716.26	–	–	–	–

PHYSICAL PROPERTIES

Parameter	CONTAMINATED SOIL NUREG/ CR-5512/ V3 - silty clay	ROCK Shot rock/ sandstone NAVFAC	BACKFILL Unit 2 soil	SOIL & AMENDMENT Mixed in Place	Inputs for Dual Simulations 1A, 1B, 2, Industrial
Density (pcf)	–	135	107.39	–	–
Density (g/cm3)	1.696	2.16	1.72	1.70	1.70
Total porosity	0.36	0.4	0.35	0.36 [6]	0.36
Effective porosity	0.0306	0.37	0.035	0.03 [6]	0.03
Field capacity	0.2196 [5]	0.03	0.315	0.22 [6]	0.22
Hydraulic conductivity (m/yr)	6.91E-01	8.02E+03	5.32E-03	6.91E-01 [6]	0.69
Zone b	10.2	4.05	11.4	10.2 [6]	10.20
Kd - thorium silty clay	5,888	–	–	–	–
Kd - radium silty clay	3,548	–	–	–	–

NOTES
User inputs in shaded areas
(1) Observed ratios (ARS, 1995)
(2) NA = The addition of No Amendment is assumed.
(3) Literature values used for naturally occuring concentrations in backfill.
(4) Site-specific background (B. Koh and Associates, 1999)
(5) Field capacity assumed proportionate for silty clay
(6) Heterogeneous material more like silty clay

Appendix C

RESRAD Version 6.0 Parameter Descriptions

Table C-1
RESRAD 6.0 Parameter Descriptions
Planned Action for Unrestricted Release
Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

RESRAD MENU	Parameter	Site Use: Default	Site Use: Industrial	Site Use: Residential Dual Simulation 1A	Site Use: Residential Dual Simulation 1B	Site Use: Residential Dual Simulation 2	Parameter Name	Definition	Discussion (R# = REFERENCE See Footnote)
R011	Length parallel to aquifer flow (m)	1.000E+02	not used	2.180E+02	not used	2.180E+02	LCZPAQ	This length is the distance between two parallel lines that are perpendicular to the direction of aquifer flow; one at the upgradient edge of the contaminated zone, the other at the downgradient edge.	The length of the widest section of the area being modeled that is perpendicular to the groundwater flow is equal to the diameter of the circular area assumed by RESRAD. A value of 218 m^2 was used for alternatives 5B-3 and 5B-2.
R011	Basic radiation dose limit (mrem/yr)	3.000E+01	2.500E+01	2.500E+01	2.500E+01	2.500E+01	BRDL	NRC guideline of 25 mrem/yr.	NRC guideline of 25 mrem/yr.
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	6.000E-05	6.000E-04	6.000E-04	6.000E-04	VCZ	The contaminated erosion rate is the rate at which soil is removed by erosion. This parameter is only in effect when the cover depth equals zero. Appendix A of R1 has a value of 6.0E-04 for a 2% slope that can be used in a farming scenario and 6.0E-05 for a 2% slope that can be used for a nonfarming scenario. This value can also be calculated using the Universal Soil Loss Equation.	Appendix A of R1 suggests values 6.0E-04 for a 2% slope that can be used in a farming scenario and 6.0E-05 for a 2% slope that can be used for a nonfarming (industrial) scenario.
R013	Average annual wind speed (m/sec)	2.000E+00	4.560E+00	4.560E+00	4.560E+00	4.560E+00	WIND	The average annual wind speed is the overall average of the wind speed, measured near the surface in a 1-year period.	The National Climatic Data Center shows an average annual wind speed of 10.2 mph for Tulsa, Oklahoma. This converts to 4.56 m/sec.
R013	Humidity in air (g/cm**3)	8.000E+00	not used	not used	not used	not used	HUMID	This parameter is only relevant to the Tritium model.	This parameter is only used when Tritium (H-3) is a principal radionuclide.
R013	Evapotranspiration coefficient	5.000E-01	2.700E-01	2.700E-01	2.700E-01	2.700E-01	EVAPTR	The evapotranspiration coefficient represents the total volume of water that changes phase, that is, from the liquid or solid state to the gaseous state, near the ground surface and is transferred to the atmosphere during a fixed period of time. R3 Figure 12 presents potential values for the United States.	Using R3, Figure 12, an average of 0.27 was determined for Northeastern Oklahoma.
R013	Precipitation (m/yr)	1.000E+00	9.900E-01	9.900E-01	9.900E-01	9.900E-01	PRECIP	The precipitation rate is the average volume of water in the form of rain, snow, hail, or sleet that falls per unit of area and per unit of time at the site according to Section 9 of R3.	The Oklahoma Climatological Survey (OCS) reports 38.9 inches as the mean annual precipitation for Tulsa, Oklahoma. 38.9 inches converts to 0.99 m.
R013	Irrigation (m/yr)	2.000E-01	0.000E+00	0.000E+00	0.000E+00	3.800E-01	RI	The irrigation rate is the amount of water that is added to the soil at the site as an artificial water supply in order to permit agricultural use of the land (Section 11, R3 & Page 198, R1). From R1, the default value for a humid region is 0.2 m/yr where the default for an arid region is 1 m/yr. This value is sufficient to produce most crops. This parameter does not include water used for livestock.	R15 Oklahoma.
R013	Irrigation mode	overhead	overhead	overhead	not used	overhead	IDITCH	No information available.	Default.
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	not used	default	not used	default	WAREA	The watershed is a region contoured by an imaginary line connecting ridges or summits of high land and drained by or draining into a river, river system, or a body of water.	Default.
R013	Accuracy for water/soil computations	1.000E-03	not used	1.000E-03	not used	1.000E-03	EPS	No information available.	Default.
R014	Density of saturated zone (g/cm**3)	1.500E+00	not used	1.720E+00	not used	1.720E+00	DENSAQ	The density is the ratio of the mass of a material to its volume. The saturated zone is the layer of the uncontaminated zone that lies below the contaminated zone and the unsaturated zone but within the water table. Typical values of Dry Density are found in R3, R4, and R10.	According to R11, the predominant type of material that makes up the saturated zone is Units 2, 3, 4, 7 5 materials. This materials is assumed to be the same as the contaminated zone. The majority of the material is Units 2 & 3 silty clay; therefore, it is assumed that this material is representative of the saturated zone. R11 states that Units 2 & 3 silty clay is classified (USCS) as CL. R10 states that CL has a density between 95-120 pcf. This averages to
R014	Saturated zone total porosity	4.000E-01	not used	3.500E-01	not used	3.500E-01	TPSZ	Total porosity of a porous medium is the ratio of the pore volume to the total volume of a representative sample. Porosity values are listed in Table E.7 of R1 and Table 3.1 & 3.2 of R3.	Consistent with R15, the total porosity was estimated from the measured bulk density as 1-(DENSAQ/2.65).
R014	Saturated zone effective porosity	2.000E-01	not used	3.500E-02	not used	3.500E-02	EPSZ	Effective porosity of a porous medium is the ratio of the part of the pore volume where water can circulate to the total volume of a representative sample. Effective porosity should not be greater than total porosity. Porosity values are listed in Table E.7 of the R1 and Tables 3.1 & 3.2 of R3.	Effective porosity was estimated to be 10% of total porosity, typical of silty clays.
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	not used	3.160E-02	not used	3.160E-02	HCSZ	Hydraulic conductivity is the measure of the soil's ability to transmit water when submitted to a hydraulic gradient. Values are shown in Table E.2 of R1 and Tables 5.1 & 5.2 of R3.	The average measured hydraulic conductivity for Unit 2 was used, $5.3E^{-3}$ m/yr (R14).
R014	Saturated zone hydraulic gradient	2.000E-02	not used	1.700E-02	not used	1.700E-02	HGWT	The hydraulic gradient is the change in hydraulic head per unit of distance of the groundwater flow in a given direction.	A hydraulic gradient of 0.017 was assumed as stated in R11, Page 4-20 for the geological unit below the upper part of the saturated zone (Unit 1).
R014	Saturated zone b parameter	5.300E+00	not used	1.040E+01	not used	1.040E+01	BSZ	The b parameter is a hydrological parameter used to evaluate the saturation ratio. Values are listed in Table E.2 of R1.	A value of 10.4 was obtained from R1, Table E.2 for silty clay.
R014	Water table drop rate (m/yr)	1.000E-03	not used	1.000E-03	not used	1.000E-03	VWT	The water table drop rate is the rate at which the depth of the water table is lowered.	The default value of 0.001 was used.

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Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

RESRAD MENU	Parameter	Site Use: Default	Site Use: Industrial	Site Use: Residential Dual Simulation 1A	Site Use: Residential Dual Simulation 1B	Site Use: Residential Dual Simulation 2	Parameter Name	Definition	Discussion *(R# = REFERENCE See Footnote)*
R014	Well pump intake depth (m below water table)	1.000E+01	not used	1.450E+01	not used	1.450E+01	DWIBWT	According to R3, the well-pump intake depth is the screened depth of a well within the aquifer (the saturated zone).	According to R3, the well-pump intake depth is the screened depth of a well within the aquifer (the saturated zone). Information obtained from a local well driller shows that residential wells usually extend from 30 feet to 500 feet into the ground in the Tulsa area. Depending on the location, screen depths range from 20 to 75 feet. An average value of 47.5 feet is used for this parameter. This value converts to 14.5 m.
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	ND	ND	ND	MODEL	The choice of ND (nondispersion) or MB (mass balance) selects which of two models used for water/soil concentration ratio calculations. Selecting 0 uses the ND model where selecting 1 uses the MB model. The MB model is not recommended for contaminated zones greater than 1,000 m^2.	Nondispersion option was selected since area >1,000 m^2.
R014	Well pumping rate (m**3/yr)	2.500E+02	not used	1.180E+02	not used	1.180E+02	UW	The well pumping rate is the total volume of water obtained annually from the well for use by humans and livestock (Page 66, R1). The associated parameter in R7 is the V_{dr} parameter. This parameter is the volume of water removed from the aquifer per year for domestic uses. Table 3.8.1 provides values for volumes of water obtained from self-supplied sources for domestic use but does not include the volume of water obtained from on-site wells to be used by livestock. Table 3.8.1 states that 71,335 L of water is obtained from on-site sources in PA. This value converts to 71.3 m^3/yr. R2, Table 6.8 states that beef animals, milk cows, poultry, and egg-laying hens intake a total of 110.6 L/d of water. This converts to 40.4 m^3/yr. Totaling the volume of water used for domestic uses and the volume of water for livestock intake, the volume of water obtained from on-site wells annually for domestic and livestock use is 111.7 m^3/yr.	The well pumping rate is the total volume of water obtained annually from the well for use by humans and livestock (Page 66, R1). The associated parameter in R7 is the V_{dr} parameter. This parameter is the volume of water removed from the aquifer per year for domestic uses. Table 3.8.1 provides values for volumes of water obtained from self-supplied sources for domestic use but does not include the volume of water obtained from on-site wells to be used by livestock. Table 3.8.1 states that 119,031 L of water is obtained from on-site sources in OK. This value converts to 119 m^3/yr. R2, Table 6.8 states that beef animals, milk cows, poultry, and egg-laying hens intake a total of 110.6 L/d of water. This converts to 40.4 m^3/yr. Totaling the volume of water used for domestic uses and the volume of water for livestock intake, the volume of water obtained from on-site wells annually for domestic and livestock use is 159.4 m^3/yr. R16 suggests a value of 118 m^3/yr which was used for the preliminary dose assessment.
R015	Number of unsaturated zone strata	1.000E+00	not used	0.000E+00	not used	0.000E+00	NS	Number of unsaturated zones used in the model.	Based on review of R11, there is no unsaturated zone present. This site historically was a swamp. The contaminated zone is directly above the saturated zone; however, the extent of contamination does not extend directly down to the saturated zone.
R016	Distribution coefficients for Th-228								
R016	Contaminated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCC(4)		R15.
R016	Unsaturated zone 1 (cm**3/g)								
R016	Saturated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCS(4)		
R016	Leach rate (/yr)	0.000E+00					ALEACH(4)		Calculated by model.
R016	Solubility constant	0.000E+00	3.16E-09	3.16E-09	3.16E-09	3.16E-09	SOLUBK(4)		Measured detection limit (PNNL, 1999).
R016	Distribution coefficients for Th-230								
R016	Contaminated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCC(5)		R15. These assumptions apply to all alternatives.
R016	Unsaturated zone 1 (cm**3/g)								
R016	Saturated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCS(5)		
R016	Leach rate (/yr)	0.000E+00					ALEACH(5)		Calculated by model.
R016	Solubility constant	0.000E+00	3.16E-09	3.16E-09	3.16E-09	3.16E-09	SOLUBK(5)		Measured detection limit (PNNL, 1999).
R016	Distribution coefficients for Th-232								
R016	Contaminated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCC(6)		R15. These assumptions apply to all alternatives.
R016	Unsaturated zone 1 (cm**3/g)								
R016	Saturated zone (cm**3/g)	6.000E+04	5.888E+03	5.888E+03	5.888E+03	5.888E+03	DCNUCS(6)		R15. These assumptions apply to all alternatives.
R016	Leach rate (/yr)	0.000E+00					ALEACH(6)		Calculated by model.
R016	Solubility constant	0.000E+00	3.16E-09	3.16E-09	3.16E-09	3.16E-09	SOLUBK(6)		Measured detection limit (PNNL, 1999).
R016	Distribution coefficients for Ra-226								
R016	Contaminated zone (cm**3/g)	7.000E+01	3.548E+03	3.548E+03	3.548E+03	3.548E+03	DCNUCC(6)		R15. These assumptions apply to all alternatives.
R016	Saturated zone (cm**3/g)	7.000E+01	3.548E+03	3.548E+03	3.548E+03	3.548E+03	DCNUCS(6)		
R016	Leach rate (/yr)	0.000E+00					ALEACH(6)		Calculated by model.
R016	Solubility constant	0.000E+00	1.00E-09	1.00E-09	1.00E-09	1.00E-09	SOLUBK(6)		PNNL-11408
R016	Distribution coefficients for Ra-228								
R016	Contaminated zone (cm**3/g)	7.000E+01	3.548E+03	3.548E+03	3.548E+03	3.548E+03	DCNUCC(6)		R15. These assumptions apply to all alternatives.
R016	Saturated zone (cm**3/g)	7.000E+01	3.548E+03	3.548E+03	3.548E+03	3.548E+03	DCNUCS(6)		
R016	Leach rate (/yr)	0.000E+00					ALEACH(6)		Calculated by model.
R016	Solubility constant	0.000E+00	1.00E-09	1.00E-09	1.00E-09	1.00E-09	SOLUBK(6)		PNNL-11408

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Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

RESRAD MENU	Parameter	Site Use: Default	Site Use: Industrial	Site Use: Residential Dual Simulation 1A	Site Use: Residential Dual Simulation 1B	Site Use: Residential Dual Simulation 2	Parameter Name	Definition	Discussion *(R# = REFERENCE See Footnote)*
R017	Inhalation rate (m**3/yr)	8.400E+03	not used	not used	not used	not used	INHALR	R2, Table 6.23 can be used to determine the inhalation rate as follows: Volumetric breathing rate of 1.2 m^3/h * time spent indoors and outdoors and gardening which is 275 total effective days = 7920 m^3/yr. R3, Section 43 a more current reference, recommends using 20 m^3/d as the average adult average inhalation rate. Using this rate times the total effective days of 275 in a year, the inhalation rate becomes 5,500m^3/yr. This parameter is only used in a scenario where the contaminated material is exposed.	R3, Section 43 recommends using 20 m^3/d as the average adult inhalation rate. Using this rate times the total effective days of 275 in a year, as stated in R3, the inhalation rate becomes 5,500m^3/yr. Inhalation rate is only applicable to a scenario where the contaminated material is exposed and the inhalation pathway is turned on. For the industrial scenario, the receptor is on site for 83.3 d/y (R2). 20 m^3/d * 83.3 = 1,666 m^3/y. R16, for the resident farmer critical group an inhalation rate of 11,690 m/y was used.
R017	Mass loading for inhalation (g/m**3)	1.000E-04	not used	not used	not used	not used	MLINH	The mass loading parameter is the concentration of soil particles in the air (Section 35, R3). Table 6.23 lists 1.0 x 10^{-4} as the outdoor air dust loading factor.	A value of 1.0E-04 was obtained from Table 6.23 of R2, outdoor air dust loading factor. This value is applicable when the inhalation pathway is turned on. R16 was used for the resident farmer critical group.
R017	Exposure duration (yr)	3.000E+01	2.500E+01	3.000E+01	3.000E+01	3.000E+01	ED	No definition available.	USEPA standard default exposure factors for industrial and residential scenarios.
R017	Shielding factor, inhalation	4.000E-01	not used	not used	not used	not used	SHF3	The shielding factor for inhalation is the ratio of airborne dust concentration indoors on-site to the concentration outdoors on site (Section 36, R3).	A value of 0.5 was determined by using the air dust loading factor for indoors (5.0E-5) and outdoors (1.0E-4) obtained from Table 6.23 of R2. This parameter was also used in the industrial scenario.
R017	Shielding factor, external gamma	7.000E-01	5.512E-01	5.512E-01	4.790E-01	not used	SHF1	The shielding factor for external gamma is the ratio of the external gamma radiation level indoors on site to the radiation levels outdoors on site (Section 48, R3). R7, Page 3.4-1 defines the indoor shielding factor as the ratio of equivalent dose behind the shield to that in front of the shield. R7 states that R2 defines this parameter the same way. Table 6.23 of R2 lists 0.33 as the indoor shielding factor.	A value of 0.5512 was selected from Table 2 of R14 and R16. R2 (NUREG 5512) states that this value is 0.33. The value of 0.5512 is more conservative and, therefore, used for both residential and industrial scenarios.
R017	Fraction of time spent indoors	5.000E-01	2.200E-01	6.571E-01	6.571E-01	not used	FIND	The fraction of time spent indoors on site is the average fraction of time in a year during which an individual stays inside a house or a building on the contaminated site (Section 28, R3).	R16 for the resident farmer. For the industrial scenario, since the total time spent on site is 2,000 hr/yr, 92% of the time is assumed to be outdoors.
R017	Fraction of time spent outdoors (on site)	2.500E-01	8.000E-02	1.101E-01	0.000E+00	not used	FOTD	The fraction of time spent outdoors on site is the average fraction of time in a year during which an individual stays outdoors on the site (Section 29, R3).	R16 for the resident farmer. For the industrial scenario, 8% of the time spent on site is time spent outdoors.
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	1.000E+00	1.000E+00	not used	FS	Setting the shape factor to 1 shows that the contaminated zone is circular or greater than 1,200 m^2 and therefore the receptor is placed in the center (Page 69, R1 & Section 50, R3).	Setting this parameter to 1 shows that the contaminated zone is circular and, therefore, the receptor is placed in the center (R1 Section 4.6.3.7).
R017	Radii of shape factor array (used if FS = -1)	5.000E+01	not used	not used	not used	not used		NA if Shape Factor Flag parameter is set to 0.	NA if Shape Factor Flag parameter is set to 1.
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	not used	1.120E+02	not used	not used	DIET(1)	Consumption rate of items whether produced off site or on site. The Contaminated Fraction Parameter takes into account the percentage of the consumed/ingested portion of the item that is obtained from the contaminated site. Consumption rate of fruits, nonleafy (other vegetables), and grain are found in Table 6.15 of R2 (46, 51, & 69 kg/yr, respectively). R3 Section 42 gives default values for all but grain (veg, 73 & fruit, 51 kg/yr) but R2 provides information on all items. Both R2 and R3 values are similar.	R16 for the resident farmer. For the resident gardener, a diet factor of 0.25 was applied to default values provided in R2, Volume III, resulting in a consumption rate of 41.5 kg/yr.
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	not used	2.140E+01	not used	not used	DIET(2)	Consumption rate of leafy vegetables is found in Table 6.15 of R2. R3 Section 44 gives default values but was eliminated because R2 is more recent.	R16 for the resident farmer. For the resident gardener, a diet factor of 0.25 was applied to default values provided in R2, Volume III, resulting in a consumption rate of 2.75 kg/yr.
R018	Milk consumption (L/yr)	9.200E+01	not used	2.330E+02	not used	2.330E+02	DIET(3)	Consumption rate of milk is found in Table 6.15 of R2. R3 Section 47 gives default values but was eliminated because R2 is more recent.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R018	Meat and poultry consumption (kg/yr)	6.300E+01	not used	6.510E+01	not used	6.510E+01	DIET(4)	Consumption rates of meat and poultry (beef, 59 kg/yr, & poultry, 9 kg/yr) are found in Table 6.15 of R2. R3 Section 46 gives values that are similar to R2.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R018	Fish consumption (kg/yr)	5.400E+00	not used	not used	not used	not used	DIET(5)	Consumption rate of fish is found on page 6.28 of R2. R3 Section 41 gives default values but was eliminated because R2 is more recent.	R16 for the resident farmer.
R018	Other seafood consumption (kg/yr)	9.000E-01	not used	not used	not used	not used	DIET(6)	Consumption rate of other seafood (lobsters, oysters, scallops, shrimp, and other nonfish) is assumed to be zero.	Zero was assumed because seafood would not be impacted from the site.

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R018	Soil ingestion rate (g/yr)	3.650E+01	not used	not used	not used	not used	SOIL	The soil ingestion rate is the accidental ingestion rate of soil material or soil dust. This value is always applicable to the residential scenario. R2 Page 6.15, uses a value of 50 mg/d (18.3 g/yr) as the value for the residential scenario. Also found in R2 Table 6.23. R3 Section 38 references 0.1 g/d (36.5 g/yr) for the ingestion rate for residential scenario. This 36.5 g/yr value was eliminated because R2 is a more recent reference .	R16 for the resident farmer.
R018	Drinking water intake (L/yr)	5.100E+02	not used	not used	not used	5.100E+02	DWI	Average amount of water consumed by an adult. R1 states that drinking water intake is 510 L/yr. R2, Section 6.5.8 states that the intake is 2 L/d. R2 is more current.	R16 for the resident farmer.
R018	Contamination fraction of drinking water	1.000E+00	not used	not used	not used	1.000E+00	FDW	Fraction of substance used that originates from the contaminated site. Only used when applicable pathway is on. For example, for a scenario that does obtain drinking water from on site, this value is zero. Off-site water is assumed to be uncontaminated (Page 71, R1). If the drinking water pathway is turned off, the value is not used by the program and essentially is zero.	R16, this parameter is set to 100% for the residential scenario assuming that all drinking water is obtained from on site.
R018	Contamination fraction of household water	1.000E+00	not used	not used	not used	not used	FHHW	Fraction of substance used that originates from the contaminated site.	Default, program controlled.
R018	Contamination fraction of livestock water	1.000E+00	not used	0.000E+00	not used	1.000E+00	FLW	Fraction of substance used that originates from the contaminated site.	R16, this parameter is set to 100% for the residential farmer scenario assuming that all water is obtained from on site. However, it is assumed that livestock are not raised by resident gardeners.
R018	Contamination fraction of irrigation water	1.000E+00	not used	0.000E+00	not used	1.000E+00	FIRW	Fraction of substance used that originates from the contaminated site.	R16, this parameter is set to 100% for the residential scenario assuming that all water is obtained from on site.
R018	Contamination fraction of aquatic food	5.000E-01	not used	not used	not used	not used	FR9	Fraction of substance used that originates from the contaminated site. Only in effect when the aquatic pathway is turned on. It is assumed in R3, Section 41 that if there is a surface water body located on site, it will provide 50% of the consumed seafood.	R16 for the resident farmer.
R018	Contamination fraction of plant food	-1.000E+00	not used	1.000E+00	not used	not used	FPLANT	Fraction of substance used that originates from the contaminated site. Only in effect when plant ingestion pathway is turned on. R3, Section 42 discusses the percentage of homegrown vegetable and fruit products versus total product consumed. As stated in R3, Section 42, the percentage of homegrown vegetables consumed is 25% of the total intake rate and the percentage of homegrown fruits consumed is 20% of the total intake rate. R3 references NRC Reg. Guide 1.109 for grain consumption rates. This reference provided a homegrown consumption percentage of 24% for grain. Averaging these values together, produced a fraction of 23%.	R16 for the resident farmer.
R018	Contamination fraction of meat	-1.000E+00	not used	1.000E+00	not used	1.000E+00	FMEAT	Fraction of substance used that originates from the contaminated site. Only in effect when meat ingestion pathway is turned on. R3, Section 46 states that 44% of total intake of beef and poultry is obtained from on site. R3 referenced a 1966 USDA report for the percentage. This percentage most likely has been lowered due to current livestock raising practices. Therefore, the value of 25% seems more representative of today's practices and those for the future.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R018	Contamination fraction of milk	-1.000E+00	not used	1.000E+00	not used	1.000E+00	FMILK	Fraction of substance used that originates from the contaminated site. Only in effect when milk ingestion pathway is turned on. R3, Section 47 states that 40% of total intake of milk is obtained from on site sources. R3 referenced a 1966 USDA report for the percentage. This percentage most likely has been lowered due to current livestoc raising practices. Therefore, the value of 25% seems more representative of today's practices and those for the future.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	not used	2.710E+01	not used	2.710E+01	LFI5	Rate at which beef animals intake fodder (forage, hay, and grain). R2 Table 6.8, Fodder intake (fresh forage + stored hay + stored grain) for beef animals. 27 + 14 + 3 = 44 kg/d.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.

Table C-1
RESRAD 6.0 Parameter Descriptions
Planned Action for Unrestricted Release
Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

RESRAD MENU	Parameter	Site Use: Default	Industrial	Residential Dual Simulation 1A	Residential Dual Simulation 1B	Residential Dual Simulation 2	Parameter Name	Definition	Discussion *(R# = REFERENCE See Footnote)*
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	not used	6.325E+01	not used	6.325E+01	LFI6	Rate at which milk cows intake fodder (forage, hay, and grain). R2 Table 6.8, Fodder Intake (fresh forage + stored hay + stored grain) for milk cows. 36 + 29 + 2 = 67 kg/d	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R019	Livestock water intake for meat (L/day)	5.000E+01	not used	5.000E+01	not used	5.000E+01	LWI5	Rate at which beef animals intake water. R2 Table 6.8 states Water intake rate for beef animals of 50 kg/d.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R019	Livestock water intake for milk (L/day)	1.600E+02	not used	6.000E+01	not used	6.000E+01	LWI6	Rate at which milk cows intake water.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
R019	Livestock soil intake (kg/day)	5.000E-01	not used	0.000E+00	not used	0.000E+00	LSI	Rate at which beef animals and milk cows intake soil.	R2 Section 6.5.1, page 6.20 uses 0.05 for beef and milk cows. This value is also the RESRAD program default. This pathway is not assumed to applicable to the resident gardener.
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	not used	1.000E-04	not used	0.000E+00	MLFD	Table 6.23 of R2 lists the outdoor air dust loading factor.	A value of 1.0E-04 was obtained from Table 6.23 of R2, outdoor air dust loading factor. This value is also the RESRAD program default.
R019	Depth of soil mixing layer (m)	1.500E-01	not used	1.500E-01	not used	0.000E+00	DM	Table 6.23 of R2 lists the value of 0.15 for the thickness of surface soil layer.	A value of 0.15 was obtained from Table 6.23 of R2, thickness of surface-soil layer. This value is also the RESRAD program default.
R019	Depth of roots (m)	9.000E-01	not used	9.000E-01	not used	9.000E-01	DROOT	This parameter is the average root depth of various plants grown in the contaminated zone. The root depth varies for different plants. R3, Section 37 states that most of the plant roots from which nutrients are obtained usually extend to less than 1 m below the surface.	R3, Section 37 states that most of the plant roots from which nutrients are obtained usually extend to less than 1 m below the surface. Therefore, the RESRAD default value of 0.9 m was used.
R019	Drinking water fraction from groundwater	1.000E+00	not used	not used	not used	1.000E+00	FGWDW	Of the drinking water obtained from on-site sources (groundwater or surface water), this parameter is the percentage of that water that originates from groundwater. Selecting 1 means 100% of drinking water is obtained from site groundwater. Note: This parameter is in effect even when the drinking water pathway is turned off.	Assumed to be 100% from on-site groundwater as there is no sufficient source of surface water on site. Municipal water is assumed to be unavailable.
R019	Household water fraction from groundwater	1.000E+00	not used	not used	not used	not used	FGWHH	Of the household water obtained from on-site sources (groundwater or surface water), this parameter is the percentage of that water that originates from groundwater. Selecting 1 means 100% of household water is obtained from site groundwater.	Assumed to be 100% from on-site groundwater as there is no sufficient source of surface water on site. Municipal water is assumed to be unavailable.
R019	Livestock water fraction from groundwater	1.000E+00	not used	1.000E+00	not used	1.000E+00	FGWLW	Of the livestock water obtained from on-site sources (groundwater or surface water), this parameter is the percentage of that water that originates from groundwater. Selecting 1 means 100% of livestock water is obtained from site groundwater.	Assumed to be 100% from on-site groundwater as there is no sufficient source of surface water on site. Municipal water is assumed to be unavailable. Not applicable to resident gardener scenario.
R019	Irrigation fraction from groundwater	1.000E+00	not used	1.000E+00	not used	1.000E+00	FGWIR	Percentage of irrigation water obtained from on-site groundwater rather than on-site surface water	Assumed to be 100% from on-site groundwater as there is no sufficient source of surface water on site. Municipal water is assumed to be unavailable.
R019B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	not used	3.000E+00	not used	not used		Information presented in R2 Section 6.5.7, Page 6.23. Parameters in Menu R019B are new to RESRAD in Version 5.82.	This set of parameters is only applicable to the residential scenario. Table 6.14 of R2 shows 4.0 kg/m^2 for other vegetable crop yield, but RESRAD only allows a max of 3.0 kg/m^2.
R019B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	not used	2.000E+00	not used	not used		Information presented in R2 Section 6.5.7, Page 6.23.	Table 6.14 of R2 shows 2.0 kg/m^2 for leafy vegetable crop yield.
R019B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	not used	1.000E+00	not used	1.000E+00		Information presented in R2 Section 6.5.7, Page 6.23.	Table 6.14 of R2 shows 1.0 kg/m^2 for grains crop yield. This factor is not applicable to resident gardner scenario.
R019B	Growing Season for Non-Leafy (years)	1.700E-01	not used	2.500E-01	not used	not used		Information presented in R2 Section 6.5.6, Page 6.21 and Table 6.12.	Table 6.12 of R2 shows 90 day (0.25 yr) growing season for other vegetables.
R019B	Growing Season for Leafy (years)	2.500E-01	not used	1.200E-01	not used	not used		Information presented in R2 Section 6.5.6, Page 6.21 and Table 6.12.	Table 6.12 of R2 shows 45 d (0.12 yr) growing season for leafy vegetables.
R019B	Growing Season for Fodder (years)	8.000E-02	not used	1.200E-01	not used	1.200E-01		Information presented in R2 Section 6.5.6, Page 6.21 and Table 6.12.	Table 6.12 of R2 shows 45 d (0.12 yr) growing season for hay. This factor is not applicable to the resident gardener scenario.
R019B	Translocation Factor for Non-Leafy	1.000E-01	not used	1.000E-01	not used	not used		The translocation fraction is the fraction of activity deposited on plant surfaces that reaches the edible parts of the nonleafy plant.	Table 6.12 of R2 shows 45 d (0.12 yr) growing season for hay.
R019B	Translocation Factor for Leafy	1.000E+00	not used	1.000E+00	not used	not used		The translocation fraction is the fraction of activity deposited on plant surfaces that reaches the edible parts of the leafy plant.	Table 6.23 Page 6.41 of R2 shows 1.0 factor for leafy vegetables.
R019B	Translocation Factor for Fodder	1.000E+00	not used	1.000E-01	not used	1.000E-01		The translocation fraction is the fraction of activity deposited on plant surfaces that reaches the edible parts of the (grains) plant.	Table 6.23 Page 6.41 of R2 shows 0.1 factor for grains. This factor is not applicable to resident gardeners.

Table C-1
RESRAD 6.0 Parameter Descriptions
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Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

RESRAD MENU	Parameter	Site Use: Default	Site Use: Industrial	Site Use: Residential Dual Simulation 1A	Site Use: Residential Dual Simulation 1B	Site Use: Residential Dual Simulation 2	Parameter Name	Definition	Discussion *(R# = REFERENCE See Footnote)*
R019B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	not used	2.500E-01	not used	not used		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2.
R019B	Dry Foliar Interception Fraction for Leafy	2.500E-01	not used	2.500E-01	not used	not used		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2.
R019B	Dry Foliar Interception Fraction for Fodder	2.500E-01	not used	2.500E-01	not used	2.500E-01		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2. This factor is not applicable to resident gardener scenario.
R019B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	not used	2.500E-01	not used	not used		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2.
R019B	Wet Foliar Interception Fraction for Leafy	2.500E-01	not used	2.500E-01	not used	not used		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2.
R019B	Wet Foliar Interception Fraction for Fodder	2.500E-01	not used	2.500E-01	not used	2.500E-01		The interception fraction as defined on Page 6.27, of R2, is the fraction of deposited activity that is retained on plant surfaces. A value of 0.25 is used for all plant types. R2 does not discuss a difference between wet and dry fractions.	Table 6.23 Page 6.41 of R2. This factor is not applicable to resident gardener scenario.
R019B	Weathering Removal Constant for Vegetation	2.000E+01	not used	2.000E+01	not used	2.000E+01		No information on this parameters was found.	Default.
STOR	Storage times of contaminated foodstuffs (days):							These parameters are affected by the consumption rates listed above. For example, if a consumption rate is set to zero the corresponding storage time is irrelevant.	These parameters are affected by the consumption rates listed above. For example, if a consumption rate is set to zero the corresponding storage time is irrelevant.
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	not used	1.400E+01	not used	not used	STOR_T(1)	The storage time for fruits, nonleafy vegetables, and grains is the time between harvest and consumption. The sensitivity analysis shows that increasing or decreasing this parameter by a factor of 2 does not have an effect on the dose.	R16 for the resident farmer.
STOR	Leafy vegetables	1.000E+00	not used	1.000E+00	not used	not used	STOR_T(2)	The storage time for leafy vegetables is the time between harvest and consumption. The sensitivity analysis shows that increasing or decreasing this parameter by a factor of 2 does not have an effect on the dose.	R16 for the resident farmer.
STOR	Milk	1.000E+00	not used	1.000E+00	not used	1.000E+00	STOR_T(3)	The storage time for milk is the time between acquisition and consumption. The sensitivity analysis shows that increasing or decreasing this parameter by a factor of 2 does not have an effect on the dose.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
STOR	Meat and poultry	2.000E+01	not used	2.000E+01	not used	2.000E+01	STOR_T(4)	The storage time for meat and poultry is the time between slaughter and consumption. The sensitivity analysis shows that increasing or decreasing this parameter by a factor of 2 does not have an effect on the dose.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.
STOR	Fish	7.000E+00	not used	not used	not used	not used	STOR_T(5)	The storage time for fish is the time between catch and consumption. The sensitivity analysis shows that increasing or decreasing this parameter by a factor of 2 does not have an effect on the dose.	No reference material available for this parameter; therefore, the RESRAD default value was used.
STOR	Crustacea and mollusks	7.000E+00	not used	not used	not used	not used	STOR_T(6)	The storage time for crustacea and mollusks is the time between catch and consumption.	No reference material available for this parameter therefore, the RESRAD default value was used.
STOR	Well water	1.000E+00	not used	1.000E+00	not used	1.000E+00	STOR_T(7)	The storage time for well water is the time between acquisition and consumption. No information available in R1, R2, or R3.	No reference material available for this parameter; therefore, the RESRAD default value was used.
STOR	Surface water	1.000E+00	not used	not used	not used	1.000E+00	STOR_T(8)	The storage time for surface water is the time between acquisition and consumption.	No reference material available for this parameter; therefore, the RESRAD default value was used.
STOR	Livestock fodder	4.500E+01	not used	0.000E+00	not used	0.000E+00	STOR_T(9)	The storage time for livestock is the time between acquisition and consumption.	R16 for the resident farmer. This pathway is not assumed to be applicable to the resident gardener.

Table C-1
RESRAD 6.0 Parameter Descriptions
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Kaiser Aluminum Chemical Corporation
Tulsa, Oklahoma

References:
R1 = Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0, September 1993.
R2 = Residual Radioactive Contamination From Decommissioning, NUREG/CR-5512-Volume I, June 1994; Volume III, June 2000.
R3 = Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil, Argonne National Laboratory, April 1993.
R4 = Goodman, Richard, E., Introduction to Rock Mechanics, 1989, John Wiley and Sons.
R5 = EPA Handbook groundwater and Wellhead Protection EPA/625/R-94/001.
R6 = The Hydrologic Evaluation of Landfill Performance (HELP) Model, US EPA, Office of Research and Development, EPA/600/R-94/168a, September 1994.
R7 = Review of Parameter Data for the NUREG/CR-5512 Residential Farmer Scenario and Probability Distributions for the DandD Parameter Analysis, Environmental Risk and Decision Analysis Department, Sandia National Laboratories, January 30, 1998.
R8 = Letter Report, Review of Technical Documents - Kaiser Aluminum and Chemical Corporation's Tulsa, Oklahoma Facility, Earth Sciences Consultants, Inc., October 14, 1999.
R9 = ARS Field Characterization Report, Kaiser Aluminum and Chemical Corporation, 1995.
R10 = Naval Facilities Engineering Command (NAVFAC), Foundations and Earth Structures, Design Manual 7.02, September 1986, Chapter 2, Table 1.
R11 = Hydrologic and Geologic Investigation Report, Kaiser Aluminum Specialty Products, A & M Engineering and Environmental Services, Inc., July 1999.
R12 = RESRAD for Windows, Version 5.82, U.S. Department of Energy, Environmental Assessment Division of Argonne National.
R13 = Site E Kaiser Specialty Products, Preliminary Report, PNNL.
R14 = Geotechnical Brief, Earth Sciences, in progress.
R15 = Draft NUREG/CR-5512 V3 Parameter Analysis for the NUREG/CR-5512 Residential Farmer Scenario.
R16 = Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning, draft, NRC 1999.

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Earth Sciences Consultants, Inc.

Appendix D

RESRAD Version 6.0 Summary Reports for Deterministic Models

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Dose Conversion Factor (and Related) Parameter Summary
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(1)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(2)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(3)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(6)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(1)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(2)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(3)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(6)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)

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

File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)

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)	6.670E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.310E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	2.180E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+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): Pb-210	3.100E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.900E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.350E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-228	6.350E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	2.498E+01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-232	6.350E+00	0.000E+00	---	S1(6)
	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(6)
R013	Cover depth (m)	3.950E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.720E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	6.000E-04	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.700E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.600E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.200E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.910E-01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.020E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.560E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	2.700E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	9.900E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-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
	Density of saturated zone (g/cm**3)	1.720E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.500E-02	2.000E-01	---	EPSZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone field capacity	3.150E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	3.160E-02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.700E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	1.040E+01	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.450E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.180E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
[illegible]	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
[illegible]	Leach rate (/yr)	0.000E+00	0.000E+00	6.409E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	3.584E+03	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.792E-05	ALEACH(2)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(2)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.810E-05	ALEACH(3)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(3)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.091E-05	ALEACH(4)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.091E-05	ALEACH(5)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(5)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	7.898E+04	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.131E-07	ALEACH(6)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(6)
R017	Inhalation rate (m**3/yr)	not used	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	not used	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	not used	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	5.512E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.180E-01	2.500E-01	---	FOTD
7	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
	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)
	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	0.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	0.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	1.000E+00	-1	---	FPLANT
R018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	2.710E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	6.325E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	6.000E+01	1.600E+02	---	LWI6
9	Livestock soil intake (kg/day)	0.000E+00	5.000E-01	---	LSI
	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	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)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	2.500E-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)	1.500E-01	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	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
C14	DCF correction factor for gaseous forms of C14	not used	1.234E+02	---	CO2F
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	2.000E+01	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)
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	0.000E+00	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
[illegible]	Total porosity of the cover material	not used	4.000E-01	---	TPCV
[illegible]	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	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions	
Area:	667.00 square meters
Thickness:	3.31 meters
Cover Depth:	3.95 meters

Initial Soil Concentrations, pCi/g	
Pb-210	3.100E-01
Ra-226	5.900E-01
Ra-228	6.350E+00
Th-228	6.350E+00
Th-230	2.498E+01
Th-232	6.350E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 25 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):	5.287E-22	5.328E-22	5.411E-22	5.713E-22	6.670E-22	1.147E-21	5.405E-21	1.233E-18
M(t):	2.115E-23	2.131E-23	2.165E-23	2.285E-23	2.668E-23	4.589E-23	2.162E-22	4.931E-20

Maximum TDOSE(t): 1.233E-18 mrem/yr at t = 1.000E+03 years

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.349E-25	0.0004	0.000E+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
Ra-228	8.187E-23	0.1548	0.000E+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
Th-228	4.432E-22	0.8382	0.000E+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
Th-230	2.157E-27	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
Th-232	3.426E-24	0.0065	0.000E+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	5.287E-22	1.0000	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 = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
ide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.349E-25	0.0004
Ra-228	0.000E+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	8.187E-23	0.1548
Th-228	0.000E+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	4.432E-22	0.8382
Th-230	0.000E+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	2.157E-27	0.0000
Th-232	0.000E+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	3.426E-24	0.0065
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	5.287E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.368E-25	0.0004	0.000E+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
Ra-228	2.006E-22	0.3764	0.000E+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
Th-228	3.109E-22	0.5835	0.000E+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
Th-230	6.520E-27	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
Th-232	2.115E-23	0.0397	0.000E+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	5.328E-22	1.0000	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+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.368E-25	0.0004
Ra-228	0.000E+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	2.006E-22	0.3764
Th-228	0.000E+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	3.109E-22	0.5835
Th-230	0.000E+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	6.520E-27	0.0000
Th-232	0.000E+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	2.115E-23	0.0397
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	5.328E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.407E-25	0.0004	0.000E+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
Ra-228	3.026E-22	0.5592	0.000E+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
Th-228	1.530E-22	0.2827	0.000E+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
Th-230	1.546E-26	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
Th-232	8.533E-23	0.1577	0.000E+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	5.411E-22	1.0000	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 = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
ide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.407E-25	0.0004
Ra-228	0.000E+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	3.026E-22	0.5592
Th-228	0.000E+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	1.530E-22	0.2827
Th-230	0.000E+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	1.546E-26	0.0000
Th-232	0.000E+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	8.533E-23	0.1577
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	5.411E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.547E-25	0.0004	0.000E+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
Ra-228	2.223E-22	0.3891	0.000E+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
Th-228	1.278E-23	0.0224	0.000E+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
Th-230	4.917E-26	0.0001	0.000E+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
Th-232	3.359E-22	0.5880	0.000E+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	5.713E-22	1.0000	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+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.547E-25	0.0004
Ra-228	0.000E+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	2.223E-22	0.3891
Th-228	0.000E+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	1.278E-23	0.0224
Th-230	0.000E+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	4.917E-26	0.0001
Th-232	0.000E+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	3.359E-22	0.5880
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	5.713E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.996E-25	0.0004	0.000E+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
Ra-228	2.527E-23	0.0379	0.000E+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
Th-228	1.064E-26	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
Th-230	1.687E-25	0.0003	0.000E+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
Th-232	6.412E-22	0.9614	0.000E+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	6.670E-22	1.0000	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 = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.996E-25	0.0004
Ra-228	0.000E+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	2.527E-23	0.0379
Th-228	0.000E+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	1.064E-26	0.0000
Th-230	0.000E+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	1.687E-25	0.0003
Th-232	0.000E+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	6.412E-22	0.9614
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	6.670E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	5.287E-25	0.0005	0.000E+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
Ra-228	9.393E-27	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
Th-228	0.000E+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
Th-230	9.961E-25	0.0009	0.000E+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
Th-232	1.146E-21	0.9987	0.000E+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	1.147E-21	1.0000	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+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
·ide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	5.287E-25	0.0005
Ra-228	0.000E+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	9.393E-27	0.0000
Th-228	0.000E+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
Th-230	0.000E+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	9.961E-25	0.0009
Th-232	0.000E+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	1.146E-21	0.9987
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	1.147E-21	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.680E-24	0.0005	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	1.577E-23	0.0029	0.000E+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
Th-232	5.387E-21	0.9966	0.000E+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	5.405E-21	1.0000	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 = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.680E-24	0.0005
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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	1.577E-23	0.0029
Th-232	0.000E+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	5.387E-21	0.9966
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	5.405E-21	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	7.851E-22	0.0006	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	1.801E-20	0.0146	0.000E+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
Th-232	1.214E-18	0.9847	0.000E+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	1.233E-18	1.0000	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-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
ide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	7.851E-22	0.0006
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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	1.801E-20	0.0146
Th-232	0.000E+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	1.214E-18	0.9847
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	1.233E-18	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(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
Pb-210	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	3.981E-25	4.013E-25	4.079E-25	4.317E-25	5.078E-25	8.962E-25	4.542E-24	1.331E-21
Ra-226	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	∑DSR(j)		3.981E-25	4.013E-25	4.079E-25	4.317E-25	5.078E-25	8.962E-25	4.542E-24	1.331E-21
Ra-228	Ra-228	1.000E+00	6.705E-27	5.998E-27	4.799E-27	2.199E-27	2.366E-28	9.655E-32	2.002E-41	0.000E+00
Ra-228	Th-228	1.000E+00	1.289E-23	3.158E-23	4.765E-23	3.500E-23	3.979E-24	1.479E-27	2.345E-37	0.000E+00
Ra-228	∑DSR(j)		1.289E-23	3.158E-23	4.765E-23	3.500E-23	3.979E-24	1.479E-27	2.345E-37	0.000E+00
Th-228	Th-228	1.000E+00	6.980E-23	4.896E-23	2.409E-23	2.013E-24	1.675E-27	2.782E-38	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Ra-226	1.000E+00	8.636E-29	2.610E-28	6.191E-28	1.969E-27	6.754E-27	3.988E-26	6.313E-25	7.212E-22
Th-230	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	∑DSR(j)		8.636E-29	2.610E-28	6.191E-28	1.969E-27	6.754E-27	3.988E-26	6.313E-25	7.212E-22
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Ra-228	1.000E+00	4.129E-28	1.185E-27	2.515E-27	5.595E-27	9.110E-27	1.765E-26	1.085E-25	6.253E-23
Th-232	Th-228	1.000E+00	5.391E-25	3.329E-24	1.344E-23	5.289E-23	1.010E-22	1.804E-22	8.482E-22	1.911E-19
Th-232	∑DSR(j)		5.395E-25	3.331E-24	1.344E-23	5.290E-23	1.010E-22	1.804E-22	8.483E-22	1.912E-19

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 25 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
Pb-210	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13
Ra-226	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11
Ra-228	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14
Th-228	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14
Th-230	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10
Th-232	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05

*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 = 1.000E+03 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	3.100E-01	0.000E+00	0.000E+00	*7.631E+13	0.000E+00	*7.631E+13
Ra-226	5.900E-01	1.000E+03	1.331E-21	*9.882E+11	1.331E-21	*9.882E+11
Ra-228	6.350E+00	4.260 ± 0.009	4.956E-23	*2.726E+14	0.000E+00	*2.726E+14
Th-228	6.350E+00	0.000E+00	6.980E-23	*8.192E+14	0.000E+00	*8.192E+14
Th-230	2.498E+01	1.000E+03	7.212E-22	*2.018E+10	7.212E-22	*2.018E+10
Th-232	6.350E+00	1.000E+03	1.912E-19	*1.096E+05	1.912E-19	*1.096E+05

*At specific activity limit

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

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	∑DOSE(j):		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	2.349E-25	2.368E-25	2.407E-25	2.547E-25	2.996E-25	5.287E-25	2.680E-24	7.851E-22
Ra-226	Th-230	1.000E+00	2.157E-27	6.520E-27	1.546E-26	4.917E-26	1.687E-25	9.961E-25	1.577E-23	1.801E-20
Ra-226	∑DOSE(j):		2.370E-25	2.433E-25	2.561E-25	3.039E-25	4.683E-25	1.525E-24	1.845E-23	1.880E-20
Ra-228	Ra-228	1.000E+00	4.258E-26	3.809E-26	3.048E-26	1.396E-26	1.502E-27	0.000E+00	0.000E+00	0.000E+00
Ra-228	Th-232	1.000E+00	2.622E-27	7.526E-27	1.597E-26	3.553E-26	5.785E-26	1.121E-25	6.890E-25	3.970E-22
Ra-228	∑DOSE(j):		4.520E-26	4.561E-26	4.645E-26	4.949E-26	5.935E-26	1.121E-25	6.890E-25	3.970E-22
Th-228	Ra-228	1.000E+00	8.183E-23	2.005E-22	3.026E-22	2.223E-22	2.526E-23	9.393E-27	0.000E+00	0.000E+00
Th-228	Th-228	1.000E+00	4.432E-22	3.109E-22	1.530E-22	1.278E-23	1.064E-26	0.000E+00	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	3.423E-24	2.114E-23	8.531E-23	3.359E-22	6.412E-22	1.146E-21	5.386E-21	1.213E-18
Th-228	∑DOSE(j):		5.285E-22	5.326E-22	5.408E-22	5.709E-22	6.665E-22	1.146E-21	5.386E-21	1.213E-18
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

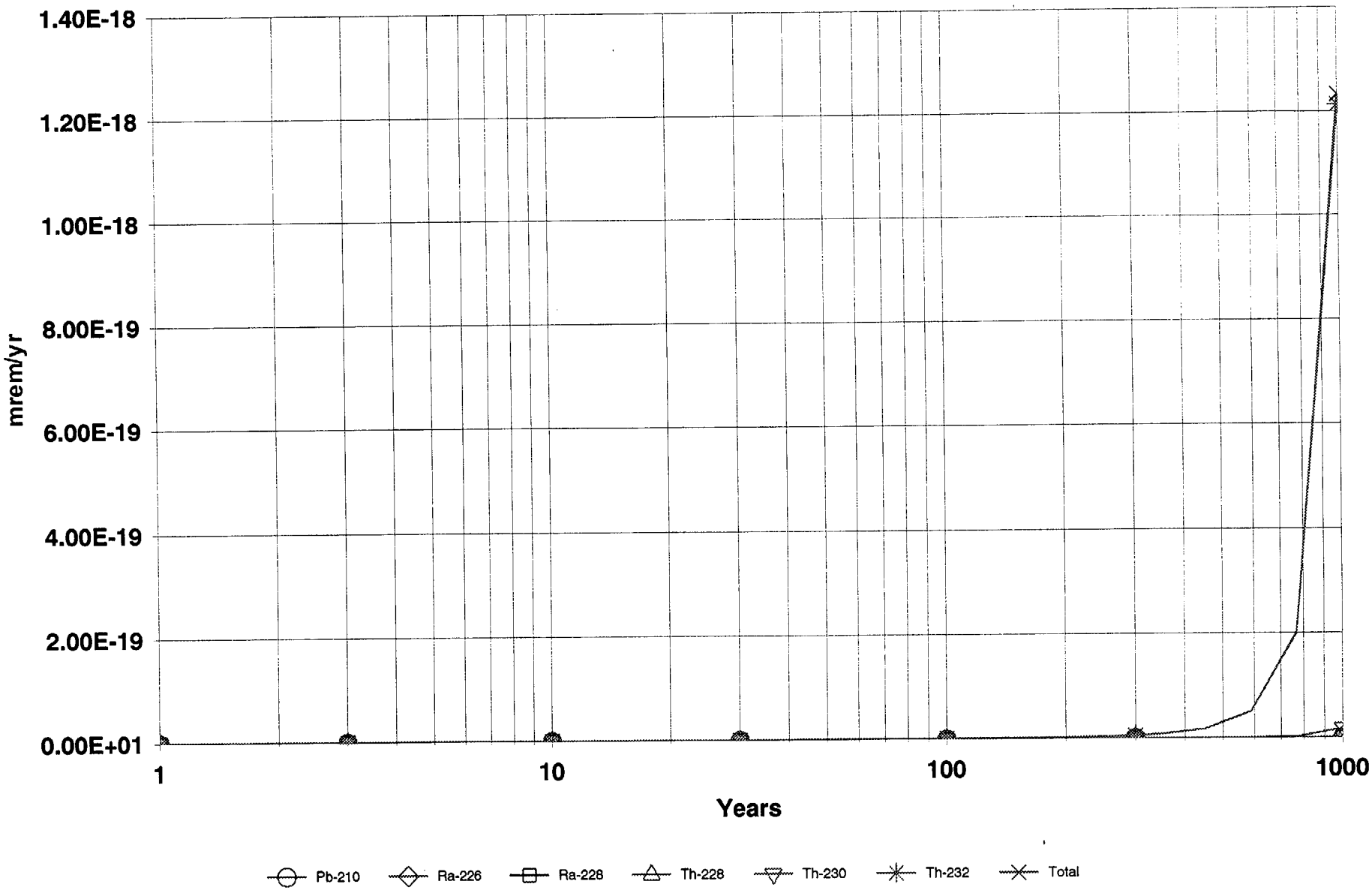
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	3.100E-01	3.003E-01	2.819E-01	2.257E-01	1.197E-01	1.299E-02	2.281E-05	5.175E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.805E-02	5.244E-02	1.568E-01	3.521E-01	5.360E-01	5.121E-01	3.735E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.664E-04	1.466E-03	1.515E-02	1.123E-01	7.263E-01	2.672E+00	8.232E+00
Pb-210	∑S(j):		3.100E-01	3.185E-01	3.358E-01	3.977E-01	5.841E-01	1.275E+00	3.184E+00	8.606E+00
Ra-226	Ra-226	1.000E+00	5.900E-01	5.897E-01	5.892E-01	5.873E-01	5.821E-01	5.640E-01	5.153E-01	3.758E-01
Ra-226	Th-230	1.000E+00	0.000E+00	1.082E-02	3.244E-02	1.080E-01	3.224E-01	1.057E+00	3.027E+00	8.617E+00
Ra-226	∑S(j):		5.900E-01	6.006E-01	6.216E-01	6.953E-01	9.044E-01	1.621E+00	3.542E+00	8.993E+00
Ra-228	Ra-228	1.000E+00	6.350E+00	5.629E+00	4.423E+00	1.902E+00	1.706E-01	3.687E-05	1.243E-15	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.211E-01	1.927E+00	4.448E+00	6.178E+00	6.349E+00	6.348E+00	6.344E+00
Ra-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.349E+00	6.348E+00	6.344E+00
Th-228	Ra-228	1.000E+00	0.000E+00	1.812E+00	3.419E+00	2.596E+00	2.555E-01	5.526E-05	1.863E-15	0.000E+00
Th-228	Th-228	1.000E+00	6.350E+00	4.420E+00	2.141E+00	1.695E-01	1.208E-04	1.167E-15	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.184E-01	7.894E-01	3.584E+00	6.093E+00	6.348E+00	6.347E+00	6.344E+00
Th-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.348E+00	6.347E+00	6.344E+00
Th-230	Th-230	1.000E+00	2.498E+01	2.498E+01	2.498E+01	2.498E+01	2.497E+01	2.493E+01	2.483E+01	2.449E+01
[illegible]32	Th-232	1.000E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.345E+00

BRF(i) is the branch fraction of the parent nuclide.

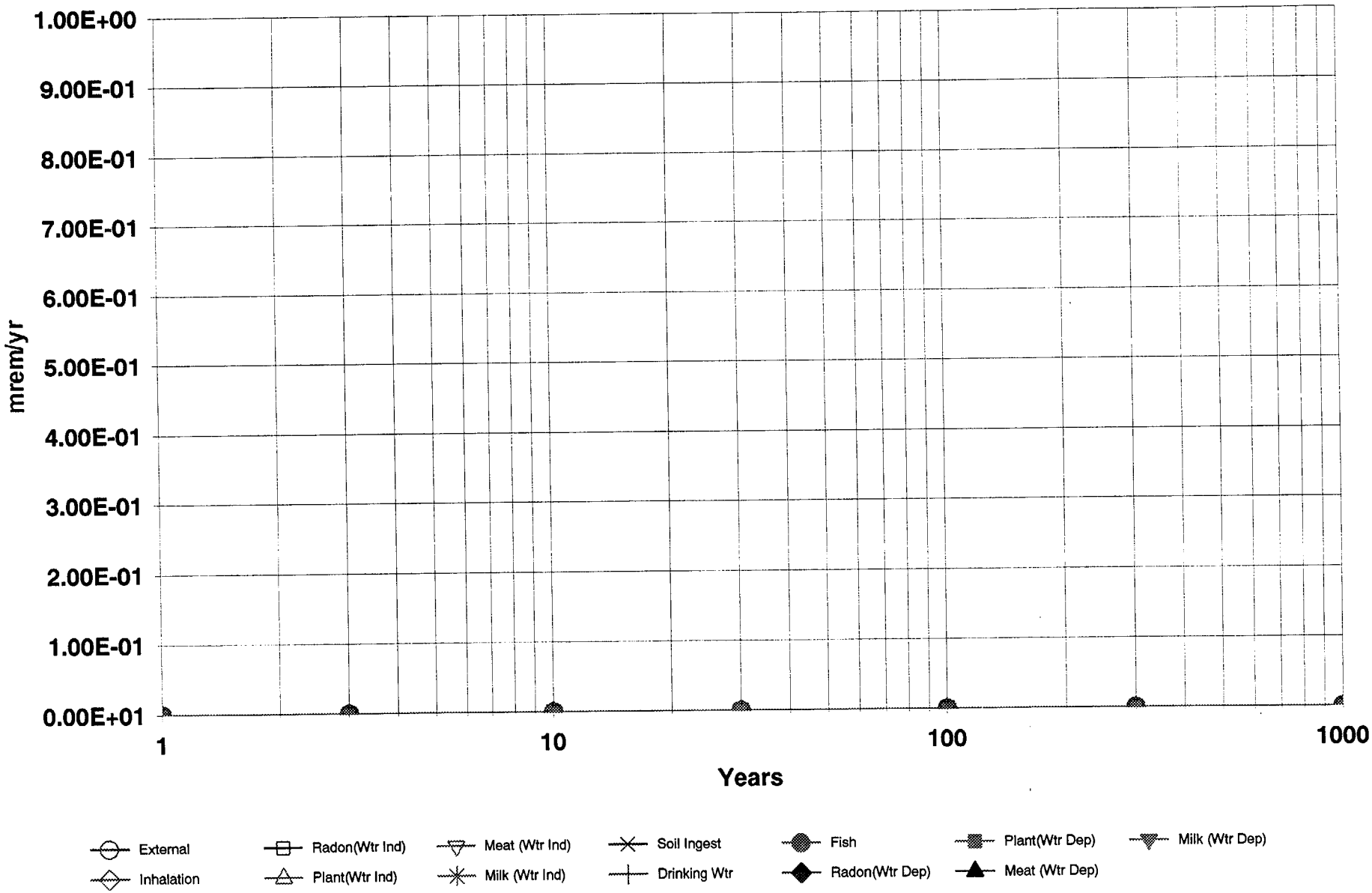
RESMAIN5.EXE execution time = 23.18 seconds

DOSE: All Nuclides Summed, All Pathways Summed



RFD5B31A.RAD 05/30/2001 11:07 Includes All Pathways

DOSE: Pb-210, Component Pathways



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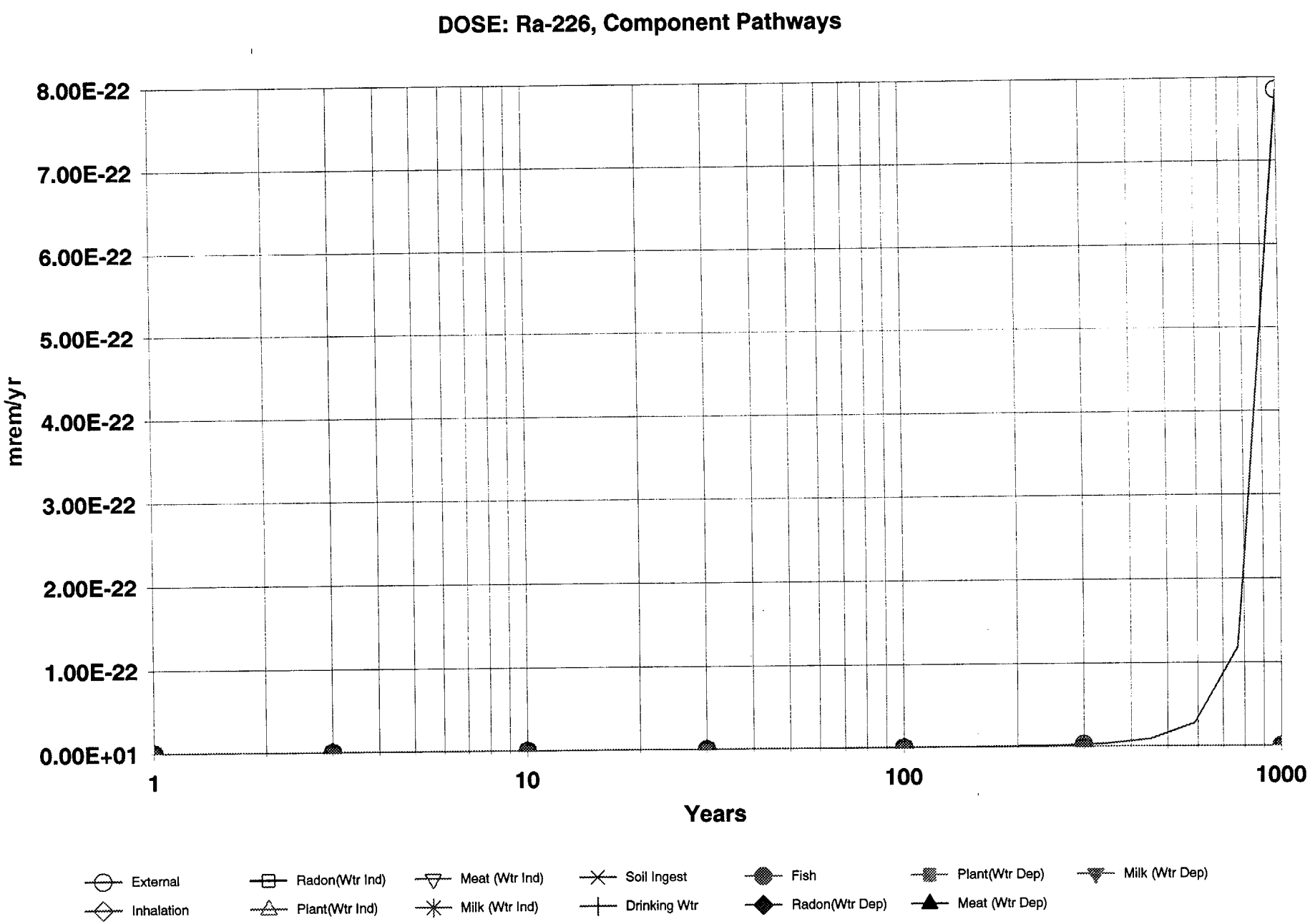

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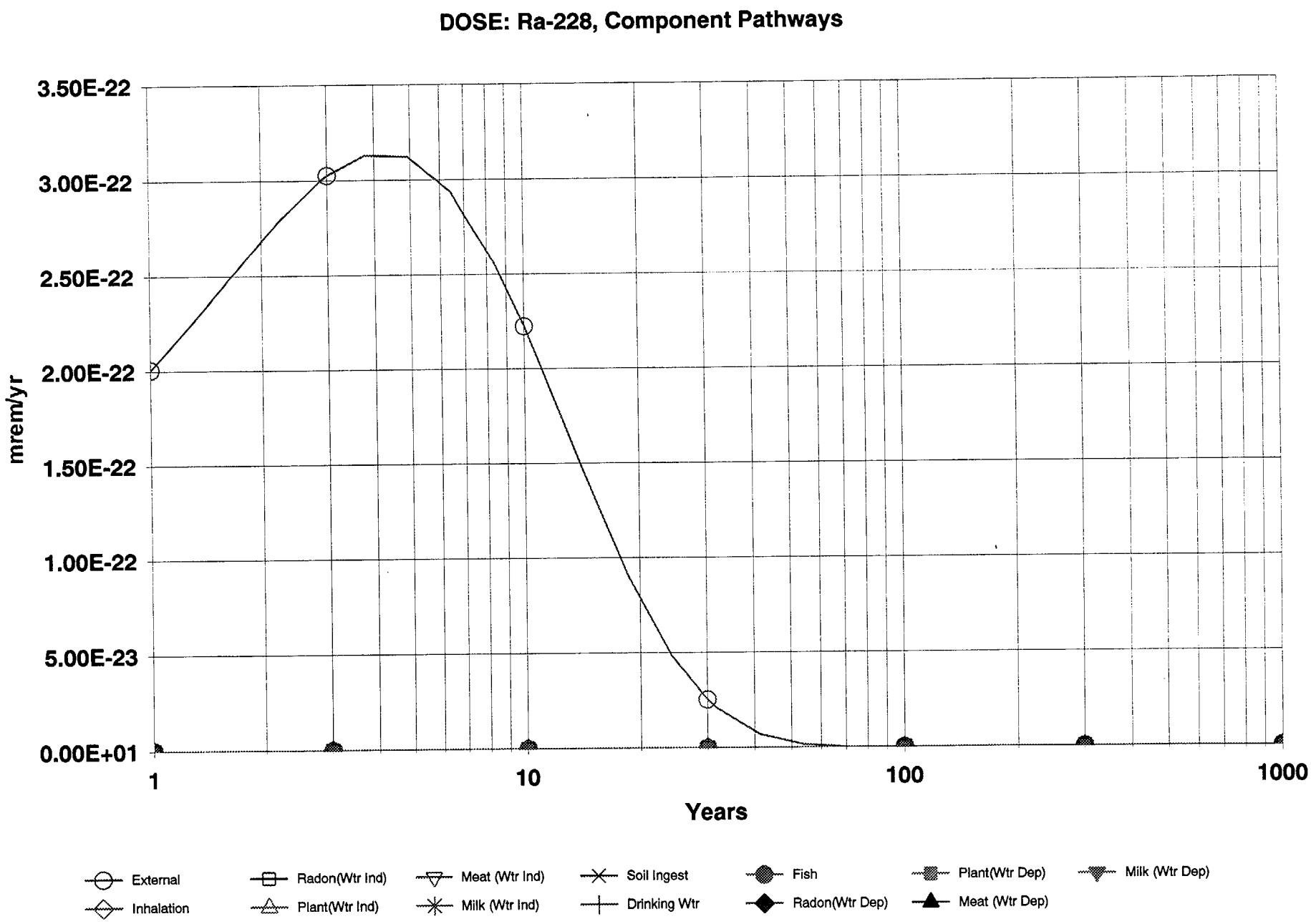

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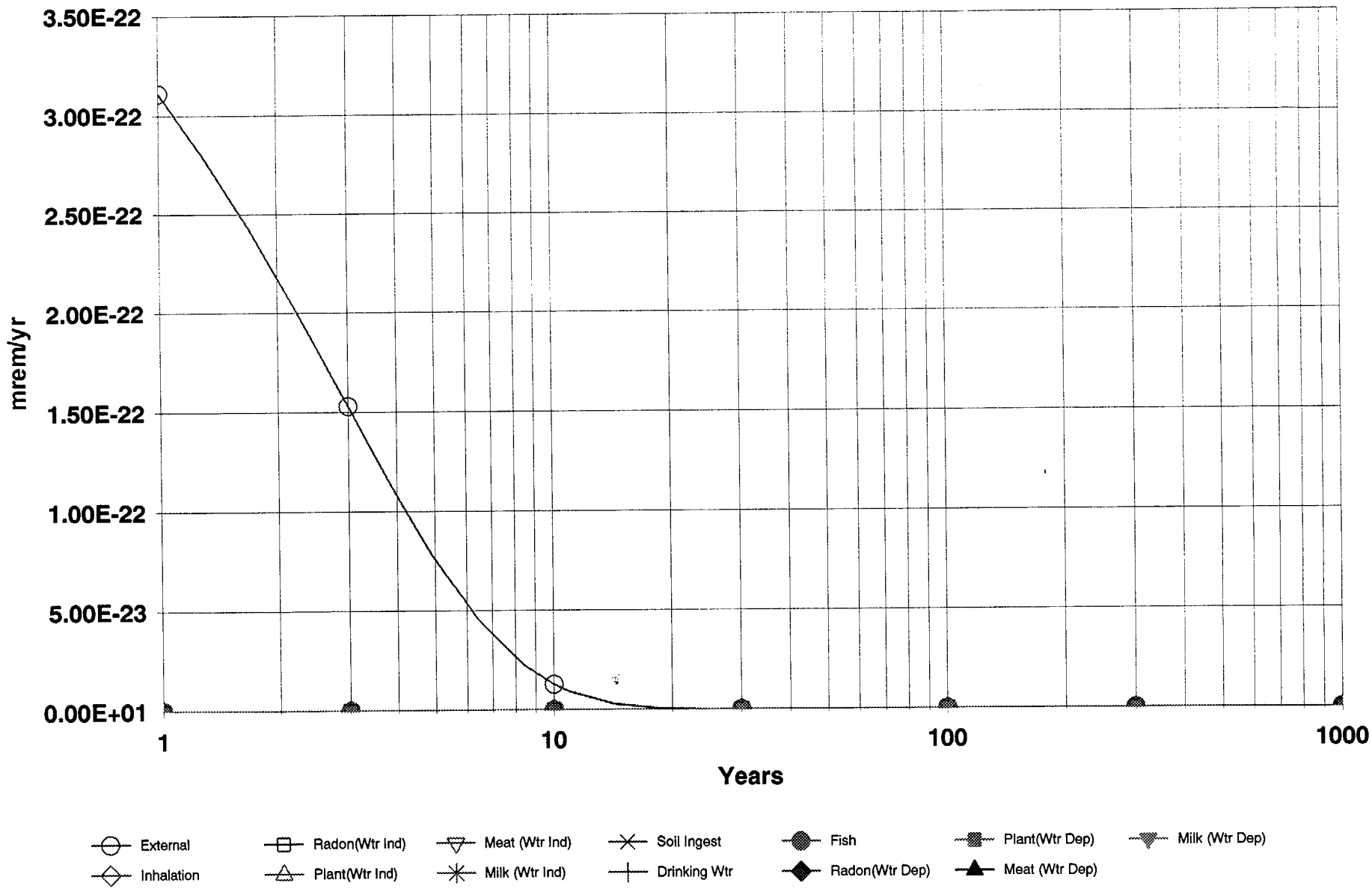
DOSE: Th-228, Component Pathways



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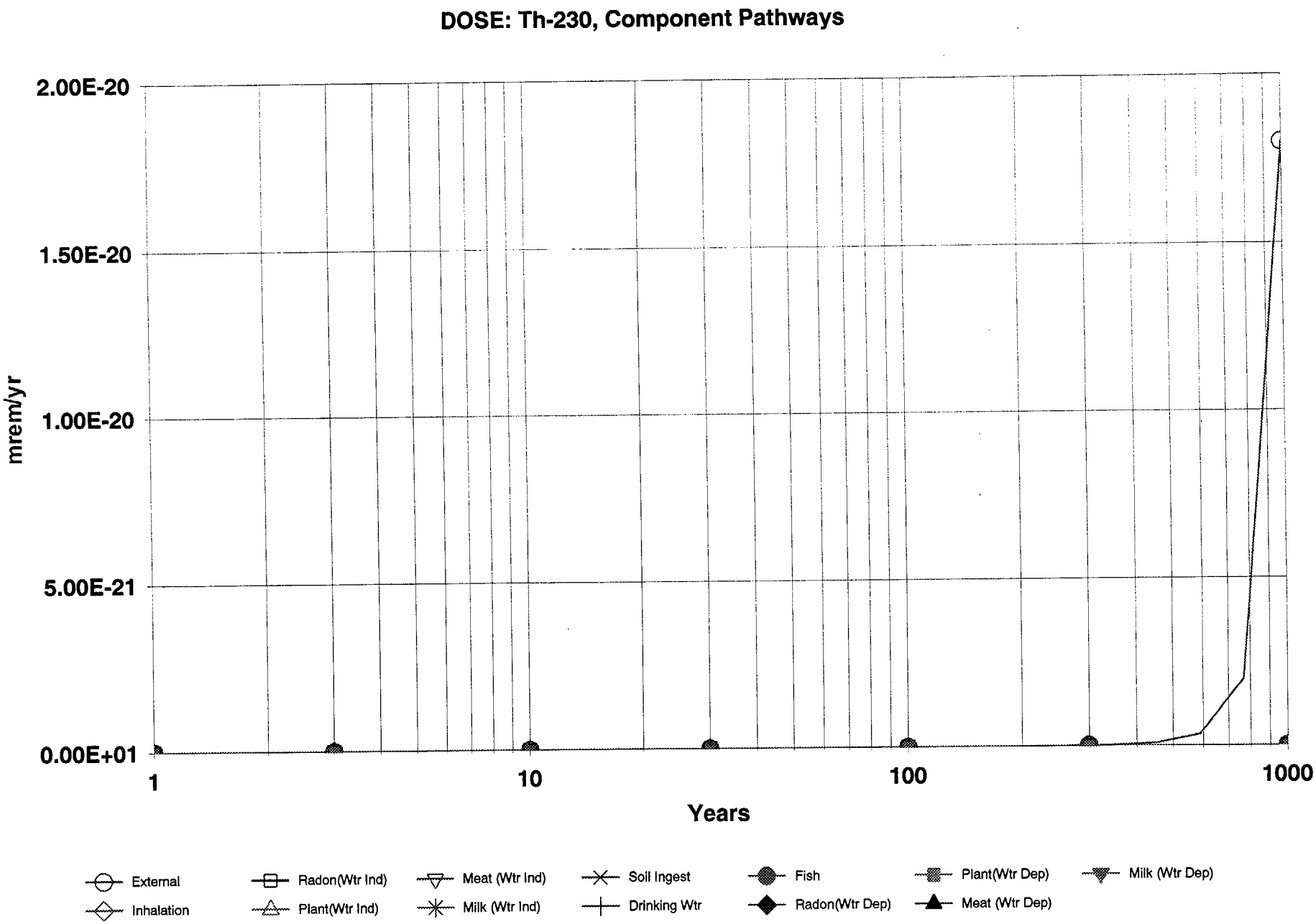

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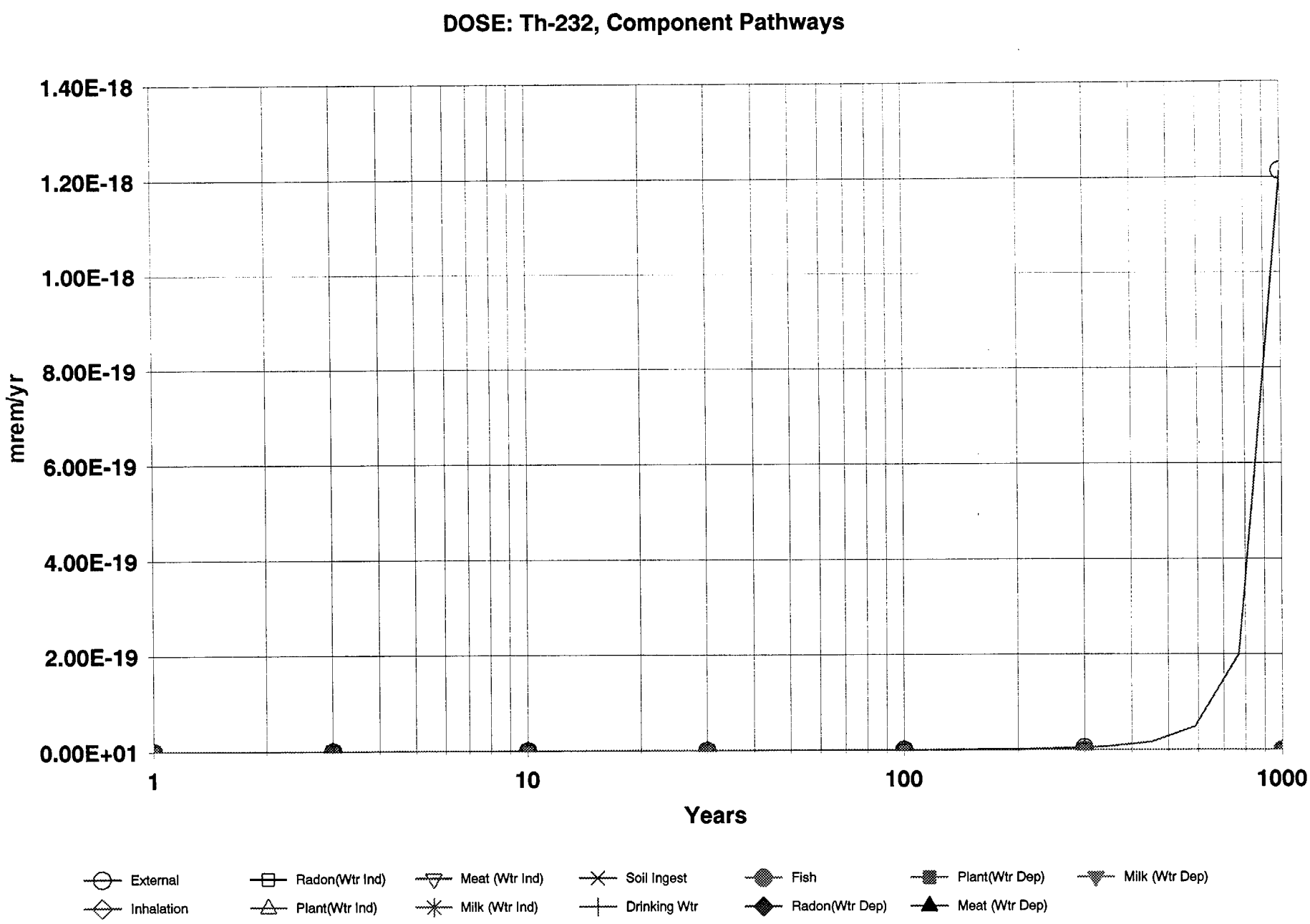

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Dose Conversion Factor (and Related) Parameter Summary
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(1)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(2)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(3)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(6)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(1)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(2)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(3)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(6)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)

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)	2.000E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.190E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+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): Pb-210	3.100E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.900E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.350E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-228	6.350E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	2.498E+01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-232	6.350E+00	0.000E+00	---	S1(6)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(6)
R013	Cover depth (m)	1.200E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.720E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	6.000E-04	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.700E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.600E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.200E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.910E-01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.020E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.560E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	2.700E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	9.900E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(1)
	Leach rate (/yr)	0.000E+00	0.000E+00	9.686E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	3.584E+03	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.708E-05	ALEACH(2)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(2)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.735E-05	ALEACH(3)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(3)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.648E-05	ALEACH(4)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.648E-05	ALEACH(5)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(5)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	7.898E+04	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.229E-06	ALEACH(6)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(6)
R017	Inhalation rate (m**3/yr)	not used	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	not used	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	not used	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	4.790E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.571E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	0.000E+00	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
	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)
	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	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)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	not used	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
C14	DCF correction factor for gaseous forms of C14	not used	1.234E+02	---	CO2F
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	2.000E+01	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)
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	0.000E+00	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
	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	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions	
Area:	200.00 square meters
Thickness:	2.19 meters
Cover Depth:	1.20 meters

Initial Soil Concentrations, pCi/g	
Pb-210	3.100E-01
Ra-226	5.900E-01
Ra-228	6.350E+00
Th-228	6.350E+00
Th-230	2.498E+01
Th-232	6.350E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 25 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):	3.810E-06	3.841E-06	3.904E-06	4.132E-06	4.862E-06	8.605E-06	4.433E-05	1.510E-02
M(t):	1.524E-07	1.536E-07	1.561E-07	1.653E-07	1.945E-07	3.442E-07	1.773E-06	6.040E-04

Maximum TDOSE(t): 1.510E-02 mrem/yr at t = 1.000E+03 years

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.149E-20	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
Ra-226	7.029E-08	0.0184	0.000E+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
Ra-228	6.923E-07	0.1817	0.000E+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
Th-228	3.015E-06	0.7914	0.000E+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
Th-230	6.456E-10	0.0002	0.000E+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
Th-232	3.164E-08	0.0083	0.000E+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	3.810E-06	1.0000	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 = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	9.149E-20	0.0000
Ra-226	0.000E+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	7.029E-08	0.0184
Ra-228	0.000E+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	6.923E-07	0.1817
Th-228	0.000E+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	3.015E-06	0.7914
Th-230	0.000E+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	6.456E-10	0.0002
Th-232	0.000E+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	3.164E-08	0.0083
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	3.810E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	9.022E-20	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
Ra-226	7.086E-08	0.0184	0.000E+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
Ra-228	1.485E-06	0.3867	0.000E+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
Th-228	2.115E-06	0.5506	0.000E+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
Th-230	1.951E-09	0.0005	0.000E+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
Th-232	1.678E-07	0.0437	0.000E+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	3.841E-06	1.0000	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+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	9.022E-20	0.0000
Ra-226	0.000E+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	7.086E-08	0.0184
Ra-228	0.000E+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	1.485E-06	0.3867
Th-228	0.000E+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	2.115E-06	0.5506
Th-230	0.000E+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	1.951E-09	0.0005
Th-232	0.000E+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	1.678E-07	0.0437
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	3.841E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.773E-20	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
Ra-226	7.202E-08	0.0184	0.000E+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
Ra-228	2.155E-06	0.5521	0.000E+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
Th-228	1.041E-06	0.2666	0.000E+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
Th-230	4.628E-09	0.0012	0.000E+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
Th-232	6.312E-07	0.1617	0.000E+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	3.904E-06	1.0000	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 = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	8.773E-20	0.0000
Ra-226	0.000E+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	7.202E-08	0.0184
Ra-228	0.000E+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	2.155E-06	0.5521
Th-228	0.000E+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	1.041E-06	0.2666
Th-230	0.000E+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	4.628E-09	0.0012
Th-232	0.000E+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	6.312E-07	0.1617
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	3.904E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.955E-20	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
Ra-226	7.622E-08	0.0184	0.000E+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
Ra-228	1.556E-06	0.3766	0.000E+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
Th-228	8.696E-08	0.0210	0.000E+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
Th-230	1.471E-08	0.0036	0.000E+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
Th-232	2.398E-06	0.5803	0.000E+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	4.132E-06	1.0000	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+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
N ide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	7.955E-20	0.0000
Ra-226	0.000E+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	7.622E-08	0.0184
Ra-228	0.000E+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	1.556E-06	0.3766
Th-228	0.000E+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	8.696E-08	0.0210
Th-230	0.000E+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	1.471E-08	0.0036
Th-232	0.000E+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	2.398E-06	0.5803
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	4.132E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.013E-20	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
Ra-226	8.964E-08	0.0184	0.000E+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
Ra-228	1.766E-07	0.0363	0.000E+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
Th-228	7.234E-11	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
Th-230	5.048E-08	0.0104	0.000E+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
Th-232	4.546E-06	0.9348	0.000E+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	4.862E-06	1.0000	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 = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	6.013E-20	0.0000
Ra-226	0.000E+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	8.964E-08	0.0184
Ra-228	0.000E+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	1.766E-07	0.0363
Th-228	0.000E+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	7.234E-11	0.0000
Th-230	0.000E+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	5.048E-08	0.0104
Th-232	0.000E+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	4.546E-06	0.9348
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	4.862E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.258E-20	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
Ra-226	1.581E-07	0.0184	0.000E+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
Ra-228	6.579E-11	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
Th-228	1.201E-21	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
Th-230	2.979E-07	0.0346	0.000E+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
Th-232	8.149E-06	0.9470	0.000E+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	8.605E-06	1.0000	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+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	2.258E-20	0.0000
Ra-226	0.000E+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	1.581E-07	0.0184
Ra-228	0.000E+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	6.579E-11	0.0000
Th-228	0.000E+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	1.201E-21	0.0000
Th-230	0.000E+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	2.979E-07	0.0346
Th-232	0.000E+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	8.149E-06	0.9470
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	8.605E-06	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.376E-21	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
Ra-226	7.997E-07	0.0180	0.000E+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
Ra-228	1.051E-20	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
Th-228	0.000E+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
Th-230	4.709E-06	0.1062	0.000E+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
Th-232	3.883E-05	0.8758	0.000E+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	4.433E-05	1.0000	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 = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	1.376E-21	0.0000
Ra-226	0.000E+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	7.997E-07	0.0180
Ra-228	0.000E+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	1.051E-20	0.0000
Th-228	0.000E+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
Th-230	0.000E+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	4.709E-06	0.1062
Th-232	0.000E+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	3.883E-05	0.8758
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	4.433E-05	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.673E-26	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
Ra-226	2.328E-04	0.0154	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	5.352E-03	0.3545	0.000E+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
Th-232	9.515E-03	0.6301	0.000E+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	1.510E-02	1.0000	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-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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	7.673E-26	0.0000
Ra-226	0.000E+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	2.328E-04	0.0154
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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	5.352E-03	0.3545
Th-232	0.000E+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	9.515E-03	0.6301
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	1.510E-02	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(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
Pb-210	Pb-210	1.000E+00	2.951E-19	2.910E-19	2.830E-19	2.566E-19	1.940E-19	7.284E-20	4.437E-21	2.475E-25
Ra-226	Ra-226	1.000E+00	1.191E-07	1.201E-07	1.221E-07	1.292E-07	1.519E-07	2.679E-07	1.355E-06	3.946E-04
Ra-226	Pb-210	1.000E+00	4.625E-21	1.390E-20	3.256E-20	9.931E-20	3.094E-19	1.643E-18	5.792E-17	1.298E-11
Ra-226	∑DSR(j)		1.191E-07	1.201E-07	1.221E-07	1.292E-07	1.519E-07	2.679E-07	1.355E-06	3.946E-04
Ra-228	Ra-228	1.000E+00	2.136E-08	1.911E-08	1.529E-08	7.004E-09	7.533E-10	3.073E-13	6.358E-23	0.000E+00
Ra-228	Th-228	1.000E+00	8.766E-08	2.148E-07	3.241E-07	2.381E-07	2.706E-08	1.005E-11	1.591E-21	0.000E+00
Ra-228	∑DSR(j)		1.090E-07	2.339E-07	3.394E-07	2.451E-07	2.781E-08	1.036E-11	1.654E-21	0.000E+00
Th-228	Th-228	1.000E+00	4.748E-07	3.331E-07	1.639E-07	1.369E-08	1.139E-11	1.891E-22	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	5.736E-21	5.847E-21	6.077E-21	6.955E-21	1.023E-20	3.941E-20	1.860E-18	1.345E-12
Th-230	Ra-226	1.000E+00	2.584E-11	7.811E-11	1.853E-10	5.891E-10	2.021E-09	1.192E-08	1.885E-07	2.143E-04
Th-230	Pb-210	1.000E+00	6.706E-25	4.724E-24	2.533E-23	2.389E-22	2.379E-21	5.305E-20	7.163E-18	6.777E-12
Th-230	∑DSR(j)		2.584E-11	7.811E-11	1.853E-10	5.891E-10	2.021E-09	1.192E-08	1.885E-07	2.143E-04
Th-232	Th-232	1.000E+00	3.061E-23	3.127E-23	3.264E-23	3.794E-23	5.828E-23	2.618E-22	1.916E-20	6.423E-14
Th-232	Ra-228	1.000E+00	1.315E-09	3.775E-09	8.012E-09	1.782E-08	2.902E-08	5.621E-08	3.456E-07	1.991E-04
Th-232	Th-228	1.000E+00	3.667E-09	2.265E-08	9.139E-08	3.598E-07	6.868E-07	1.227E-06	5.769E-06	1.299E-03
Th-232	∑DSR(j)		4.983E-09	2.642E-08	9.941E-08	3.776E-07	7.158E-07	1.283E-06	6.114E-06	1.498E-03

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 25 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
Pb-210	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13
Ra-226	2.098E+08	2.082E+08	2.048E+08	1.935E+08	1.645E+08	9.330E+07	1.844E+07	6.336E+04
Ra-228	2.293E+08	1.069E+08	7.366E+07	1.020E+08	8.989E+08	2.413E+12	*2.726E+14	*2.726E+14
Th-228	5.265E+07	7.506E+07	1.526E+08	1.826E+09	2.195E+12	*8.192E+14	*8.192E+14	*8.192E+14
Th-230	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	1.237E+10	2.096E+09	1.326E+08	1.167E+05
Th-232	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	1.668E+04

*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 = 1.000E+03 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	3.100E-01	0.000E+00	2.951E-19	*7.631E+13	2.475E-25	*7.631E+13
Ra-226	5.900E-01	1.000E+03	3.946E-04	6.336E+04	3.946E-04	6.336E+04
Ra-228	6.350E+00	4.145 ± 0.008	3.505E-07	7.133E+07	0.000E+00	*2.726E+14
Th-228	6.350E+00	0.000E+00	4.748E-07	5.265E+07	0.000E+00	*8.192E+14
Th-230	2.498E+01	1.000E+03	2.143E-04	1.167E+05	2.143E-04	1.167E+05
Th-232	6.350E+00	1.000E+03	1.498E-03	1.668E+04	1.498E-03	1.668E+04

*At specific activity limit

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

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	9.149E-20	9.022E-20	8.773E-20	7.955E-20	6.013E-20	2.258E-20	1.376E-21	7.673E-26
Pb-210	Ra-226	1.000E+00	2.729E-21	8.200E-21	1.921E-20	5.859E-20	1.825E-19	9.694E-19	3.417E-17	7.659E-12
Pb-210	Th-230	1.000E+00	1.675E-23	1.180E-22	6.327E-22	5.968E-21	5.942E-20	1.325E-18	1.789E-16	1.693E-10
Pb-210	∑DOSE(j):		9.424E-20	9.854E-20	1.076E-19	1.441E-19	3.021E-19	2.317E-18	2.131E-16	1.770E-10
Ra-226	Ra-226	1.000E+00	7.029E-08	7.086E-08	7.202E-08	7.622E-08	8.964E-08	1.581E-07	7.997E-07	2.328E-04
Ra-226	Th-230	1.000E+00	6.456E-10	1.951E-09	4.628E-09	1.471E-08	5.048E-08	2.979E-07	4.709E-06	5.352E-03
Ra-226	∑DOSE(j):		7.094E-08	7.281E-08	7.665E-08	9.094E-08	1.401E-07	4.560E-07	5.508E-06	5.585E-03
Ra-228	Ra-228	1.000E+00	1.356E-07	1.213E-07	9.707E-08	4.448E-08	4.783E-09	1.951E-12	4.037E-22	0.000E+00
Ra-228	Th-232	1.000E+00	8.352E-09	2.397E-08	5.088E-08	1.132E-07	1.842E-07	3.569E-07	2.194E-06	1.264E-03
Ra-228	∑DOSE(j):		1.440E-07	1.453E-07	1.480E-07	1.576E-07	1.890E-07	3.569E-07	2.194E-06	1.264E-03
Th-228	Ra-228	1.000E+00	5.566E-07	1.364E-06	2.058E-06	1.512E-06	1.718E-07	6.384E-11	1.010E-20	0.000E+00
Th-228	Th-228	1.000E+00	3.015E-06	2.115E-06	1.041E-06	8.696E-08	7.234E-11	1.201E-21	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	2.329E-08	1.438E-07	5.803E-07	2.285E-06	4.361E-06	7.792E-06	3.663E-05	8.251E-03
Th-228	∑DOSE(j):		3.595E-06	3.623E-06	3.679E-06	3.884E-06	4.533E-06	7.792E-06	3.663E-05	8.251E-03
Th-230	Th-230	1.000E+00	1.433E-19	1.461E-19	1.518E-19	1.737E-19	2.554E-19	9.844E-19	4.647E-17	3.360E-11
[illegible]32	Th-232	1.000E+00	1.944E-22	1.986E-22	2.073E-22	2.409E-22	3.701E-22	1.663E-21	1.217E-19	4.078E-13

BRF(i) is the branch fraction of the parent nuclide.

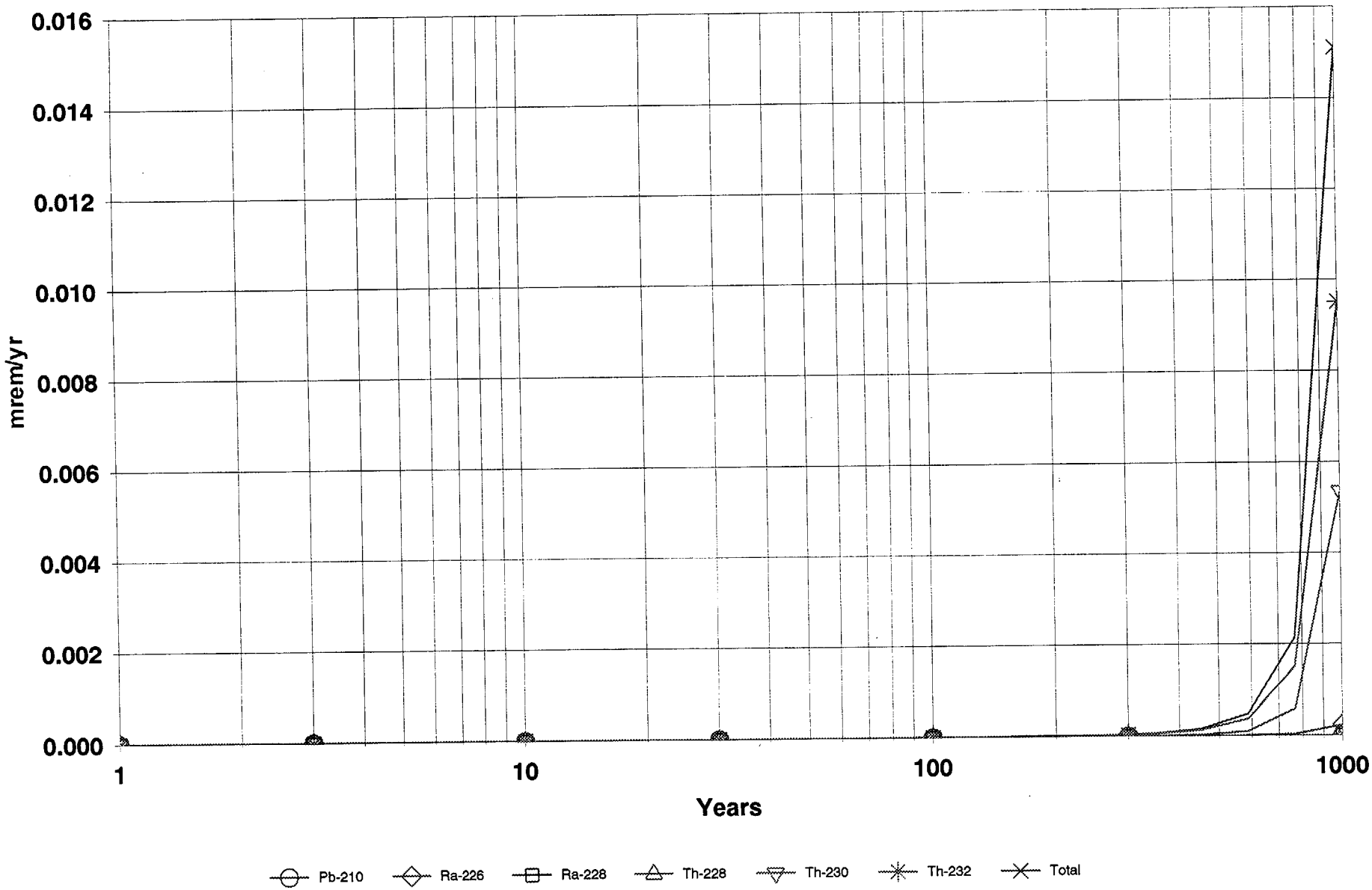
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	3.100E-01	3.002E-01	2.816E-01	2.250E-01	1.185E-01	1.257E-02	2.067E-05	3.729E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.804E-02	5.242E-02	1.565E-01	3.506E-01	5.309E-01	5.056E-01	3.664E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.664E-04	1.466E-03	1.513E-02	1.120E-01	7.212E-01	2.642E+00	8.093E+00
Pb-210	∑S(j):		3.100E-01	3.184E-01	3.355E-01	3.966E-01	5.811E-01	1.265E+00	3.148E+00	8.460E+00
Ra-226	Ra-226	1.000E+00	5.900E-01	5.897E-01	5.892E-01	5.873E-01	5.819E-01	5.635E-01	5.139E-01	3.723E-01
Ra-226	Th-230	1.000E+00	0.000E+00	1.082E-02	3.244E-02	1.080E-01	3.223E-01	1.056E+00	3.021E+00	8.555E+00
Ra-226	∑S(j):		5.900E-01	6.005E-01	6.216E-01	6:952E-01	9.042E-01	1.620E+00	3.534E+00	8.927E+00
Ra-228	Ra-228	1.000E+00	6.350E+00	5.629E+00	4.423E+00	1.902E+00	1.705E-01	3.684E-05	1.240E-15	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.211E-01	1.927E+00	4.447E+00	6.178E+00	6.348E+00	6.346E+00	6.341E+00
Ra-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.348E+00	6.346E+00	6.341E+00
Th-228	Ra-228	1.000E+00	0.000E+00	1.812E+00	3.419E+00	2.596E+00	2.554E-01	5.521E-05	1.858E-15	0.000E+00
Th-228	Th-228	1.000E+00	6.350E+00	4.420E+00	2.141E+00	1.695E-01	1.208E-04	1.166E-15	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.184E-01	7.894E-01	3.584E+00	6.093E+00	6.348E+00	6.346E+00	6.341E+00
Th-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.348E+00	6.346E+00	6.341E+00
Th-230	Th-230	1.000E+00	2.498E+01	2.498E+01	2.498E+01	2.497E+01	2.496E+01	2.492E+01	2.479E+01	2.435E+01
Th-232	Th-232	1.000E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.342E+00

BRF(i) is the branch fraction of the parent nuclide.

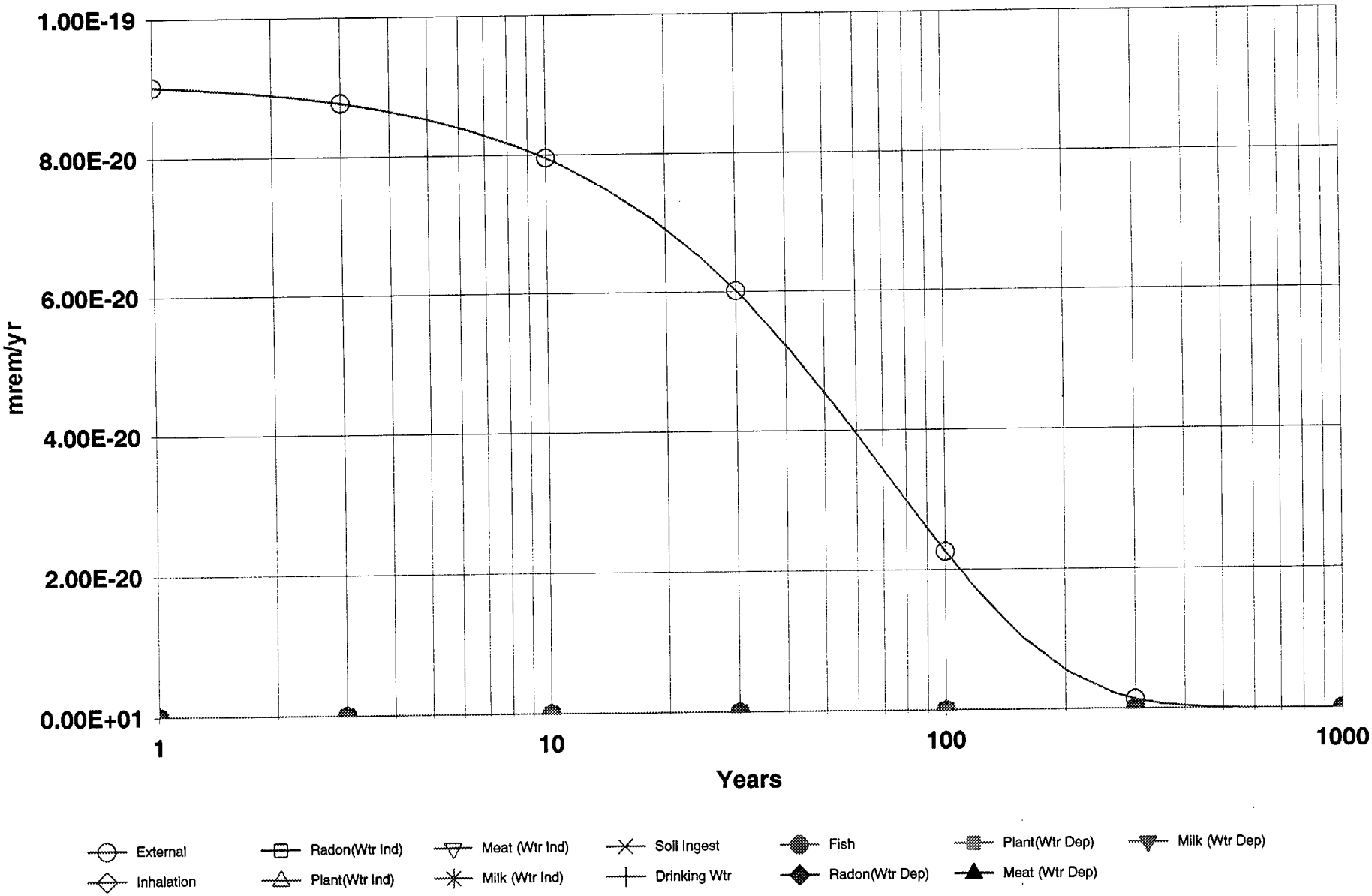
RESMAIN5.EXE execution time = 22.85 seconds

DOSE: All Nuclides Summed, All Pathways Summed



D5B3-1B.RAD 05/30/2001 11:14 Includes All Pathways

DOSE: Pb-210, Component Pathways



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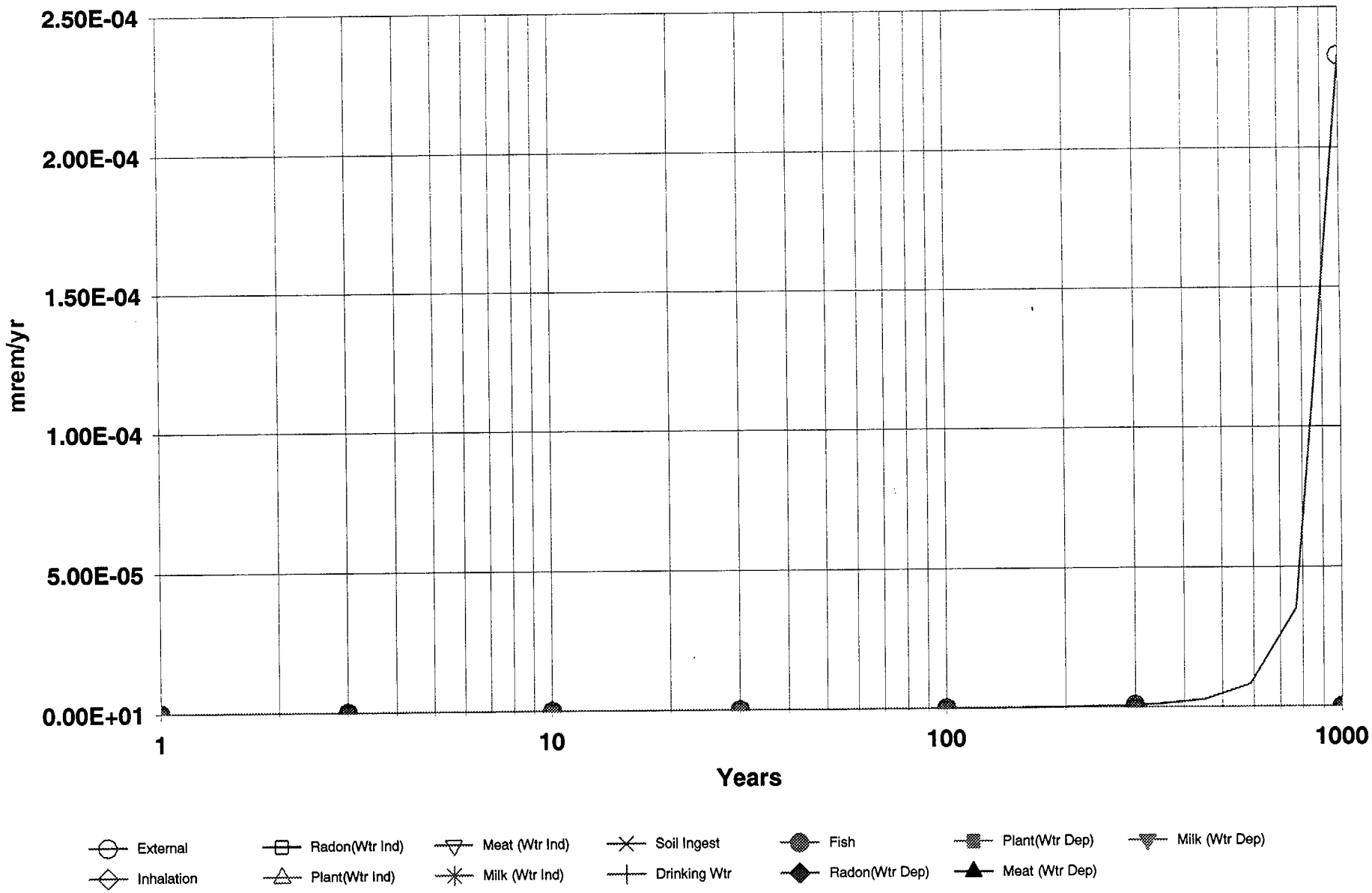

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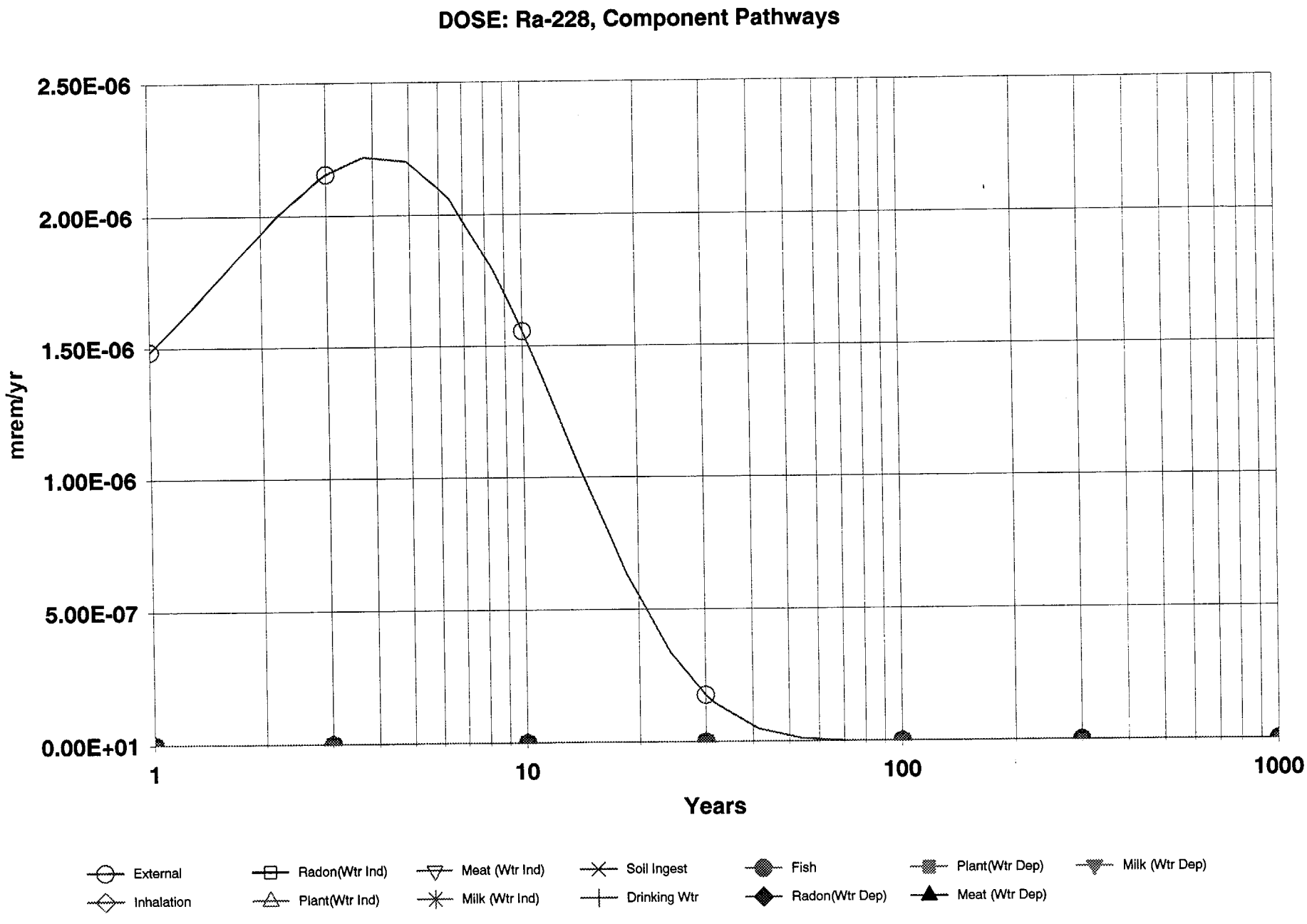

D5B3-1B.RAD 05/30/2001 11:14

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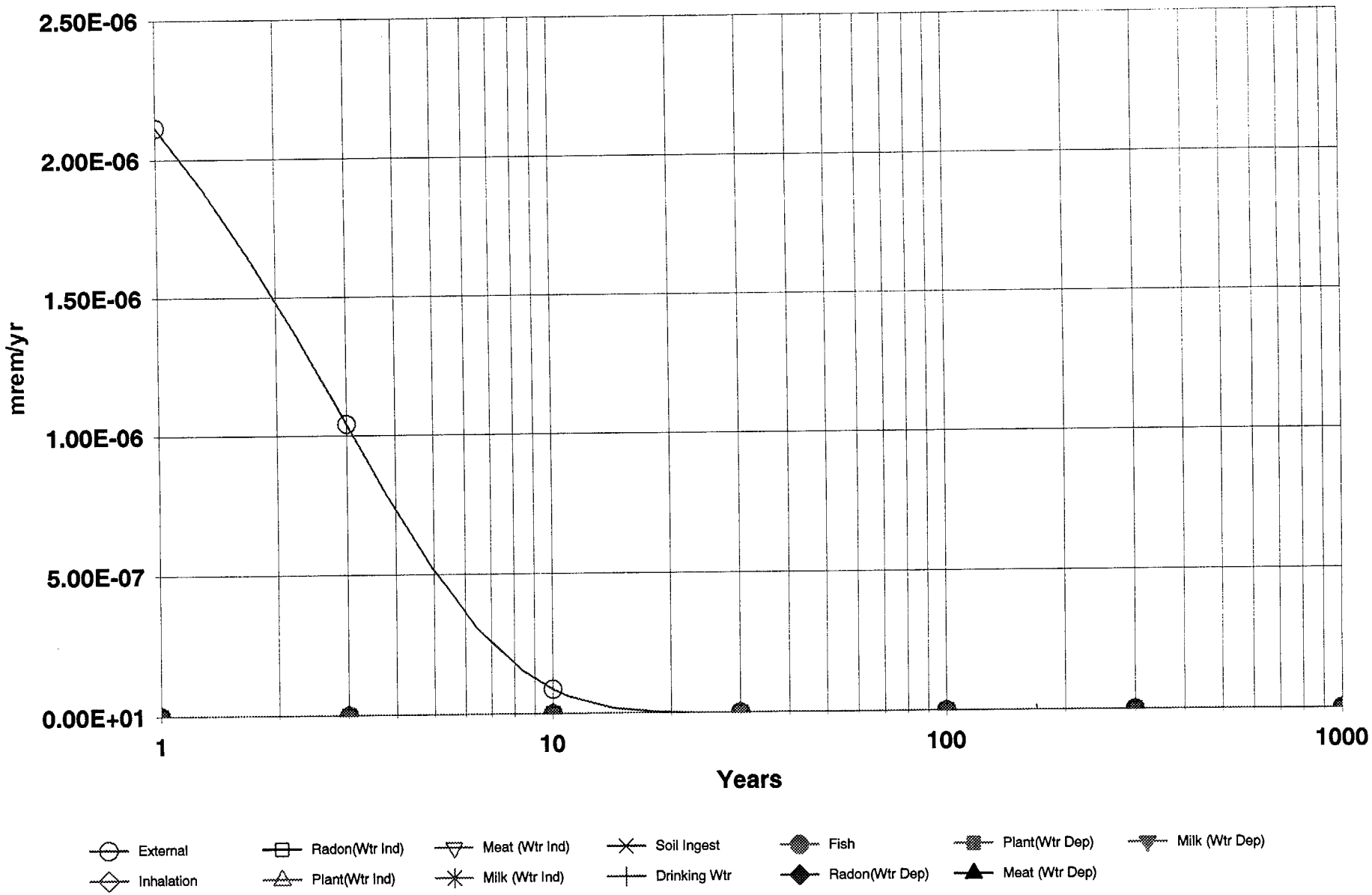

D5B3-1B.RAD 05/30/2001 11:14

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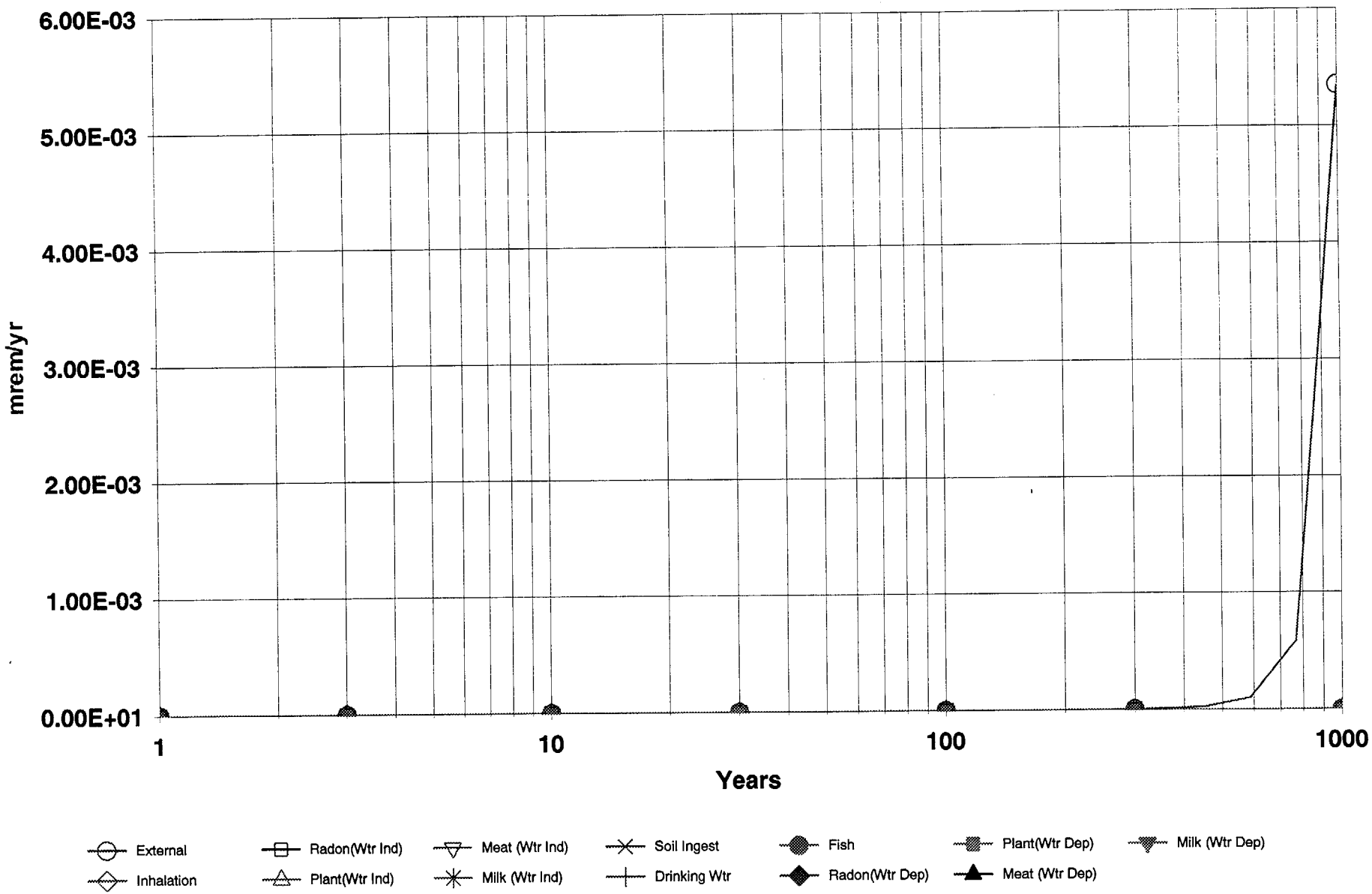

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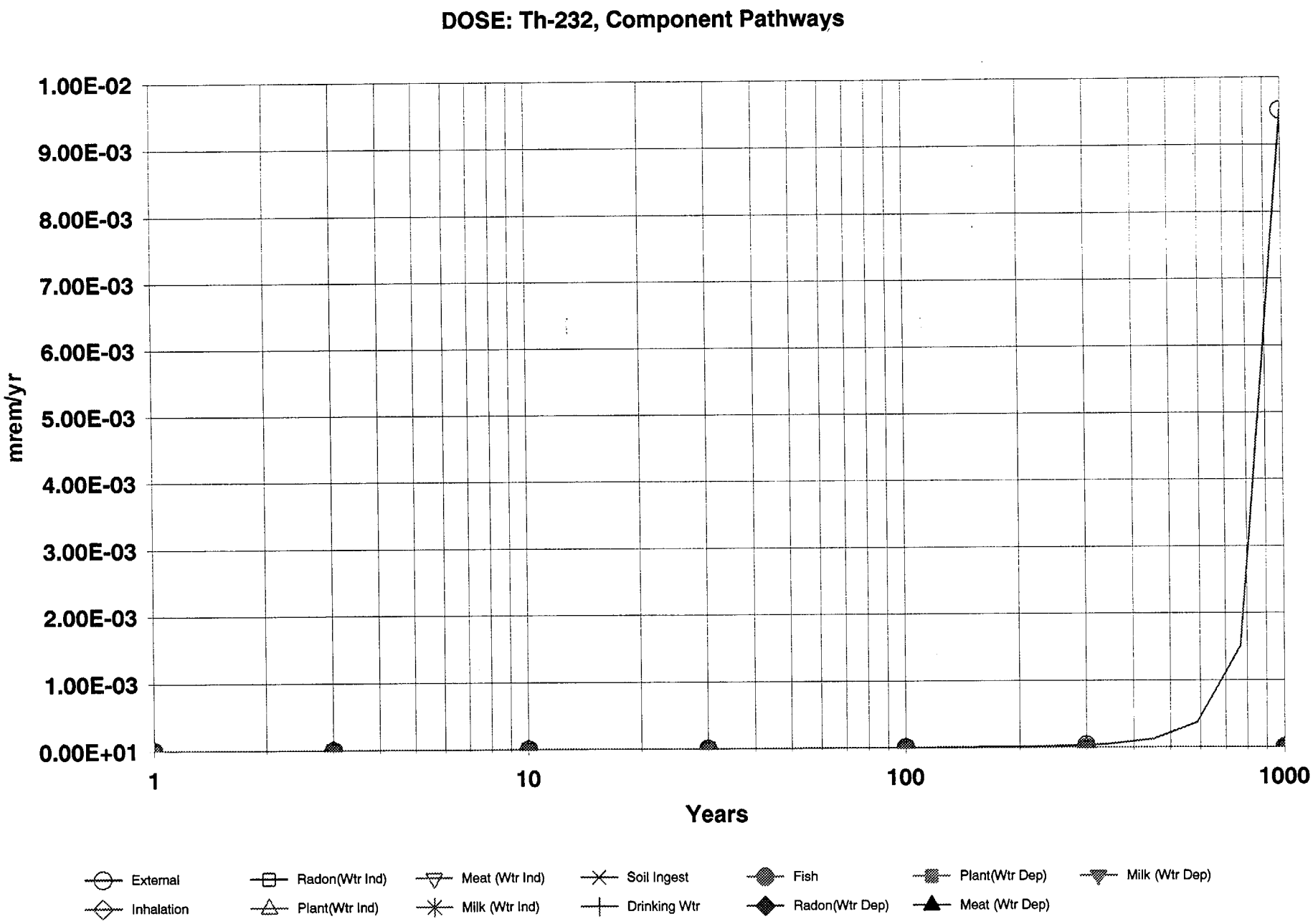

D5B3-1B.RAD 05/30/2001 11:14

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Dose Conversion Factor (and Related) Parameter Summary
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(1)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(2)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(3)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(6)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(1)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(2)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(3)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(6)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D-34				
D	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
D	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)

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)	3.743E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.310E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	2.180E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+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): Pb-210	3.100E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.900E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.350E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-228	6.350E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	2.498E+01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-232	6.350E+00	0.000E+00	---	S1(6)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(6)
R013	Cover depth (m)	3.050E+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)	6.000E-04	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.700E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.600E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.200E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.910E-01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.020E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.560E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	2.700E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	9.900E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	3.800E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-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)	1.720E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.500E-02	2.000E-01	---	EPSZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone field capacity	3.150E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	3.160E-02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.700E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	1.040E+01	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.450E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.180E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.133E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.199E-05	ALEACH(2)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(2)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.199E-05	ALEACH(3)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(3)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.928E-05	ALEACH(4)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.928E-05	ALEACH(5)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(5)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	7.898E+04	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.437E-06	ALEACH(6)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(6)
R017	Inhalation rate (m**3/yr)	not used	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	not used	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	not used	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	not used	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	not used	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	1.000E+00	>0 shows circular AREA.	FS
R	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)
R	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	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)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+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	not used	-1	---	FPLANT
R018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	2.710E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	6.325E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+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)	0.000E+00	5.000E-01	---	LSI
R	Mass loading for foliar deposition (g/m**3)	0.000E+00	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	0.000E+00	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	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)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	1.500E-01	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	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	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
C14	DCF correction factor for gaseous forms of C14	not used	1.234E+02	---	CO2F
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	2.000E+01	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)
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	0.000E+00	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	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions	
Area:	37432.00 square meters
Thickness:	3.31 meters
Cover Depth:	3.05 meters

Initial Soil Concentrations, pCi/g	
Pb-210	3.100E-01
Ra-226	5.900E-01
Ra-228	6.350E+00
Th-228	6.350E+00
Th-230	2.498E+01
Th-232	6.350E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 25 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):	1.699E-04	5.114E-04	1.191E-03	3.540E-03	1.015E-02	3.372E-02	9.855E-02	2.606E-01
M(t):	6.797E-06	2.046E-05	4.763E-05	1.416E-04	4.061E-04	1.349E-03	3.942E-03	1.042E-02

Maximum TDOSE(t): 2.606E-01 mrem/yr at t = 1.000E+03 years

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.574E-04	0.9264	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.310E-06	0.0136	6.860E-06	0.0404	1.666E-04	0.9804
Ra-226	3.117E-06	0.0183	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.304E-08	0.0003	1.356E-07	0.0008	3.296E-06	0.0194
Ra-228	1.981E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.537E-09	0.0000	2.235E-08	0.0001
Th-228	0.000E+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
Th-230	1.420E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.852E-10	0.0000	6.155E-10	0.0000	1.500E-08	0.0001
Th-232	3.776E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.632E-12	0.0000	4.240E-11	0.0000
Total	1.606E-04	0.9450	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.353E-06	0.0138	6.998E-06	0.0412	1.699E-04	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	4.608E-04	0.9012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.303E-06	0.0143	2.015E-05	0.0394	4.883E-04	0.9549
Ra-226	2.152E-05	0.0421	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.289E-07	0.0006	9.401E-07	0.0018	2.279E-05	0.0446
Ra-228	5.778E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.032E-10	0.0000	8.005E-09	0.0000	6.598E-08	0.0001
Th-228	0.000E+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
Th-230	2.107E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.114E-09	0.0000	9.183E-09	0.0000	2.230E-07	0.0004
Th-232	2.583E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.856E-13	0.0000	3.458E-11	0.0000	2.931E-10	0.0000
Total	4.826E-04	0.9438	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.635E-06	0.0149	2.111E-05	0.0413	5.114E-04	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.011E-03	0.8494	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.639E-05	0.0138	4.428E-05	0.0372	1.072E-03	0.9004
Ra-226	1.094E-04	0.0919	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.743E-06	0.0015	4.787E-06	0.0040	1.159E-04	0.0974
Ra-228	1.103E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.443E-09	0.0000	1.549E-08	0.0000	1.272E-07	0.0001
Th-228	0.000E+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
Th-230	2.390E-06	0.0020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.747E-08	0.0000	1.044E-07	0.0001	2.532E-06	0.0021
Th-232	1.140E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.692E-12	0.0000	1.585E-10	0.0000	1.308E-09	0.0000
Total	1.123E-03	0.9434	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.817E-05	0.0153	4.918E-05	0.0413	1.191E-03	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.434E-03	0.6877	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.987E-05	0.0113	1.066E-04	0.0301	2.581E-03	0.7291
Ra-226	8.474E-04	0.2394	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.380E-05	0.0039	3.711E-05	0.0105	8.983E-04	0.2538
Ra-228	1.503E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.606E-09	0.0000	2.051E-08	0.0000	1.734E-07	0.0000
Th-228	0.000E+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
Th-230	5.693E-05	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.216E-07	0.0003	2.492E-06	0.0007	6.034E-05	0.0170
Th-232	4.706E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.310E-11	0.0000	6.512E-10	0.0000	5.431E-09	0.0000
Total	3.339E-03	0.9433	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.459E-05	0.0154	1.462E-04	0.0413	3.540E-03	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.757E-03	0.3701	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.176E-05	0.0061	1.646E-04	0.0162	3.984E-03	0.3924
Ra-226	4.786E-03	0.4714	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.847E-05	0.0077	2.097E-04	0.0207	5.075E-03	0.4998
Ra-228	4.290E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.492E-10	0.0000	5.393E-09	0.0000	4.904E-08	0.0000
Th-228	0.000E+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
Th-230	1.032E-03	0.1017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.689E-05	0.0017	4.522E-05	0.0045	1.095E-03	0.1078
Th-232	4.011E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.964E-11	0.0000	5.251E-10	0.0000	4.606E-09	0.0000
Total	9.576E-03	0.9432	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.571E-04	0.0155	4.195E-04	0.0413	1.015E-02	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.353E-03	0.0401	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.227E-05	0.0007	5.927E-05	0.0018	1.435E-03	0.0425
Ra-226	1.548E-02	0.4592	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.544E-04	0.0075	6.783E-04	0.0201	1.641E-02	0.4868
Ra-228	3.515E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.600E-13	0.0000	3.861E-12	0.0000	3.957E-11	0.0000
Th-228	0.000E+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
Th-230	1.497E-02	0.4439	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.457E-04	0.0073	6.556E-04	0.0194	1.587E-02	0.4706
Th-232	1.271E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.107E-13	0.0000	1.485E-12	0.0000	1.440E-11	0.0000
Total	3.180E-02	0.9432	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.224E-04	0.0155	1.393E-03	0.0413	3.372E-02	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.262E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.196E-07	0.0000	3.182E-07	0.0000	7.700E-06	0.0001
Ra-226	1.742E-02	0.1768	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.864E-04	0.0029	7.634E-04	0.0077	1.847E-02	0.1875
Ra-228	3.855E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.775E-23	0.0000	3.911E-22	0.0000	4.304E-21	0.0000
Th-228	0.000E+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
Th-230	7.552E-02	0.7663	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.241E-03	0.0126	3.308E-03	0.0336	8.007E-02	0.8125
Th-232	8.504E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.334E-22	0.0000	9.194E-22	0.0000	9.557E-21	0.0000
Total	9.295E-02	0.9432	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.528E-03	0.0155	4.072E-03	0.0413	9.855E-02	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.694E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.790E-17	0.0000	7.423E-17	0.0000	1.796E-15	0.0000
Ra-226	1.323E-02	0.0508	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.175E-04	0.0008	5.799E-04	0.0022	1.403E-02	0.0538
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	2.326E-01	0.8924	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.822E-03	0.0147	1.019E-02	0.0391	2.466E-01	0.9462
Th-232	0.000E+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	2.458E-01	0.9432	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.040E-03	0.0155	1.077E-02	0.0413	2.606E-01	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(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
Pb-210	Pb-210	1.000E+00	5.374E-04	1.575E-03	3.459E-03	8.325E-03	1.285E-02	4.628E-03	2.484E-05	5.795E-15
Ra-226	Ra-226	1.000E+00	3.510E-09	1.146E-08	2.768E-08	8.425E-08	2.440E-07	7.816E-07	2.144E-06	5.269E-06
Ra-226	Pb-210	1.000E+00	5.582E-06	3.862E-05	1.965E-04	1.522E-03	8.601E-03	2.782E-02	3.131E-02	2.377E-02
Ra-226	∑DSR(j)		5.586E-06	3.863E-05	1.965E-04	1.522E-03	8.601E-03	2.782E-02	3.131E-02	2.378E-02
Ra-228	Ra-228	1.000E+00	3.504E-09	1.029E-08	1.963E-08	2.583E-08	6.776E-09	4.843E-12	4.903E-22	0.000E+00
Ra-228	Th-228	1.000E+00	1.545E-11	9.721E-11	4.041E-10	1.472E-09	9.465E-10	1.388E-12	1.875E-22	0.000E+00
Ra-228	∑DSR(j)		3.519E-09	1.039E-08	2.004E-08	2.731E-08	7.723E-09	6.231E-12	6.778E-22	0.000E+00
Th-228	Th-228	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Ra-226	1.000E+00	5.458E-14	4.159E-13	2.316E-12	2.132E-11	1.803E-10	1.909E-09	1.572E-08	1.301E-07
Th-230	Pb-210	1.000E+00	6.006E-10	8.925E-09	1.013E-07	2.416E-06	4.382E-05	6.352E-04	3.205E-03	9.870E-03
Th-230	∑DSR(j)		6.006E-10	8.926E-09	1.013E-07	2.416E-06	4.382E-05	6.352E-04	3.205E-03	9.870E-03
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Ra-228	1.000E+00	6.653E-12	4.585E-11	2.032E-10	8.231E-10	6.607E-10	1.865E-12	1.153E-21	0.000E+00
Th-232	Th-228	1.000E+00	2.339E-14	3.104E-13	2.879E-12	3.209E-11	6.469E-11	4.033E-13	3.518E-22	0.000E+00
Th-232	∑DSR(j)		6.677E-12	4.616E-11	2.061E-10	8.552E-10	7.253E-10	2.268E-12	1.505E-21	0.000E+00

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 25 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
Pb-210	4.652E+04	1.587E+04	7.228E+03	3.003E+03	1.945E+03	5.402E+03	1.007E+06	*7.631E+13
Ra-226	4.476E+06	6.471E+05	1.272E+05	1.642E+04	2.907E+03	8.986E+02	7.984E+02	1.051E+03
Ra-228	7.104E+09	2.406E+09	1.248E+09	9.155E+08	3.237E+09	4.012E+12	*2.726E+14	*2.726E+14
Th-228	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14
Th-230	*2.018E+10	2.801E+09	2.467E+08	1.035E+07	5.705E+05	3.936E+04	7.799E+03	2.533E+03
Th-232	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05

*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 = 1.000E+03 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	3.100E-01	31.13 ± 0.06	1.286E-02	1.944E+03	5.795E-15	*7.631E+13
Ra-226	5.900E-01	198.5 ± 0.4	3.214E-02	7.777E+02	2.378E-02	1.051E+03
Ra-228	6.350E+00	8.23 ± 0.02	2.781E-08	8.988E+08	0.000E+00	*2.726E+14
Th-228	6.350E+00	0.000E+00	0.000E+00	*8.192E+14	0.000E+00	*8.192E+14
Th-230	2.498E+01	1.000E+03	9.870E-03	2.533E+03	9.870E-03	2.533E+03
Th-232	6.350E+00	16.94 ± 0.03	1.068E-09	*1.096E+05	0.000E+00	*1.096E+05

*At specific activity limit

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

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	1.666E-04	4.883E-04	1.072E-03	2.581E-03	3.984E-03	1.435E-03	7.700E-06	1.796E-15
Pb-210	Ra-226	1.000E+00	3.294E-06	2.279E-05	1.159E-04	8.982E-04	5.074E-03	1.641E-02	1.847E-02	1.403E-02
Pb-210	Th-230	1.000E+00	1.500E-08	2.230E-07	2.532E-06	6.034E-05	1.095E-03	1.587E-02	8.007E-02	2.466E-01
Pb-210	∑DOSE(j):		1.699E-04	5.113E-04	1.191E-03	3.539E-03	1.015E-02	3.372E-02	9.855E-02	2.606E-01
Ra-226	Ra-226	1.000E+00	2.071E-09	6.761E-09	1.633E-08	4.971E-08	1.440E-07	4.611E-07	1.265E-06	3.109E-06
Ra-226	Th-230	1.000E+00	1.363E-12	1.039E-11	5.785E-11	5.327E-10	4.504E-09	4.768E-08	3.926E-07	3.250E-06
Ra-226	∑DOSE(j):		2.073E-09	6.771E-09	1.639E-08	5.024E-08	1.485E-07	5.088E-07	1.658E-06	6.359E-06
Ra-228	Ra-228	1.000E+00	2.225E-08	6.537E-08	1.247E-07	1.640E-07	4.303E-08	3.075E-11	3.113E-21	0.000E+00
Ra-228	Th-232	1.000E+00	4.225E-11	2.912E-10	1.290E-09	5.227E-09	4.195E-09	1.184E-11	7.323E-21	0.000E+00
Ra-228	∑DOSE(j):		2.229E-08	6.566E-08	1.260E-07	1.693E-07	4.722E-08	4.260E-11	1.044E-20	0.000E+00
Th-228	Ra-228	1.000E+00	9.810E-11	6.173E-10	2.566E-09	9.350E-09	6.010E-09	8.815E-12	1.191E-21	0.000E+00
Th-228	Th-228	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	1.485E-13	1.971E-12	1.828E-11	2.038E-10	4.108E-10	2.561E-12	2.234E-21	0.000E+00
Th-228	∑DOSE(j):		9.825E-11	6.192E-10	2.585E-09	9.554E-09	6.421E-09	1.138E-11	3.425E-21	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

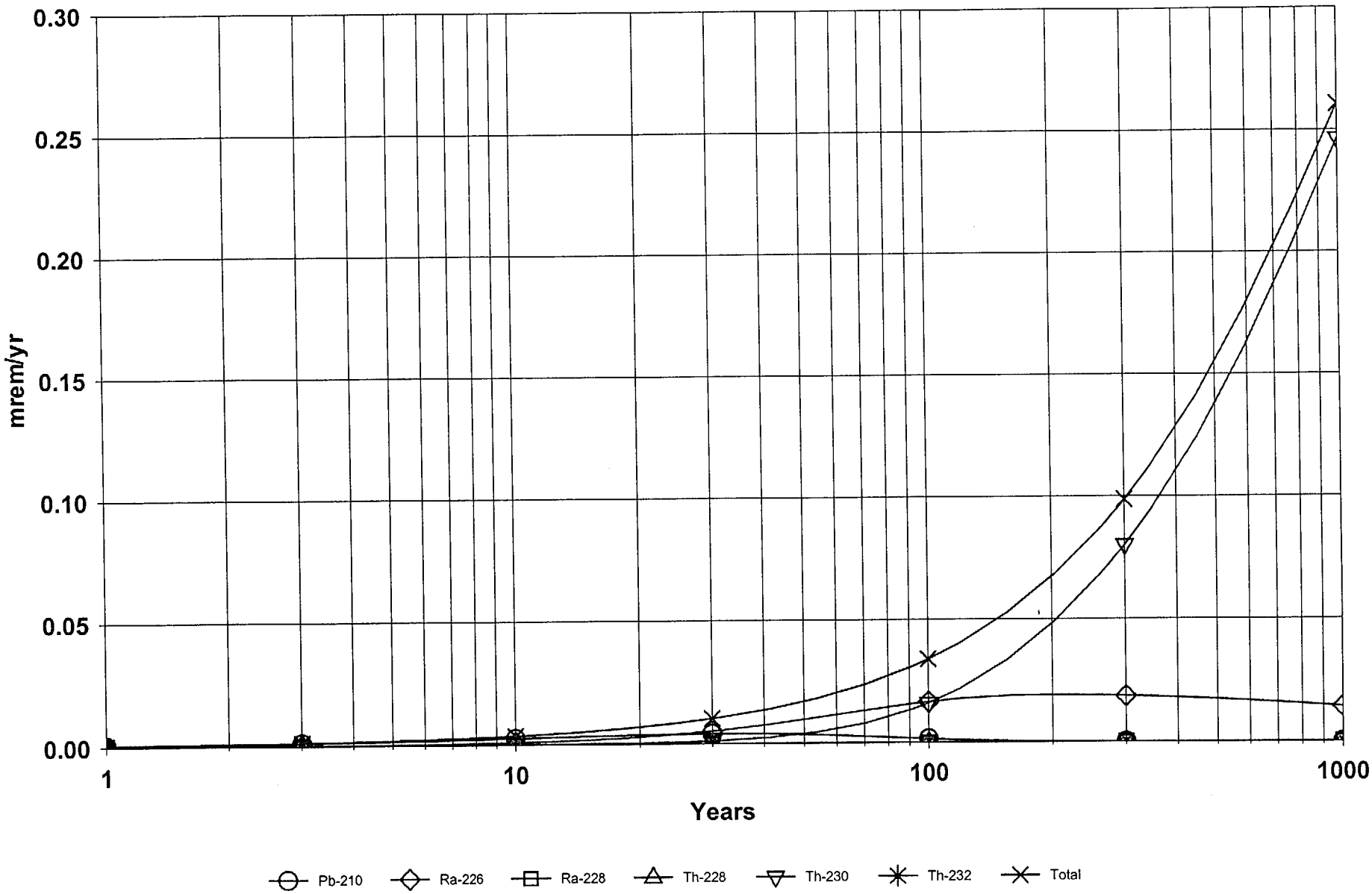
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	3.100E-01	3.002E-01	2.814E-01	2.246E-01	1.179E-01	1.237E-02	1.968E-05	3.165E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.804E-02	5.240E-02	1.564E-01	3.499E-01	5.283E-01	5.023E-01	3.627E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.664E-04	1.465E-03	1.512E-02	1.118E-01	7.186E-01	2.627E+00	8.024E+00
Pb-210	∑S(j):		3.100E-01	3.184E-01	3.353E-01	3.961E-01	5.796E-01	1.259E+00	3.130E+00	8.386E+00
Ra-226	Ra-226	1.000E+00	5.900E-01	5.897E-01	5.892E-01	5.873E-01	5.818E-01	5.632E-01	5.131E-01	3.705E-01
Ra-226	Th-230	1.000E+00	0.000E+00	1.082E-02	3.244E-02	1.080E-01	3.223E-01	1.056E+00	3.017E+00	8.523E+00
Ra-226	∑S(j):		5.900E-01	6.005E-01	6.216E-01	6.952E-01	9.041E-01	1.619E+00	3.530E+00	8.893E+00
Ra-228	Ra-228	1.000E+00	6.350E+00	5.629E+00	4.423E+00	1.902E+00	1.705E-01	3.682E-05	1.238E-15	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.211E-01	1.927E+00	4.447E+00	6.178E+00	6.347E+00	6.346E+00	6.339E+00
Ra-228	∑S(j):		6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.348E+00	6.347E+00	6.346E+00	6.339E+00
Th-228	Ra-228	1.000E+00	0.000E+00	1.812E+00	3.419E+00	2.596E+00	2.554E-01	5.518E-05	1.855E-15	0.000E+00
Th-228	Th-228	1.000E+00	6.350E+00	4.420E+00	2.141E+00	1.695E-01	1.208E-04	1.166E-15	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.184E-01	7.894E-01	3.583E+00	6.092E+00	6.347E+00	6.345E+00	6.339E+00
Th-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.347E+00	6.345E+00	6.339E+00
Th-230	Th-230	1.000E+00	2.498E+01	2.498E+01	2.498E+01	2.497E+01	2.496E+01	2.491E+01	2.477E+01	2.428E+01
Th-232	Th-232	1.000E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.347E+00	6.341E+00

BRF(i) is the branch fraction of the parent nuclide.

RESMAIN5.EXE execution time = 472.25 seconds
Total water/soil iteration failures = 44.

DOSE: All Nuclides Summed, All Pathways Summed



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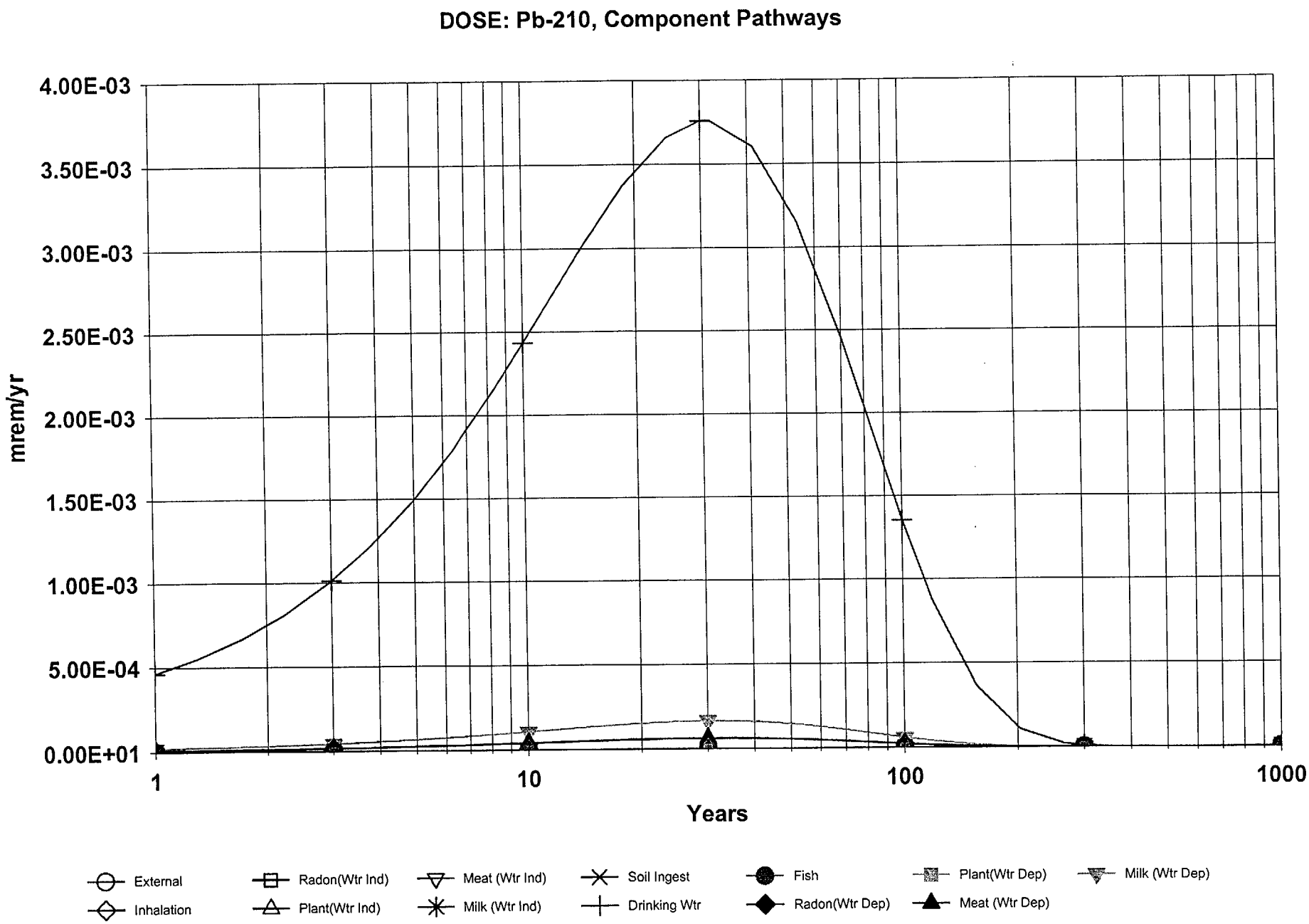

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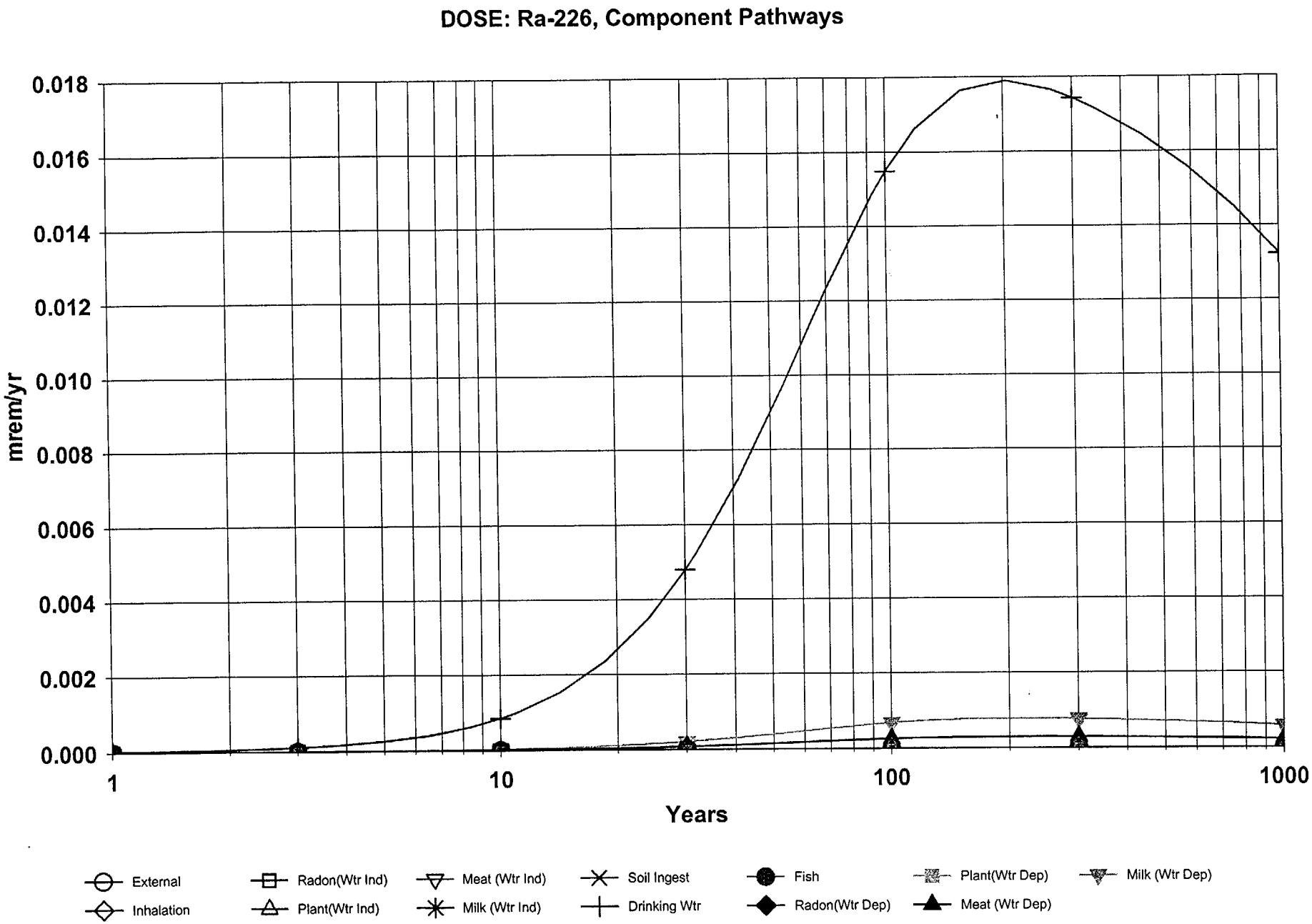

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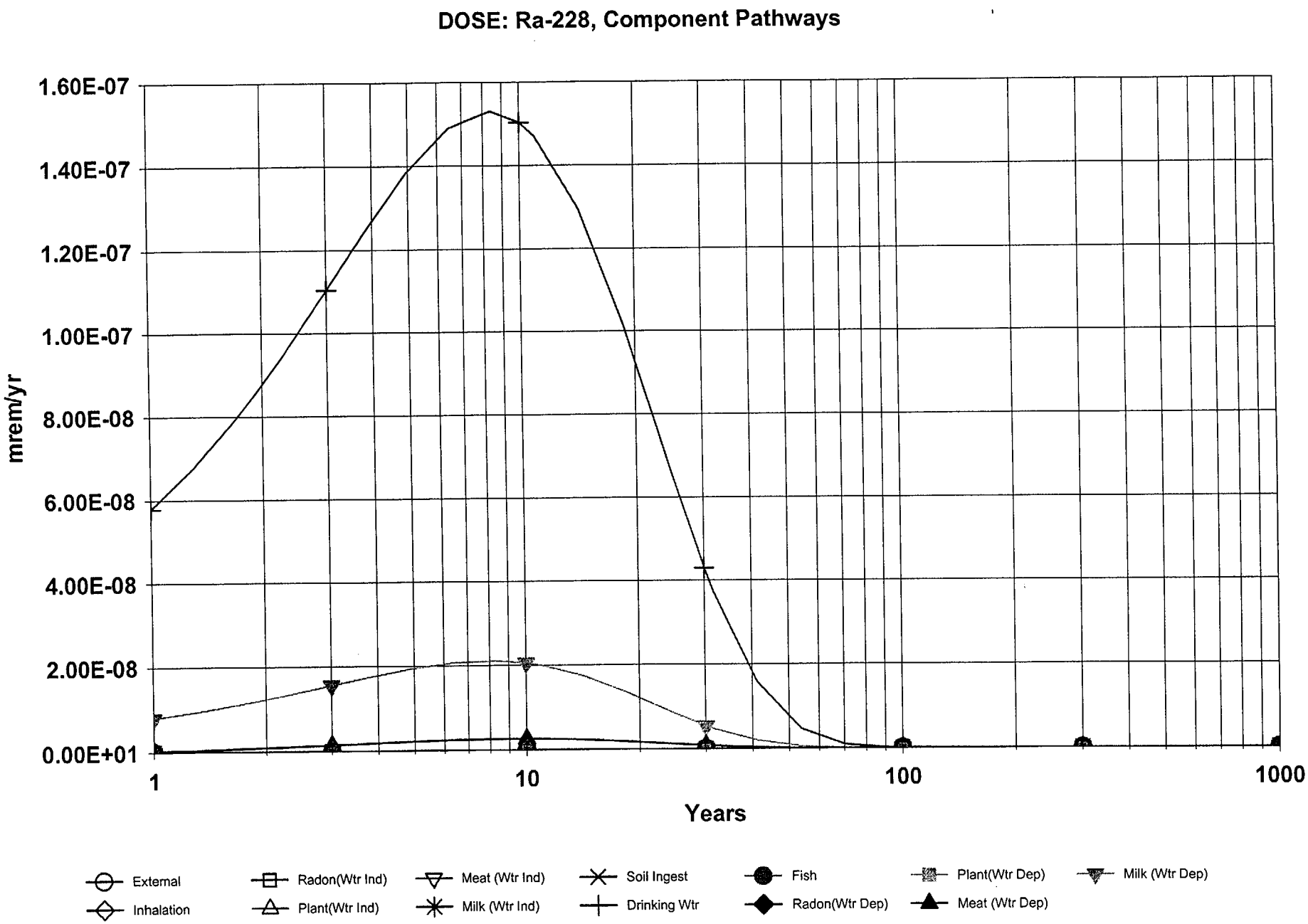

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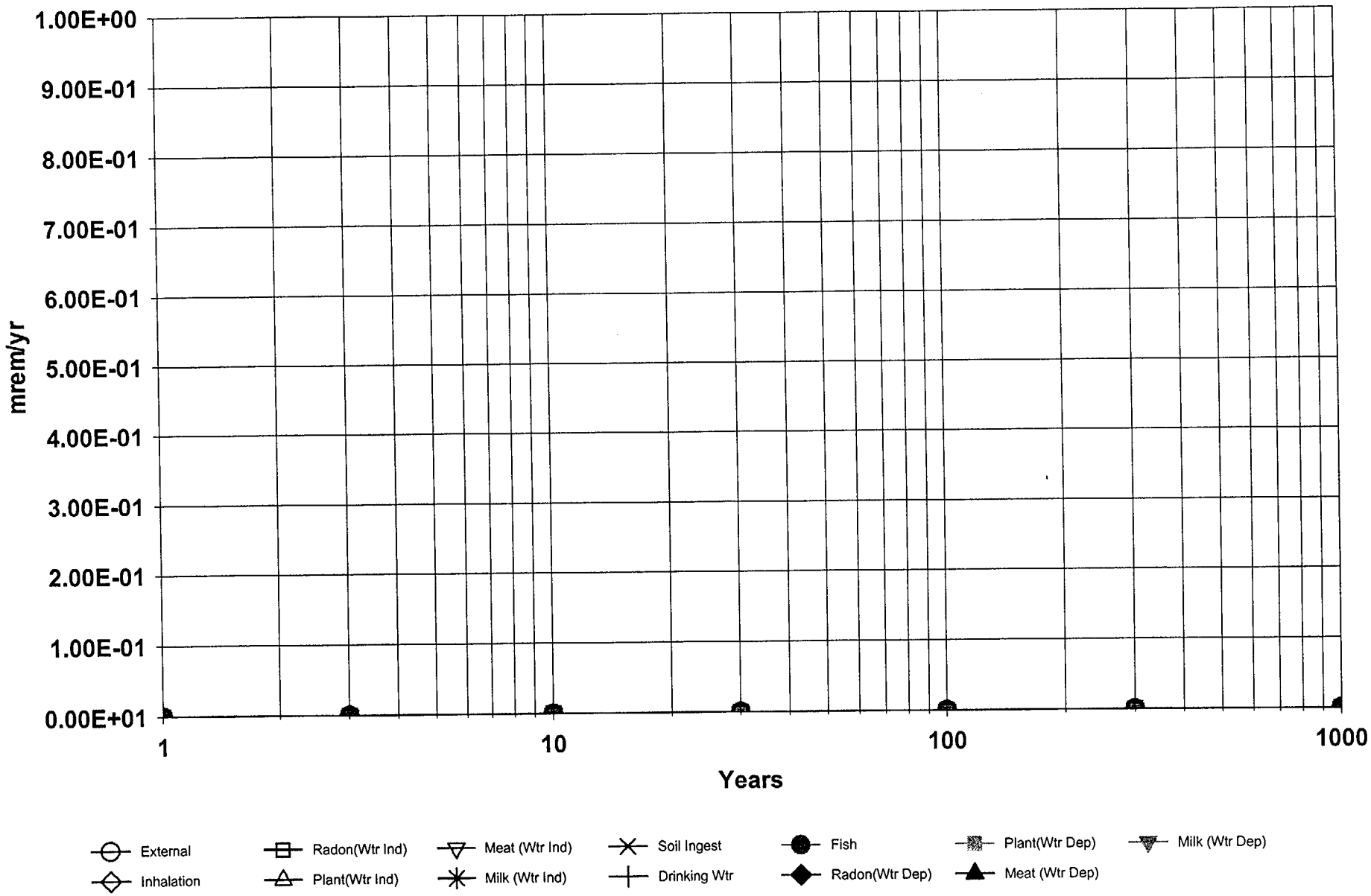
DOSE: Th-228, Component Pathways



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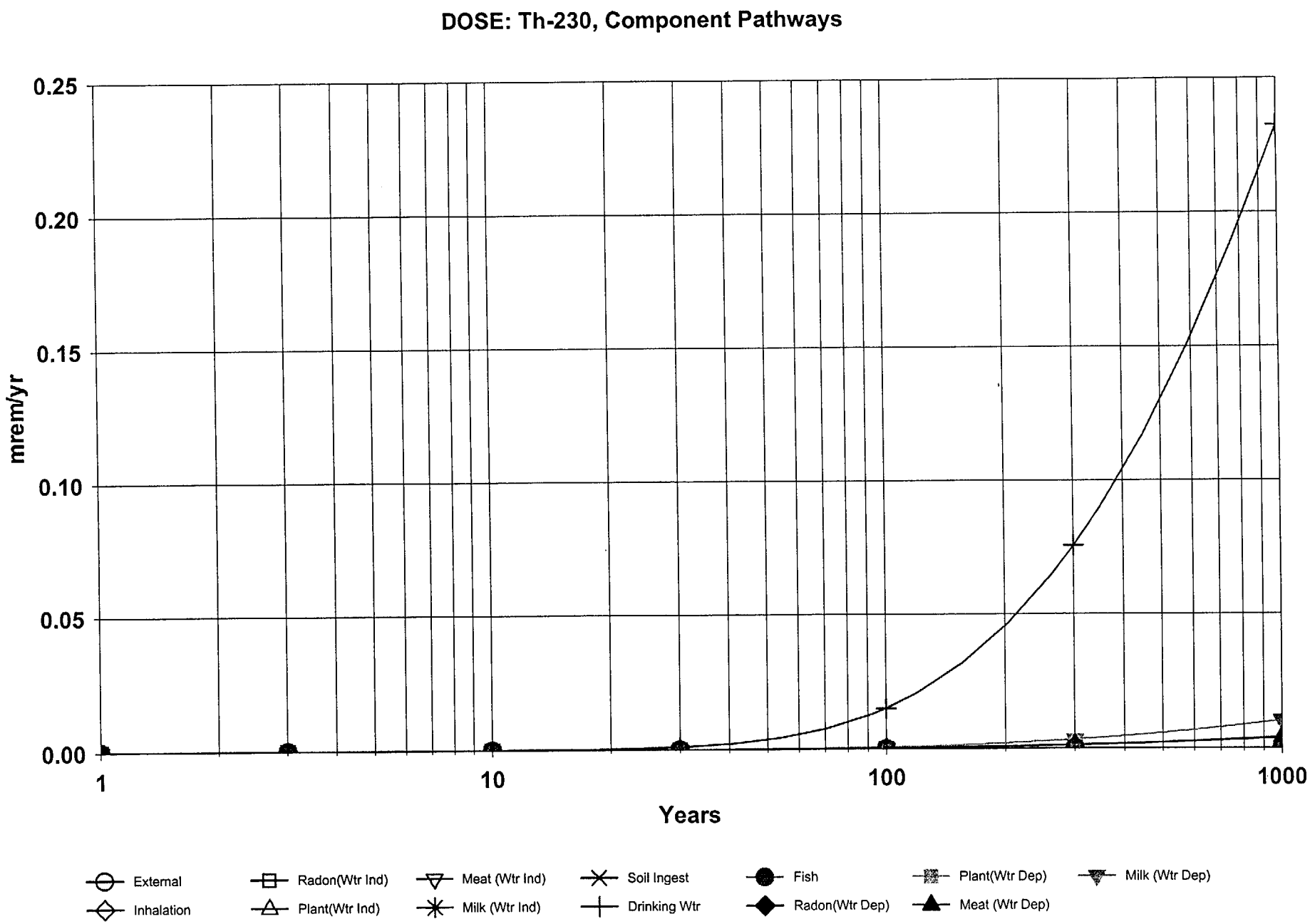

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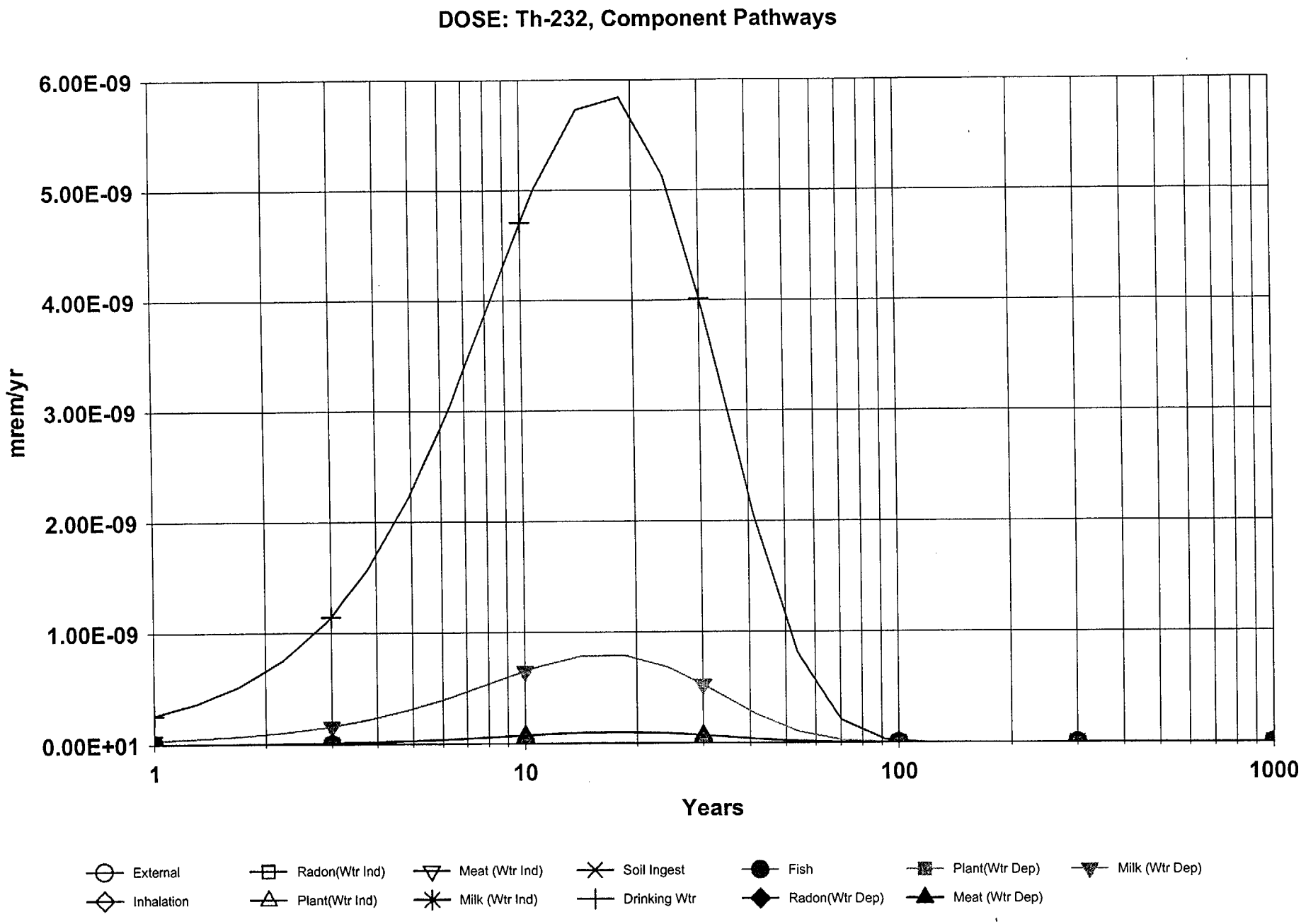

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Dose Conversion Factor (and Related) Parameter Summary
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(1)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(2)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(3)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(6)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(1)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(2)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(3)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(6)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)

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)	6.670E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.310E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	2.180E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+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): Pb-210	3.100E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.900E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.350E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-228	6.350E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	2.498E+01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-232	6.350E+00	0.000E+00	---	S1(6)
2	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
[illegible]	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(6)
R013	Cover depth (m)	3.950E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.720E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	6.000E-04	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.700E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.600E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.200E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.910E-01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.020E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.560E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	2.700E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	9.900E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-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
	Density of saturated zone (g/cm**3)	1.720E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.500E-02	2.000E-01	---	EPSZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone field capacity	3.150E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	3.160E-02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.700E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	1.040E+01	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.450E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	1.180E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
[illegible]	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
	Leach rate (/yr)	0.000E+00	0.000E+00	6.409E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	3.584E+03	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.792E-05	ALEACH(2)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(2)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.810E-05	ALEACH(3)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(3)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.091E-05	ALEACH(4)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.091E-05	ALEACH(5)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(5)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	7.898E+04	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.131E-07	ALEACH(6)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(6)
R017	Inhalation rate (m**3/yr)	not used	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	not used	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	not used	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	5.512E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	1.180E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
	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)
	Ring 11	not used	0.000E+00	---	FRACA(11)
	Ring 12	not used	0.000E+00	---	FRACA(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	4.150E+01	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.750E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	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)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	0.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	1.000E+00	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
9	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
9	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	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)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	2.500E-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)	not used	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	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
C14	DCF correction factor for gaseous forms of C14	not used	1.234E+02	---	CO2F
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	2.000E+01	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)
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	0.000E+00	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	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions	
Area:	667.00 square meters
Thickness:	3.31 meters
Cover Depth:	3.95 meters

Initial Soil Concentrations, pCi/g	
Pb-210	3.100E-01
Ra-226	5.900E-01
Ra-228	6.350E+00
Th-228	6.350E+00
Th-230	2.498E+01
Th-232	6.350E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 25 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):	5.287E-22	5.328E-22	5.411E-22	5.713E-22	6.670E-22	1.147E-21	5.405E-21	1.233E-18
M(t):	2.115E-23	2.131E-23	2.165E-23	2.285E-23	2.668E-23	4.589E-23	2.162E-22	4.931E-20

Maximum TDOSE(t): 1.233E-18 mrem/yr at t = 1.000E+03 years

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.349E-25	0.0004	0.000E+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
Ra-228	8.187E-23	0.1548	0.000E+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
Th-228	4.432E-22	0.8382	0.000E+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
Th-230	2.157E-27	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
Th-232	3.426E-24	0.0065	0.000E+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	5.287E-22	1.0000	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 = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.349E-25	0.0004
Ra-228	0.000E+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	8.187E-23	0.1548
Th-228	0.000E+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	4.432E-22	0.8382
Th-230	0.000E+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	2.157E-27	0.0000
Th-232	0.000E+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	3.426E-24	0.0065
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	5.287E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.368E-25	0.0004	0.000E+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
Ra-228	2.006E-22	0.3764	0.000E+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
Th-228	3.109E-22	0.5835	0.000E+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
Th-230	6.520E-27	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
Th-232	2.115E-23	0.0397	0.000E+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	5.328E-22	1.0000	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+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.368E-25	0.0004
Ra-228	0.000E+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	2.006E-22	0.3764
Th-228	0.000E+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	3.109E-22	0.5835
Th-230	0.000E+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	6.520E-27	0.0000
Th-232	0.000E+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	2.115E-23	0.0397
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	5.328E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.407E-25	0.0004	0.000E+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
Ra-228	3.026E-22	0.5592	0.000E+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
Th-228	1.530E-22	0.2827	0.000E+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
Th-230	1.546E-26	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
Th-232	8.533E-23	0.1577	0.000E+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	5.411E-22	1.0000	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 = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.407E-25	0.0004
Ra-228	0.000E+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	3.026E-22	0.5592
Th-228	0.000E+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	1.530E-22	0.2827
Th-230	0.000E+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	1.546E-26	0.0000
Th-232	0.000E+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	8.533E-23	0.1577
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	5.411E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.547E-25	0.0004	0.000E+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
Ra-228	2.223E-22	0.3891	0.000E+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
Th-228	1.278E-23	0.0224	0.000E+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
Th-230	4.917E-26	0.0001	0.000E+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
Th-232	3.359E-22	0.5880	0.000E+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	5.713E-22	1.0000	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+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.547E-25	0.0004
Ra-228	0.000E+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	2.223E-22	0.3891
Th-228	0.000E+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	1.278E-23	0.0224
Th-230	0.000E+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	4.917E-26	0.0001
Th-232	0.000E+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	3.359E-22	0.5880
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	5.713E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.996E-25	0.0004	0.000E+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
Ra-228	2.527E-23	0.0379	0.000E+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
Th-228	1.064E-26	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
Th-230	1.687E-25	0.0003	0.000E+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
Th-232	6.412E-22	0.9614	0.000E+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	6.670E-22	1.0000	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 = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.996E-25	0.0004
Ra-228	0.000E+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	2.527E-23	0.0379
Th-228	0.000E+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	1.064E-26	0.0000
Th-230	0.000E+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	1.687E-25	0.0003
Th-232	0.000E+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	6.412E-22	0.9614
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	6.670E-22	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	5.287E-25	0.0005	0.000E+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
Ra-228	9.393E-27	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
Th-228	0.000E+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
Th-230	9.961E-25	0.0009	0.000E+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
Th-232	1.146E-21	0.9987	0.000E+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	1.147E-21	1.0000	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+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	5.287E-25	0.0005
Ra-228	0.000E+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	9.393E-27	0.0000
Th-228	0.000E+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
Th-230	0.000E+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	9.961E-25	0.0009
Th-232	0.000E+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	1.146E-21	0.9987
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	1.147E-21	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	2.680E-24	0.0005	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	1.577E-23	0.0029	0.000E+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
Th-232	5.387E-21	0.9966	0.000E+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	5.405E-21	1.0000	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 = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
lide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	2.680E-24	0.0005
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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	1.577E-23	0.0029
Th-232	0.000E+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	5.387E-21	0.9966
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	5.405E-21	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	7.851E-22	0.0006	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	1.801E-20	0.0146	0.000E+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
Th-232	1.214E-18	0.9847	0.000E+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	1.233E-18	1.0000	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-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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	7.851E-22	0.0006
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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	1.801E-20	0.0146
Th-232	0.000E+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	1.214E-18	0.9847
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	1.233E-18	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(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
Pb-210	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	3.981E-25	4.013E-25	4.079E-25	4.317E-25	5.078E-25	8.962E-25	4.542E-24	1.331E-21
Ra-226	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	∑DSR(j)		3.981E-25	4.013E-25	4.079E-25	4.317E-25	5.078E-25	8.962E-25	4.542E-24	1.331E-21
Ra-228	Ra-228	1.000E+00	6.705E-27	5.998E-27	4.799E-27	2.199E-27	2.366E-28	9.655E-32	2.002E-41	0.000E+00
Ra-228	Th-228	1.000E+00	1.289E-23	3.158E-23	4.765E-23	3.500E-23	3.979E-24	1.479E-27	2.345E-37	0.000E+00
Ra-228	∑DSR(j)		1.289E-23	3.158E-23	4.765E-23	3.500E-23	3.979E-24	1.479E-27	2.345E-37	0.000E+00
Th-228	Th-228	1.000E+00	6.980E-23	4.896E-23	2.409E-23	2.013E-24	1.675E-27	2.782E-38	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Ra-226	1.000E+00	8.636E-29	2.610E-28	6.191E-28	1.969E-27	6.754E-27	3.988E-26	6.313E-25	7.212E-22
Th-230	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	∑DSR(j)		8.636E-29	2.610E-28	6.191E-28	1.969E-27	6.754E-27	3.988E-26	6.313E-25	7.212E-22
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Ra-228	1.000E+00	4.129E-28	1.185E-27	2.515E-27	5.595E-27	9.110E-27	1.765E-26	1.085E-25	6.253E-23
Th-232	Th-228	1.000E+00	5.391E-25	3.329E-24	1.344E-23	5.289E-23	1.010E-22	1.804E-22	8.482E-22	1.911E-19
Th-232	∑DSR(j)		5.395E-25	3.331E-24	1.344E-23	5.290E-23	1.010E-22	1.804E-22	8.483E-22	1.912E-19

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 25 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
Pb-210	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13	*7.631E+13
Ra-226	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11	*9.882E+11
Ra-228	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14	*2.726E+14
Th-228	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14
Th-230	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10	*2.018E+10
Th-232	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05

*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 = 1.000E+03 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	3.100E-01	0.000E+00	0.000E+00	*7.631E+13	0.000E+00	*7.631E+13
Ra-226	5.900E-01	1.000E+03	1.331E-21	*9.882E+11	1.331E-21	*9.882E+11
Ra-228	6.350E+00	4.260 ± 0.009	4.956E-23	*2.726E+14	0.000E+00	*2.726E+14
Th-228	6.350E+00	0.000E+00	6.980E-23	*8.192E+14	0.000E+00	*8.192E+14
Th-230	2.498E+01	1.000E+03	7.212E-22	*2.018E+10	7.212E-22	*2.018E+10
Th-232	6.350E+00	1.000E+03	1.912E-19	*1.096E+05	1.912E-19	*1.096E+05

*At specific activity limit

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

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	Ra-226	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	∑DOSE(j):		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	Ra-226	1.000E+00	2.349E-25	2.368E-25	2.407E-25	2.547E-25	2.996E-25	5.287E-25	2.680E-24	7.851E-22
Ra-226	Th-230	1.000E+00	2.157E-27	6.520E-27	1.546E-26	4.917E-26	1.687E-25	9.961E-25	1.577E-23	1.801E-20
Ra-226	∑DOSE(j):		2.370E-25	2.433E-25	2.561E-25	3.039E-25	4.683E-25	1.525E-24	1.845E-23	1.880E-20
Ra-228	Ra-228	1.000E+00	4.258E-26	3.809E-26	3.048E-26	1.396E-26	1.502E-27	0.000E+00	0.000E+00	0.000E+00
Ra-228	Th-232	1.000E+00	2.622E-27	7.526E-27	1.597E-26	3.553E-26	5.785E-26	1.121E-25	6.890E-25	3.970E-22
Ra-228	∑DOSE(j):		4.520E-26	4.561E-26	4.645E-26	4.949E-26	5.935E-26	1.121E-25	6.890E-25	3.970E-22
Th-228	Ra-228	1.000E+00	8.183E-23	2.005E-22	3.026E-22	2.223E-22	2.526E-23	9.393E-27	0.000E+00	0.000E+00
Th-228	Th-228	1.000E+00	4.432E-22	3.109E-22	1.530E-22	1.278E-23	1.064E-26	0.000E+00	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	3.423E-24	2.114E-23	8.531E-23	3.359E-22	6.412E-22	1.146E-21	5.386E-21	1.213E-18
Th-228	∑DOSE(j):		5.285E-22	5.326E-22	5.408E-22	5.709E-22	6.665E-22	1.146E-21	5.386E-21	1.213E-18
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

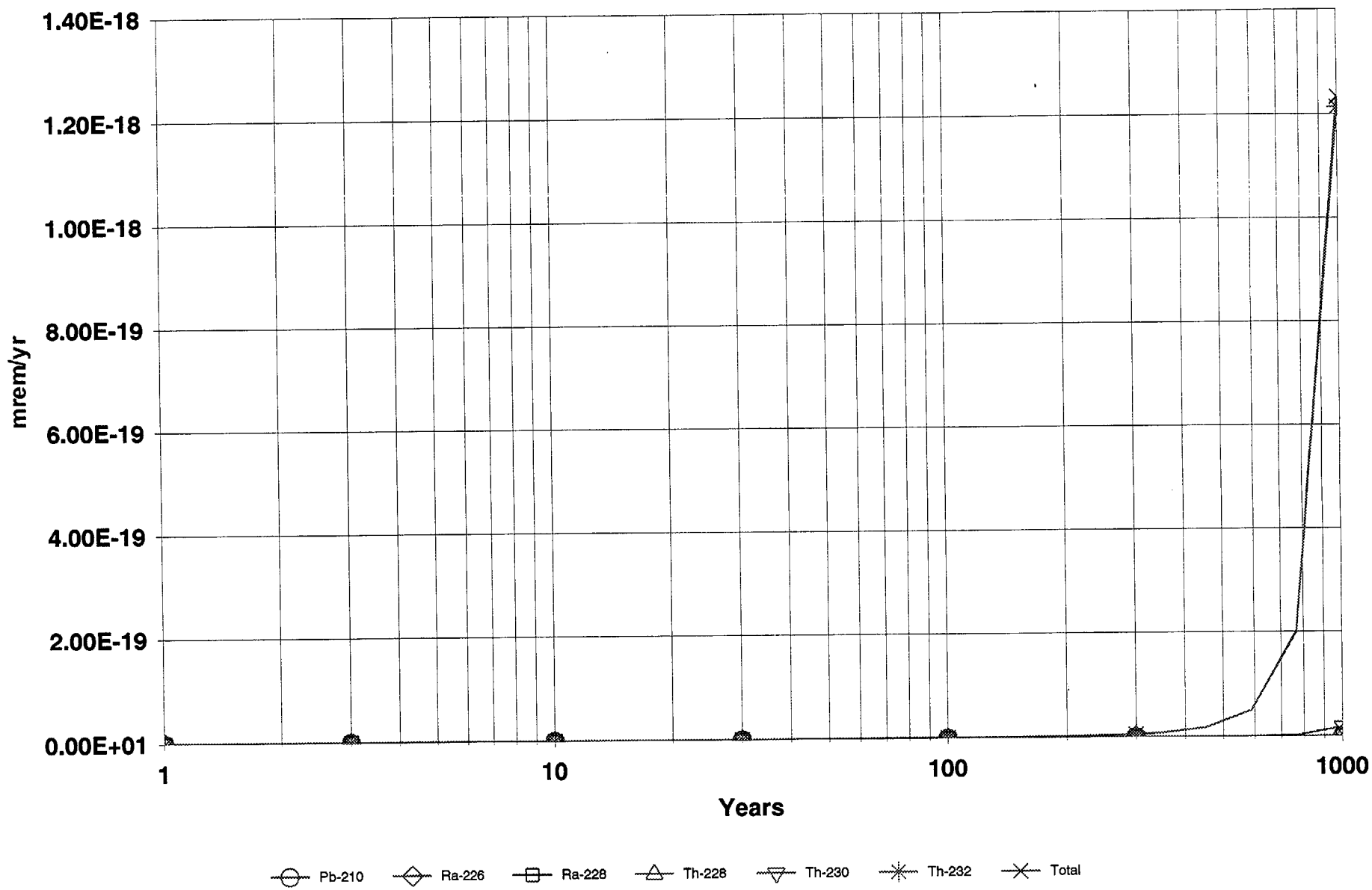
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	3.100E-01	3.003E-01	2.819E-01	2.257E-01	1.197E-01	1.299E-02	2.281E-05	5.175E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.805E-02	5.244E-02	1.568E-01	3.521E-01	5.360E-01	5.121E-01	3.735E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.664E-04	1.466E-03	1.515E-02	1.123E-01	7.263E-01	2.672E+00	8.232E+00
Pb-210	∑S(j):		3.100E-01	3.185E-01	3.358E-01	3.977E-01	5.841E-01	1.275E+00	3.184E+00	8.606E+00
Ra-226	Ra-226	1.000E+00	5.900E-01	5.897E-01	5.892E-01	5.873E-01	5.821E-01	5.640E-01	5.153E-01	3.758E-01
Ra-226	Th-230	1.000E+00	0.000E+00	1.082E-02	3.244E-02	1.080E-01	3.224E-01	1.057E+00	3.027E+00	8.617E+00
Ra-226	∑S(j):		5.900E-01	6.006E-01	6.216E-01	6.953E-01	9.044E-01	1.621E+00	3.542E+00	8.993E+00
Ra-228	Ra-228	1.000E+00	6.350E+00	5.629E+00	4.423E+00	1.902E+00	1.706E-01	3.687E-05	1.243E-15	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.211E-01	1.927E+00	4.448E+00	6.178E+00	6.349E+00	6.348E+00	6.344E+00
Ra-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.349E+00	6.348E+00	6.344E+00
Th-228	Ra-228	1.000E+00	0.000E+00	1.812E+00	3.419E+00	2.596E+00	2.555E-01	5.526E-05	1.863E-15	0.000E+00
Th-228	Th-228	1.000E+00	6.350E+00	4.420E+00	2.141E+00	1.695E-01	1.208E-04	1.167E-15	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.184E-01	7.894E-01	3.584E+00	6.093E+00	6.348E+00	6.347E+00	6.344E+00
Th-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.348E+00	6.347E+00	6.344E+00
Th-230	Th-230	1.000E+00	2.498E+01	2.498E+01	2.498E+01	2.498E+01	2.497E+01	2.493E+01	2.483E+01	2.449E+01
Th-232	Th-232	1.000E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.345E+00

BRF(i) is the branch fraction of the parent nuclide.

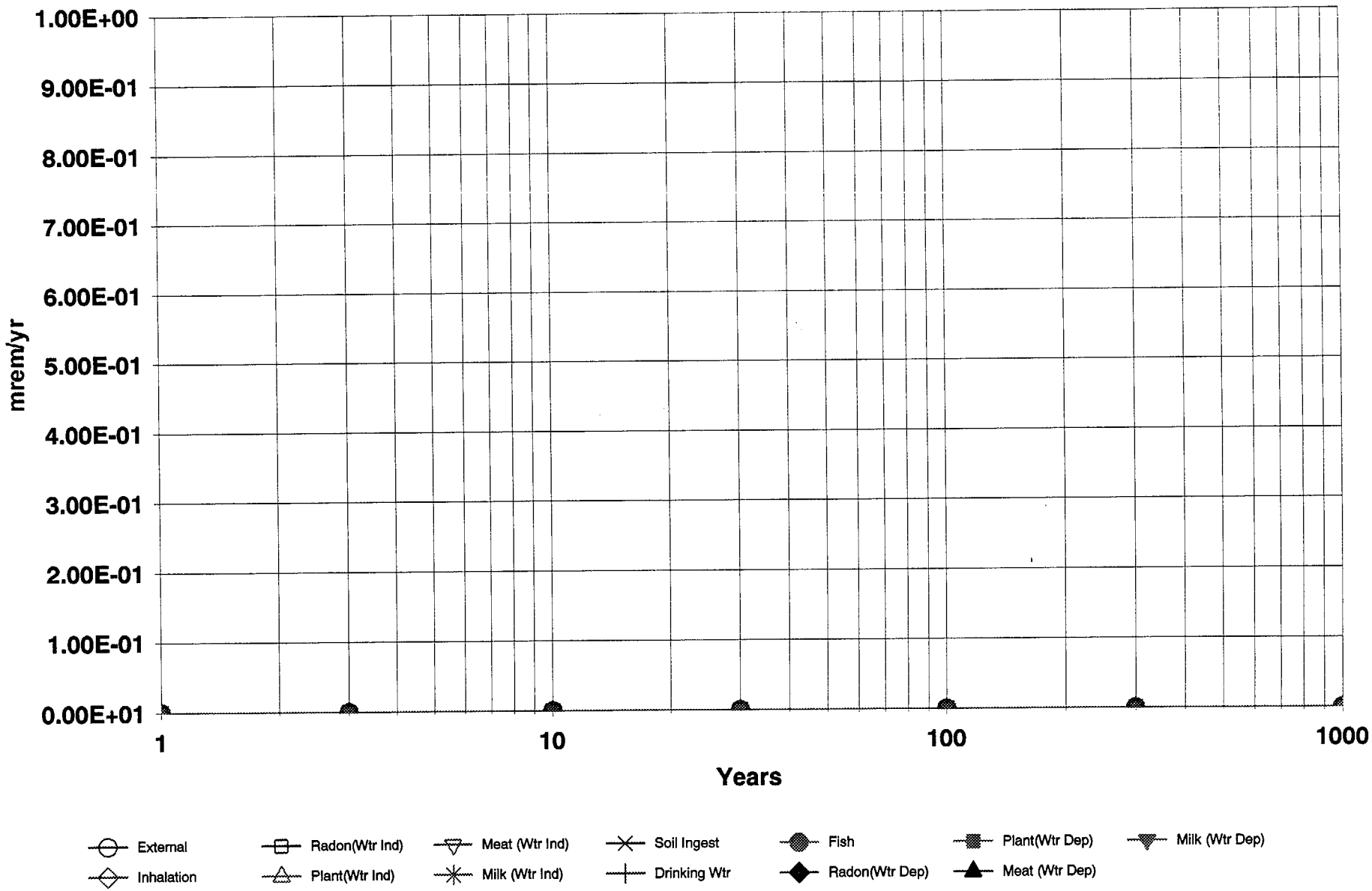
RESMAIN5.EXE execution time = 23.67 seconds

DOSE: All Nuclides Summed, All Pathways Summed



RGD5B31A.RAD 05/30/2001 11:34 Includes All Pathways

DOSE: Pb-210, Component Pathways



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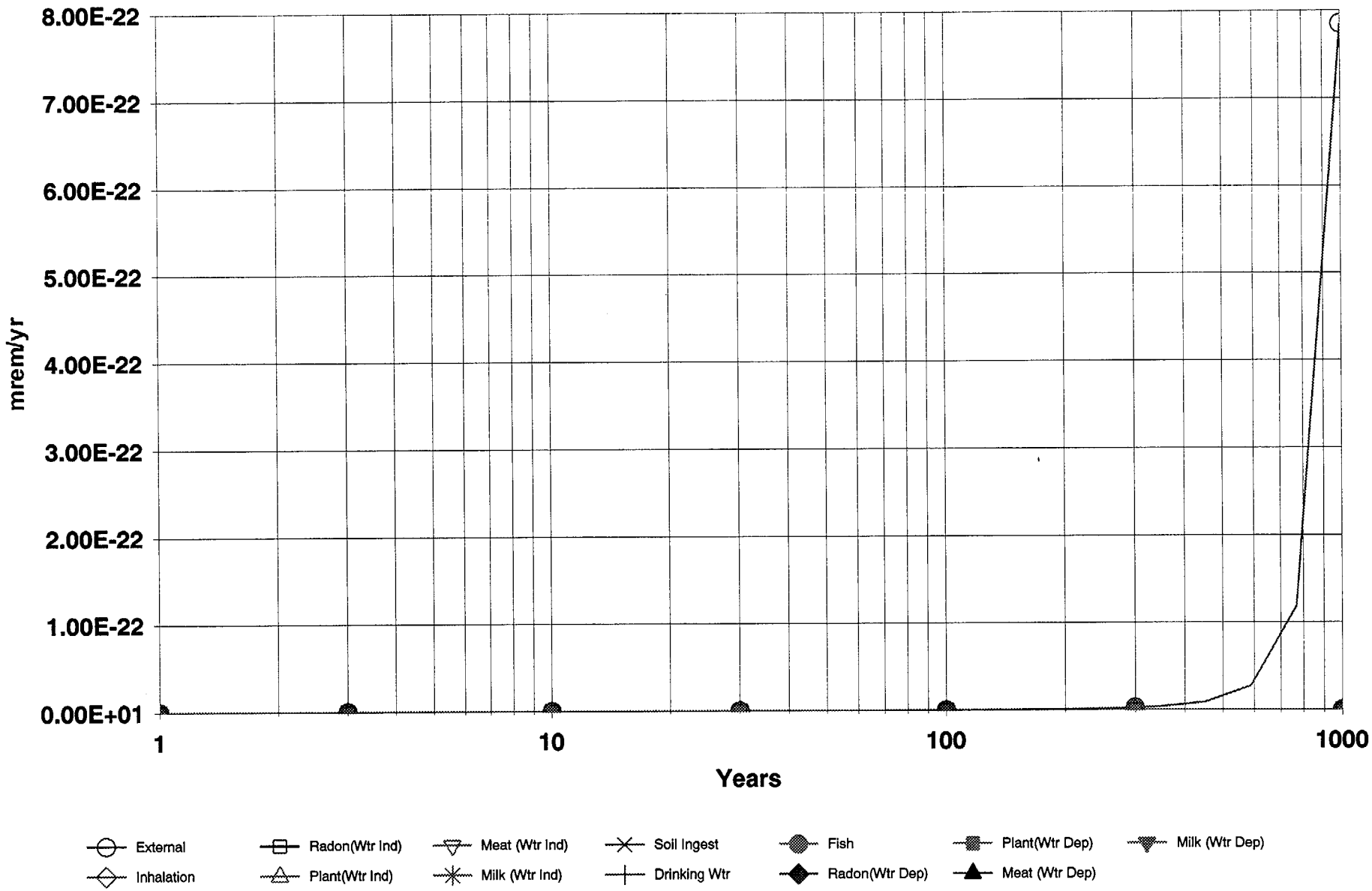

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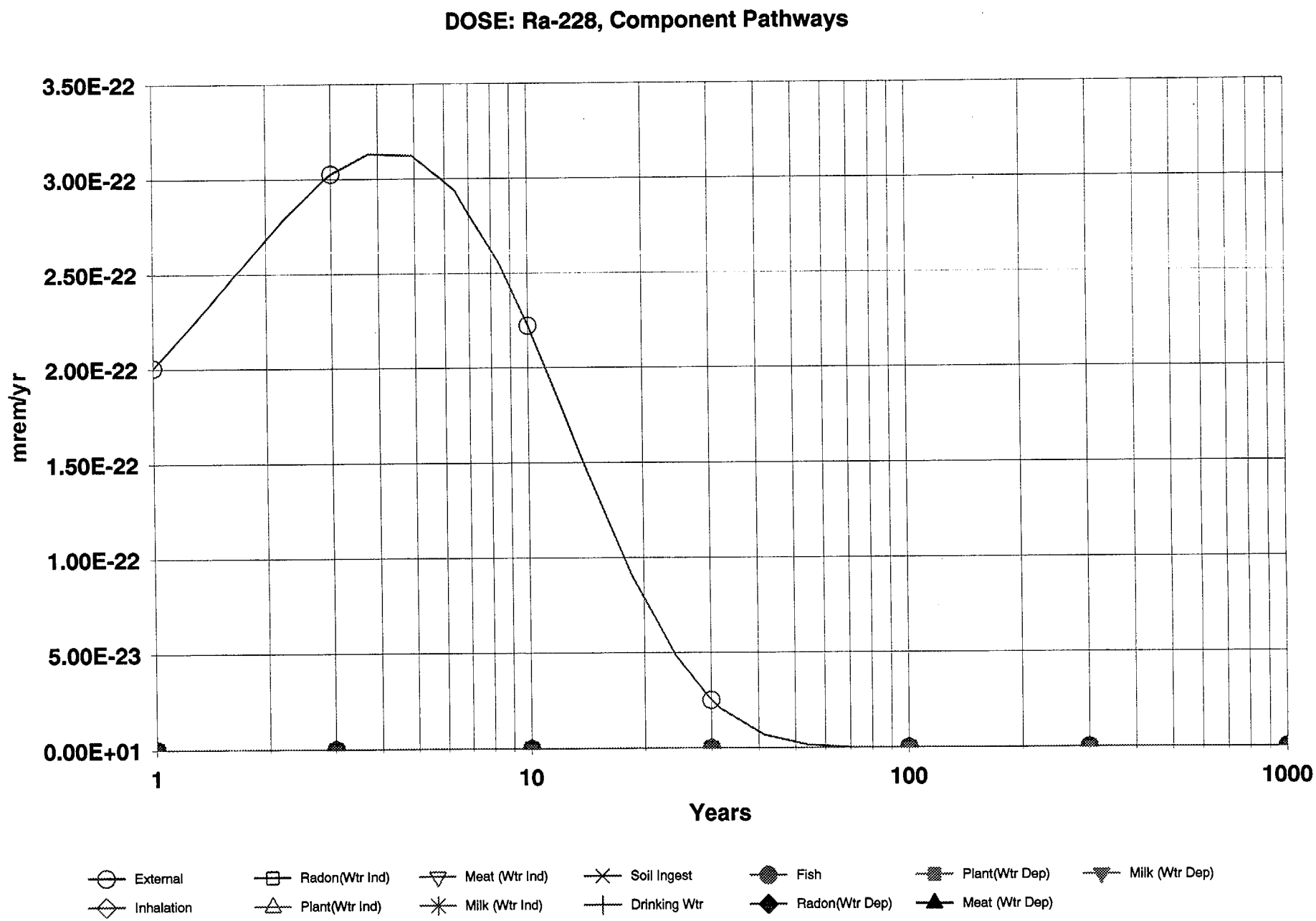

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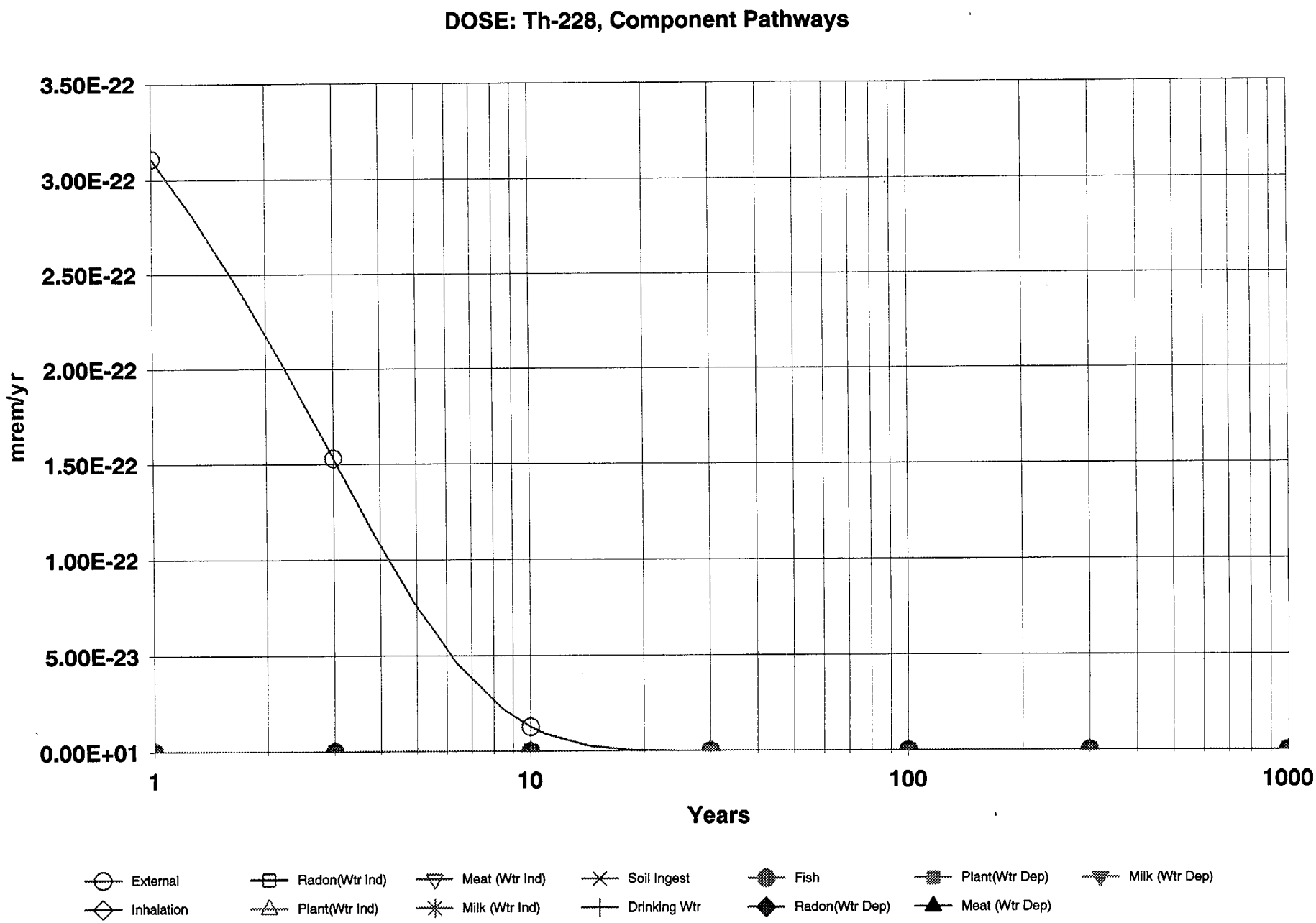

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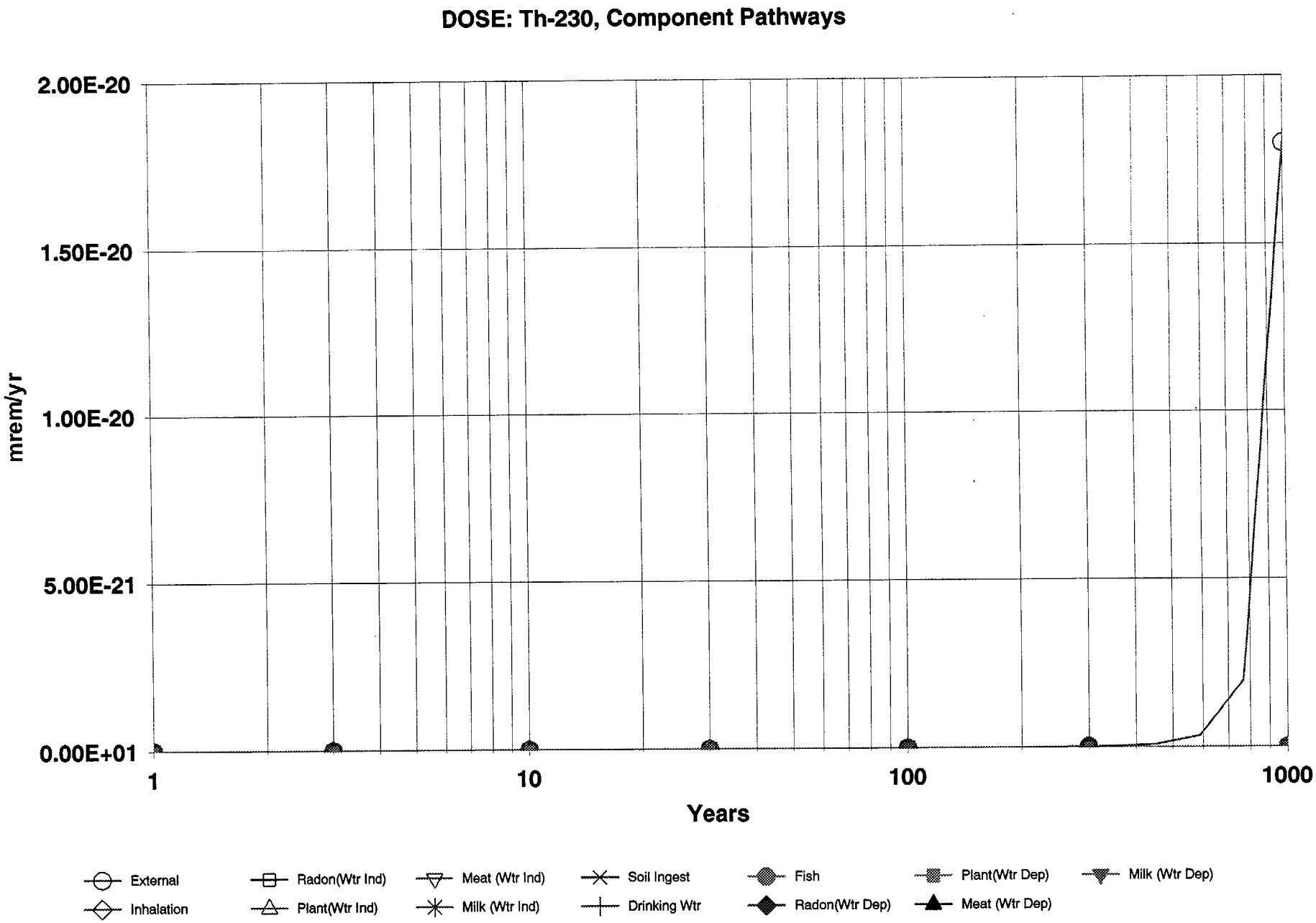
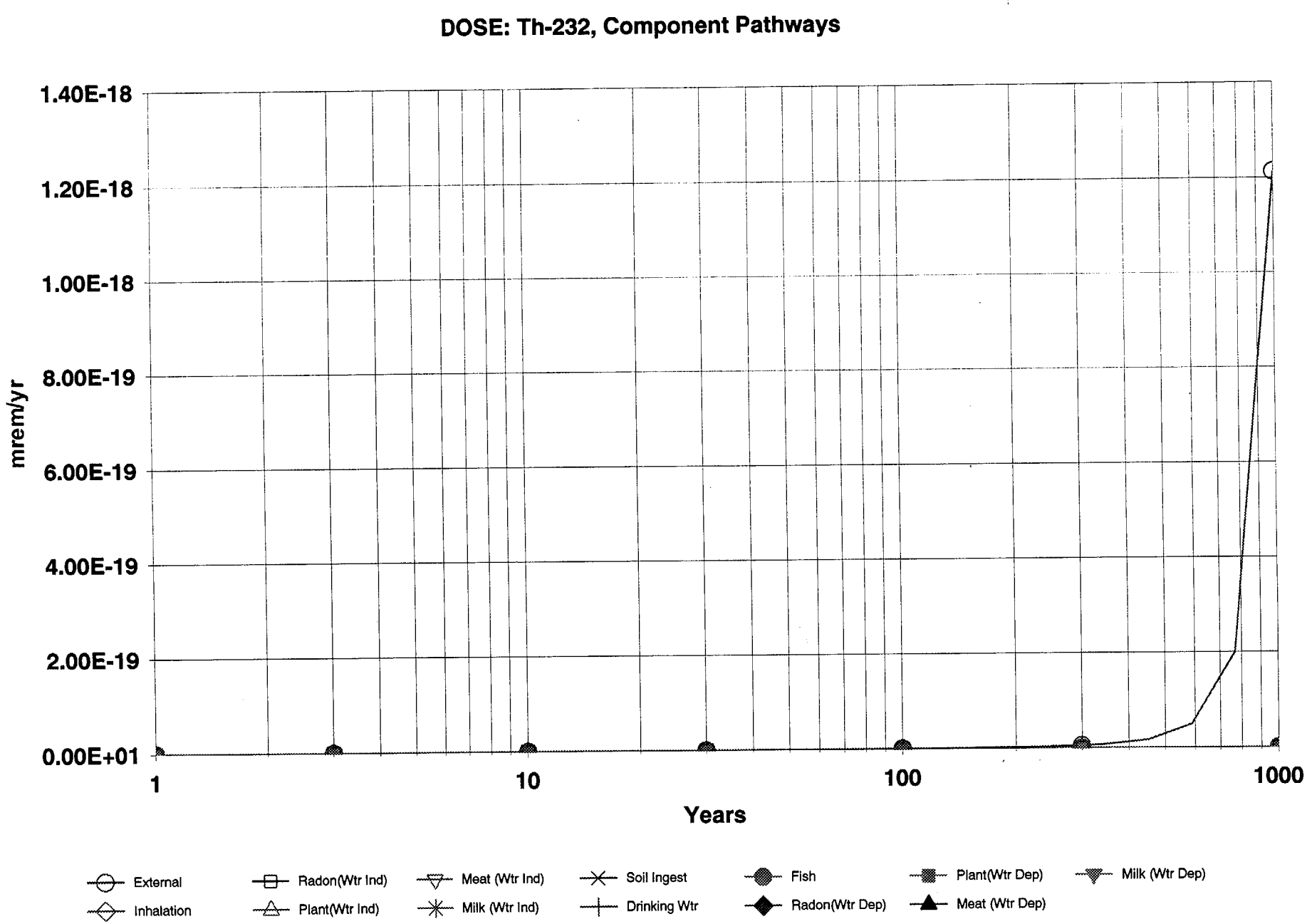


RGD5B31A.RAD 05/30/2001 11:34



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Dose Conversion Factor (and Related) Parameter Summary
File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(1)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(2)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(3)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(6)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(1)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(2)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(3)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(6)
D-34	Food transfer factors:			
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(1,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(1,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(1,3)
D				
[illegible]	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(4,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(4,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(1,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(2,1)
[illegible]	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(2,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)

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

File: Default.LIB

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(4,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)

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)	3.743E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	3.310E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	2.180E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	2.500E+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): Pb-210	3.100E-01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Ra-226	5.900E-01	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-228	6.350E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Th-228	6.350E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Th-230	2.498E+01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-232	6.350E+00	0.000E+00	---	S1(6)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(6)
R013	Cover depth (m)	3.050E+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)	6.000E-04	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.700E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.000E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.600E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.200E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	6.910E-01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	1.020E+01	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.560E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	2.700E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	9.900E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	3.800E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	5.000E-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)	1.720E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	3.500E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.500E-02	2.000E-01	---	EPSZ

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone field capacity	3.150E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	3.160E-02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.700E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	1.040E+01	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.450E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	0.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.133E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.199E-05	ALEACH(2)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(2)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	3.548E+03	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.199E-05	ALEACH(3)
R016	Solubility constant	1.000E-09	0.000E+00	---	SOLUBK(3)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.928E-05	ALEACH(4)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(4)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.928E-05	ALEACH(5)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(5)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.888E+03	6.000E+04	7.898E+04	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.888E+03	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.437E-06	ALEACH(6)
R016	Solubility constant	3.160E-09	0.000E+00	---	SOLUBK(6)
R017	Inhalation rate (m**3/yr)	not used	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	not used	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	not used	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	not used	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	not used	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	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)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	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)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+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	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	not used	1.500E-01	---	DM
R019	Depth of roots (m)	not used	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	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C	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

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
C14	DCF correction factor for gaseous forms of C14	not used	1.234E+02	---	CO2F
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	2.000E+01	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)
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	0.000E+00	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	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

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

Contaminated Zone Dimensions	
Area:	37432.00 square meters
Thickness:	3.31 meters
Cover Depth:	3.05 meters

Initial Soil Concentrations, pCi/g	
Pb-210	3.100E-01
Ra-226	5.900E-01
Ra-228	6.350E+00
Th-228	6.350E+00
Th-230	2.498E+01
Th-232	6.350E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 25 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):	1.606E-04	4.826E-04	1.123E-03	3.339E-03	9.576E-03	3.180E-02	9.295E-02	2.458E-01
M(t):	6.423E-06	1.931E-05	4.494E-05	1.335E-04	3.830E-04	1.272E-03	3.718E-03	9.831E-03

Maximum TDOSE(t): 2.458E-01 mrem/yr at t = 1.000E+03 years

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.574E-04	0.9804	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.574E-04	0.9804
Ra-226	3.117E-06	0.0194	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.117E-06	0.0194
Ra-228	1.981E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.981E-08	0.0001
Th-228	0.000E+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
Th-230	1.420E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-08	0.0001
Th-232	3.776E-11	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	3.776E-11	0.0000
Total	1.606E-04	1.0000	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-04	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	4.608E-04	0.9548	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.608E-04	0.9548
Ra-226	2.152E-05	0.0446	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.152E-05	0.0446
Ra-228	5.777E-08	0.0001	0.000E+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-08	0.0001
Th-228	0.000E+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
Th-230	2.107E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.107E-07	0.0004
Th-232	2.583E-10	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	2.583E-10	0.0000
Total	4.826E-04	1.0000	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	4.826E-04	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.011E-03	0.9004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.011E-03	0.9004
Ra-226	1.094E-04	0.0974	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.094E-04	0.0974
Ra-228	1.103E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-07	0.0001
Th-228	0.000E+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
Th-230	2.390E-06	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.390E-06	0.0021
Th-232	1.140E-09	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	1.140E-09	0.0000
Total	1.123E-03	1.0000	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	1.123E-03	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.434E-03	0.7291	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.434E-03	0.7291
Ra-226	8.474E-04	0.2538	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.474E-04	0.2538
Ra-228	1.503E-07	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	1.503E-07	0.0000
Th-228	0.000E+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
Th-230	5.693E-05	0.0171	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.693E-05	0.0171
Th-232	4.706E-09	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	4.706E-09	0.0000
Total	3.339E-03	1.0000	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	3.339E-03	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.757E-03	0.3924	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.757E-03	0.3924
Ra-226	4.786E-03	0.4998	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.786E-03	0.4998
Ra-228	4.290E-08	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	4.290E-08	0.0000
Th-228	0.000E+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
Th-230	1.032E-03	0.1078	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-03	0.1078
Th-232	4.011E-09	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	4.011E-09	0.0000
Total	9.576E-03	1.0000	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	9.576E-03	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.353E-03	0.0425	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.353E-03	0.0425
Ra-226	1.548E-02	0.4868	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.548E-02	0.4868
Ra-228	3.515E-11	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	3.515E-11	0.0000
Th-228	0.000E+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
Th-230	1.497E-02	0.4706	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.497E-02	0.4706
Th-232	1.271E-11	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	1.271E-11	0.0000
Total	3.180E-02	1.0000	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	3.180E-02	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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 = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.262E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.262E-06	0.0001
Ra-226	1.742E-02	0.1875	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.742E-02	0.1875
Ra-228	3.855E-21	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	3.855E-21	0.0000
Th-228	0.000E+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
Th-230	7.552E-02	0.8125	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.552E-02	0.8125
Th-232	8.504E-21	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	8.504E-21	0.0000
Total	9.295E-02	1.0000	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	9.295E-02	1.0000

*Sum of all water independent and dependent pathways.

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-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+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
Ra-226	0.000E+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
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	0.000E+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
Th-232	0.000E+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-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.694E-15	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	1.694E-15	0.0000
Ra-226	1.323E-02	0.0538	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.323E-02	0.0538
Ra-228	0.000E+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
Th-228	0.000E+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
Th-230	2.326E-01	0.9462	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.326E-01	0.9462
Th-232	0.000E+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	2.458E-01	1.0000	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	2.458E-01	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	DSR(j,t) (mrem/yr)/(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
Pb-210	Pb-210	1.000E+00	5.078E-04	1.487E-03	3.263E-03	7.852E-03	1.212E-02	4.365E-03	2.343E-05	5.466E-15
Ra-226	Ra-226	1.000E+00	3.110E-09	1.002E-08	2.392E-08	7.241E-08	2.093E-07	6.700E-07	1.838E-06	4.516E-06
Ra-226	Pb-210	1.000E+00	5.280E-06	3.647E-05	1.854E-04	1.436E-03	8.112E-03	2.624E-02	2.953E-02	2.242E-02
Ra-226	∑DSR(j)		5.283E-06	3.648E-05	1.854E-04	1.436E-03	8.113E-03	2.624E-02	2.953E-02	2.243E-02
Ra-228	Ra-228	1.000E+00	3.104E-09	9.002E-09	1.697E-08	2.220E-08	5.813E-09	4.152E-12	4.202E-22	0.000E+00
Ra-228	Th-228	1.000E+00	1.522E-11	9.608E-11	3.997E-10	1.463E-09	9.423E-10	1.383E-12	1.869E-22	0.000E+00
Ra-228	∑DSR(j)		3.119E-09	9.098E-09	1.737E-08	2.367E-08	6.755E-09	5.535E-12	6.071E-22	0.000E+00
Th-228	Th-228	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	Ra-226	1.000E+00	4.860E-14	3.660E-13	2.014E-12	1.837E-11	1.548E-10	1.637E-09	1.347E-08	1.115E-07
Th-230	Pb-210	1.000E+00	5.685E-10	8.435E-09	9.566E-08	2.279E-06	4.133E-05	5.991E-04	3.023E-03	9.309E-03
Th-230	∑DSR(j)		5.686E-10	8.435E-09	9.567E-08	2.279E-06	4.133E-05	5.991E-04	3.023E-03	9.309E-03
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Ra-228	1.000E+00	5.924E-12	4.037E-11	1.767E-10	7.093E-10	5.673E-10	1.599E-12	9.887E-22	0.000E+00
Th-232	Th-228	1.000E+00	2.297E-14	3.066E-13	2.844E-12	3.184E-11	6.436E-11	4.017E-13	3.506E-22	0.000E+00
Th-232	∑DSR(j)		5.947E-12	4.067E-11	1.796E-10	7.412E-10	6.317E-10	2.001E-12	1.339E-21	0.000E+00

*Branch Fraction is the cumulative factor for the j't principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ≤ 0.5 yr) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 25 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
Pb-210	4.923E+04	1.682E+04	7.662E+03	3.184E+03	2.063E+03	5.728E+03	1.067E+06	*7.631E+13
Ra-226	4.732E+06	6.853E+05	1.348E+05	1.741E+04	3.082E+03	9.527E+02	8.465E+02	1.115E+03
Ra-228	8.014E+09	2.748E+09	1.439E+09	1.056E+09	3.701E+09	4.517E+12	*2.726E+14	*2.726E+14
Th-228	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14	*8.192E+14
Th-230	*2.018E+10	2.964E+09	2.613E+08	1.097E+07	6.049E+05	4.173E+04	8.269E+03	2.685E+03
Th-232	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05	*1.096E+05

*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 = 1.000E+03 years

Nuclide (i)	Initial pCi/g	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Pb-210	3.100E-01	31.13 ± 0.06	1.213E-02	2.061E+03	5.466E-15	*7.631E+13
Ra-226	5.900E-01	198.5 ± 0.4	3.032E-02	8.246E+02	2.243E-02	1.115E+03
Ra-228	6.350E+00	8.27 ± 0.02	2.409E-08	1.038E+09	0.000E+00	*2.726E+14
Th-228	6.350E+00	0.000E+00	0.000E+00	*8.192E+14	0.000E+00	*8.192E+14
Th-230	2.498E+01	1.000E+03	9.309E-03	2.685E+03	9.309E-03	2.685E+03
Th-232	6.350E+00	16.98 ± 0.03	9.269E-10	*1.096E+05	0.000E+00	*1.096E+05

*At specific activity limit

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

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	1.574E-04	4.608E-04	1.011E-03	2.434E-03	3.757E-03	1.353E-03	7.262E-06	1.694E-15
Pb-210	Ra-226	1.000E+00	3.115E-06	2.152E-05	1.094E-04	8.473E-04	4.786E-03	1.548E-02	1.742E-02	1.323E-02
Pb-210	Th-230	1.000E+00	1.420E-08	2.107E-07	2.390E-06	5.693E-05	1.032E-03	1.497E-02	7.552E-02	2.325E-01
Pb-210	∑DOSE(j):		1.606E-04	4.826E-04	1.123E-03	3.338E-03	9.576E-03	3.180E-02	9.295E-02	2.458E-01
Ra-226	Ra-226	1.000E+00	1.835E-09	5.912E-09	1.412E-08	4.272E-08	1.235E-07	3.953E-07	1.084E-06	2.665E-06
Ra-226	Th-230	1.000E+00	1.214E-12	9.143E-12	5.031E-11	4.590E-10	3.867E-09	4.089E-08	3.365E-07	2.786E-06
Ra-226	∑DOSE(j):		1.836E-09	5.921E-09	1.417E-08	4.318E-08	1.274E-07	4.362E-07	1.421E-06	5.450E-06
Ra-228	Ra-228	1.000E+00	1.971E-08	5.716E-08	1.078E-07	1.410E-07	3.691E-08	2.636E-11	2.668E-21	0.000E+00
Ra-228	Th-232	1.000E+00	3.762E-11	2.563E-10	1.122E-09	4.504E-09	3.603E-09	1.016E-11	6.278E-21	0.000E+00
Ra-228	∑DOSE(j):		1.975E-08	5.742E-08	1.089E-07	1.455E-07	4.052E-08	3.652E-11	8.947E-21	0.000E+00
Th-228	Ra-228	1.000E+00	9.663E-11	6.101E-10	2.538E-09	9.288E-09	5.984E-09	8.783E-12	1.187E-21	0.000E+00
Th-228	Th-228	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	1.459E-13	1.947E-12	1.806E-11	2.022E-10	4.087E-10	2.551E-12	2.226E-21	0.000E+00
Th-228	∑DOSE(j):		9.678E-11	6.121E-10	2.556E-09	9.491E-09	6.392E-09	1.133E-11	3.413E-21	0.000E+00
Th-230	Th-230	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	Th-232	1.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

BRF(i) is the branch fraction of the parent nuclide.

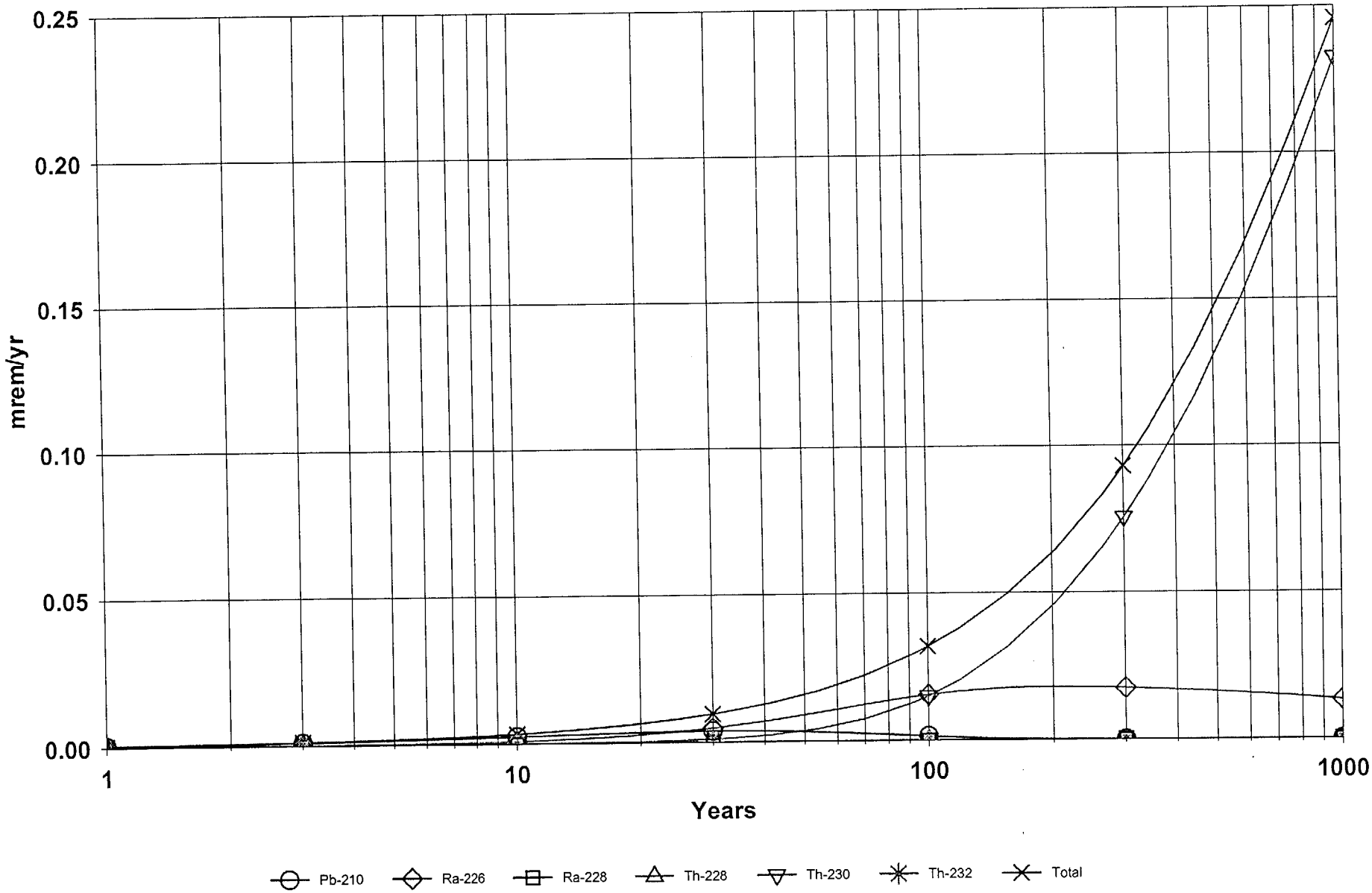
Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	BRF(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
Pb-210	Pb-210	1.000E+00	3.100E-01	3.002E-01	2.814E-01	2.246E-01	1.179E-01	1.237E-02	1.968E-05	3.165E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.804E-02	5.240E-02	1.564E-01	3.499E-01	5.283E-01	5.023E-01	3.627E-01
Pb-210	Th-230	1.000E+00	0.000E+00	1.664E-04	1.465E-03	1.512E-02	1.118E-01	7.186E-01	2.627E+00	8.024E+00
Pb-210	∑S(j):		3.100E-01	3.184E-01	3.353E-01	3.961E-01	5.796E-01	1.259E+00	3.130E+00	8.386E+00
Ra-226	Ra-226	1.000E+00	5.900E-01	5.897E-01	5.892E-01	5.873E-01	5.818E-01	5.632E-01	5.131E-01	3.705E-01
Ra-226	Th-230	1.000E+00	0.000E+00	1.082E-02	3.244E-02	1.080E-01	3.223E-01	1.056E+00	3.017E+00	8.523E+00
Ra-226	∑S(j):		5.900E-01	6.005E-01	6.216E-01	6.952E-01	9.041E-01	1.619E+00	3.530E+00	8.893E+00
Ra-228	Ra-228	1.000E+00	6.350E+00	5.629E+00	4.423E+00	1.902E+00	1.705E-01	3.682E-05	1.238E-15	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	7.211E-01	1.927E+00	4.447E+00	6.178E+00	6.347E+00	6.346E+00	6.339E+00
Ra-228	∑S(j):		6.350E+00	6.350E+00	6.349E+00	6.349E+00	6.348E+00	6.347E+00	6.346E+00	6.339E+00
Th-228	Ra-228	1.000E+00	0.000E+00	1.812E+00	3.419E+00	2.596E+00	2.554E-01	5.518E-05	1.855E-15	0.000E+00
Th-228	Th-228	1.000E+00	6.350E+00	4.420E+00	2.141E+00	1.695E-01	1.208E-04	1.166E-15	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	1.184E-01	7.894E-01	3.583E+00	6.092E+00	6.347E+00	6.345E+00	6.339E+00
Th-228	∑S(j):		6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.348E+00	6.347E+00	6.345E+00	6.339E+00
Th-230	Th-230	1.000E+00	2.498E+01	2.498E+01	2.498E+01	2.497E+01	2.496E+01	2.491E+01	2.477E+01	2.428E+01
Th-232	Th-232	1.000E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.350E+00	6.349E+00	6.347E+00	6.341E+00

BRF(i) is the branch fraction of the parent nuclide.

RESMAIN5.EXE execution time = 340.49 seconds
Total water/soil iteration failures = 32.

DOSE: All Nuclides Summed, All Pathways Summed



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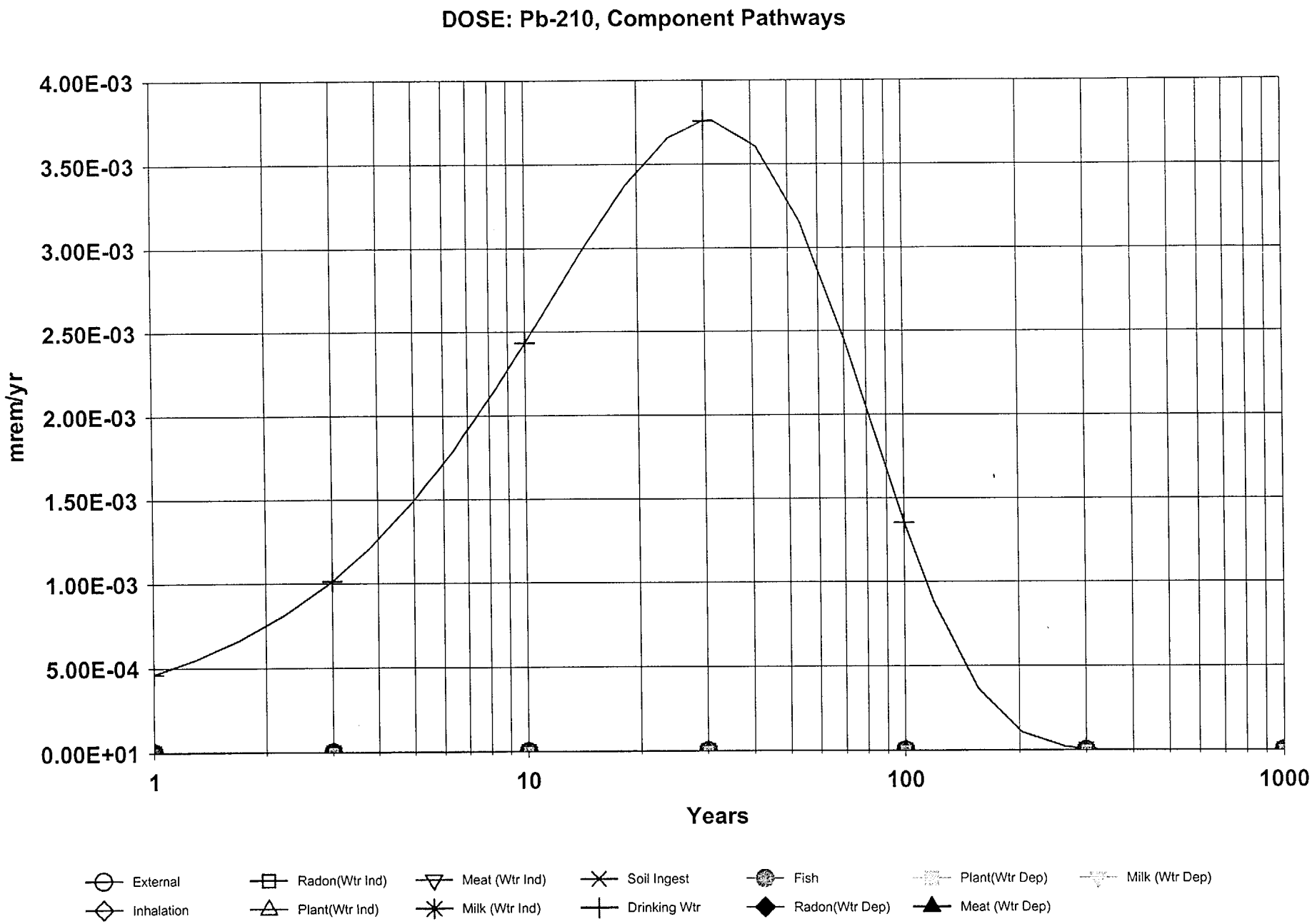

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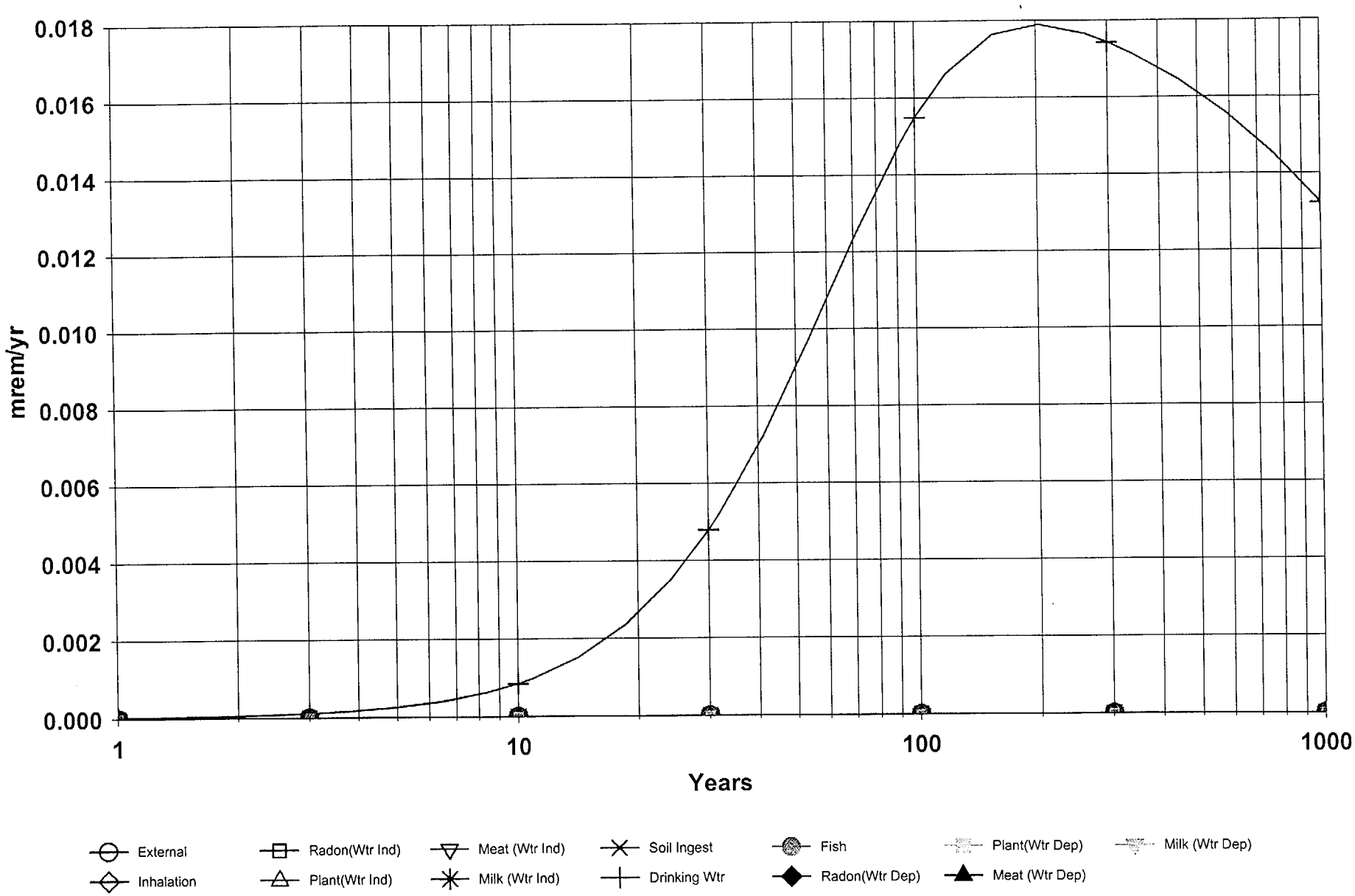

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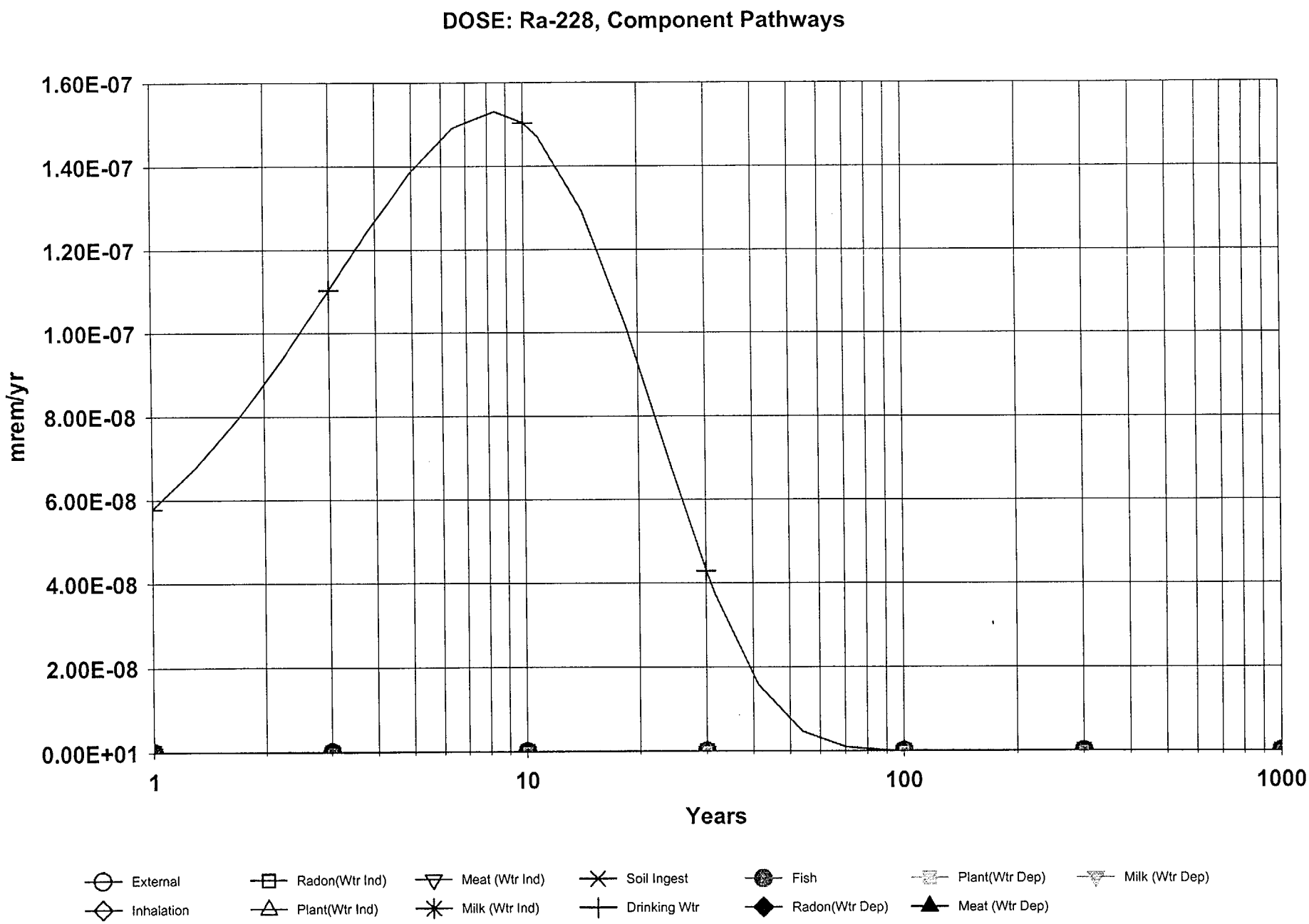

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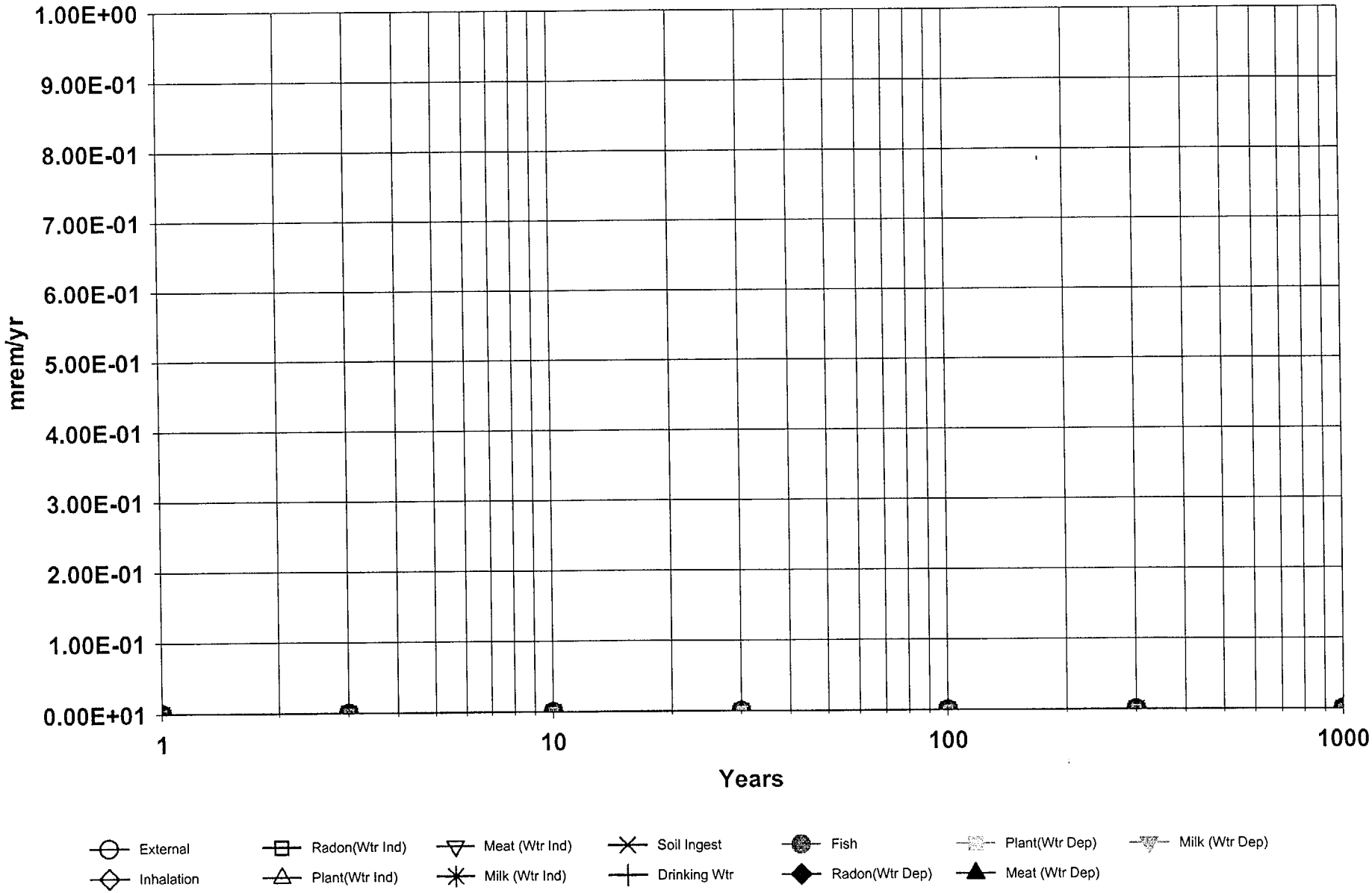

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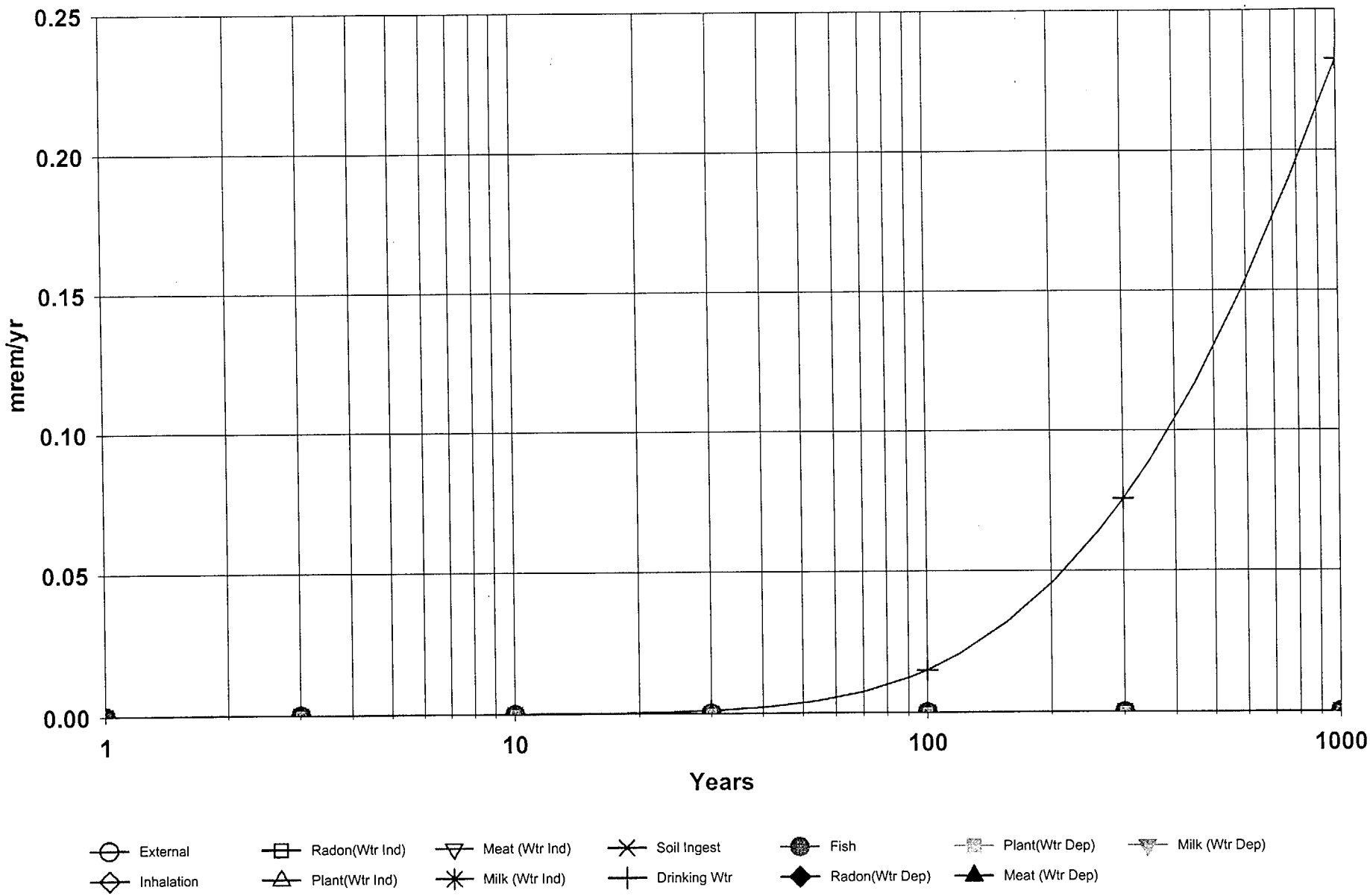

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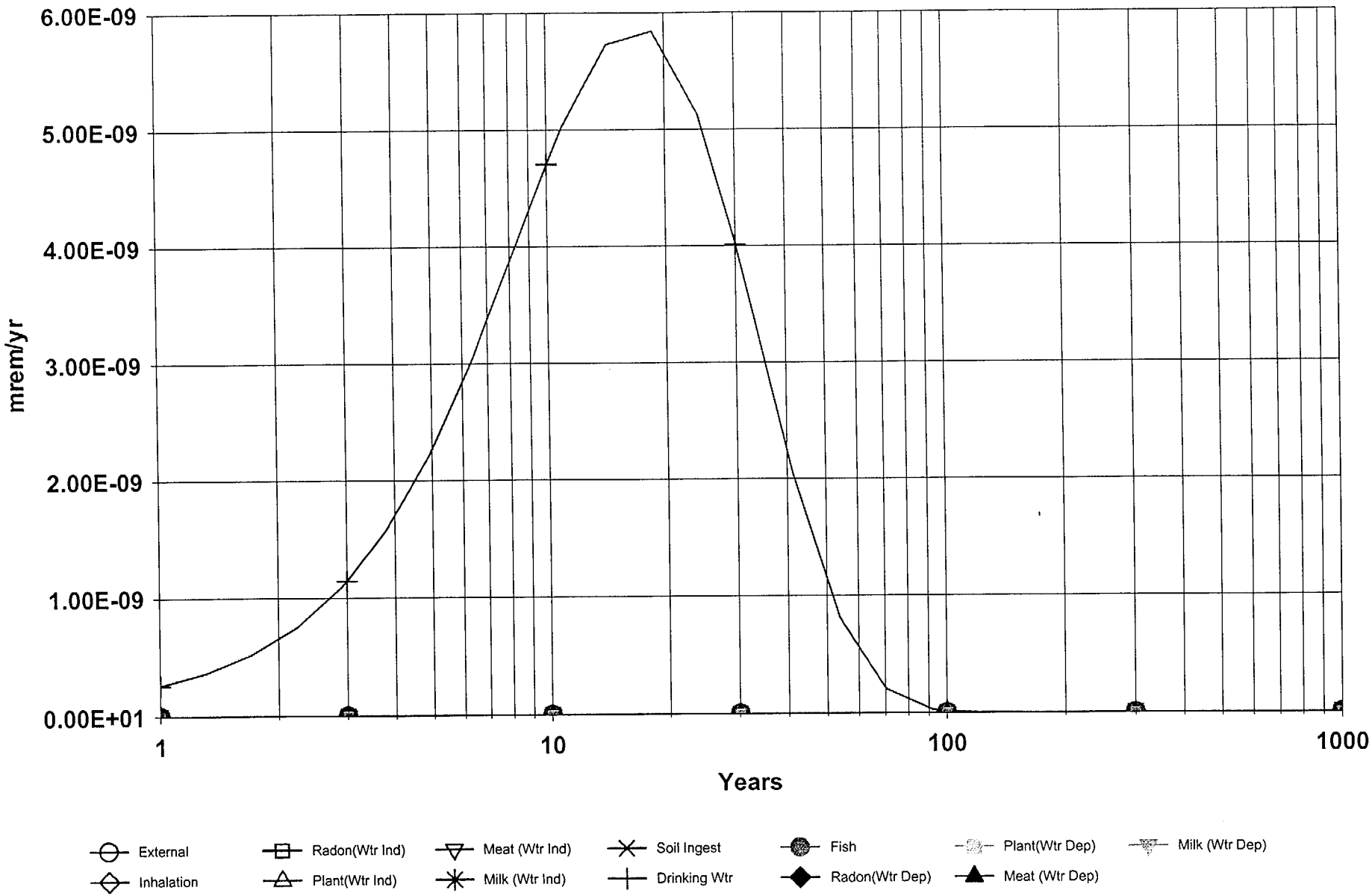
DOSE: Th-232, Component Pathways



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Appendix E

Environmental Health and Safety Plan
Kaiser Aluminum & Chemical Corporation
Tulsa, Oklahoma
June 2000, Revision 2

ENVIRONMENTAL HEALTH AND SAFETY PLAN

KAISER ALUMINUM AND CHEMICAL CORPORATION

TULSA, OKLAHOMA

June 2000, Revision 2

Approval

These persons have approved the plan for use

L. Max Scott 7/7/00

L. Max Scott **Date**
Radiation Safety Officer

SPHanda 06/27/00

Paul Handa **Date**
Site Administrator/Environmental, Safety & Health Supervisor

Bill Vinzant 6-28-00

J.W. (Bill) Vinzant **Date**
Safety, Health & Environmental Manager

Reviewed by: Duane F. Ludlow 6-22-00

Duane Ludlow **Date**
Corporate Safety, Health & Environmental Manager

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1.0 INTRODUCTION

This document provides the basic policies, objectives, organizational structure and guidelines of the Kaiser Aluminum and Chemical Corporation (Kaiser) Health and Safety Plan (HSP), which governs all non-radiological aspects of remediation work at the 41st Street, Tulsa, Oklahoma thorium remediation site. The HSP was written in accordance with OSHA standards codified in 29 CFR 1910.120.

1.1 Purpose

The Kaiser HSP identifies potential hazards and specifies an appropriate level of response to protect the health and safety of workers and the general public.

1.2 Quality Assurance

1.2.1 Records and Documentation

Records required by regulations, permits, plans, and procedures implementing the health and safety program shall be maintained on site, and preserved.

Records may be the original, a reproduced copy or microform, if such reproduced copy or microform is duly authenticated by authorized personnel and capable of producing a clear and legible copy after storage.

1.2.2 Record Retention and Ownership

Records shall be maintained, as a minimum, for the period of time specified in the applicable regulations, unless disposition is otherwise directed by the NRC/OSHA/EPA/DOT or other regulatory agency which maintains jurisdiction over those records. Unless otherwise specified, Kaiser shall normally maintain copies of each record of shipment of radioactive material not exempt for a period of not less than three years after shipment or removal from Kaiser inventory under applicable regulations.

1.2.3 Variances

If conditions develop requiring a deviation from the HSP, a written request for variance shall be made to one or more persons in a position authorized to approve the Plan.

1.2.4 Safety Work Permit (SWP)

The purpose of the SWP is to identify special instructions or precautions pertinent to performing work in a safe manner not covered or detailed by the HSP or a standard operation procedure or instruction. SWPs are prepared at the discretion of the HSO. (Refer to Attachment 1.)

2.0 POLICY AND STANDARDS

2.1 Policy

It is the policy of Kaiser, to conduct its operations in a manner that minimizes health and safety risks to its employees, contractors and the general public. This HSP applies to Kaiser employees, contractors, subcontractors and visitors to the site, including local, state and federal government employees.

2.2 Visitor Control

For purposes of this HSP, a visitor is defined as a person not routinely involved with the site activity. Visitors shall generally be limited to persons with a business purpose. Visitors to the Kaiser Site shall be required to receive visitor instruction information prior to entry into any restricted area. Visitors shall be escorted by the Site Administrator, or a designee.

Any visitor failing to comply with provisions of this HSP shall be requested to leave the work area. Incidents of noncompliance shall be recorded.

3.0 GENERAL SITE INFORMATION

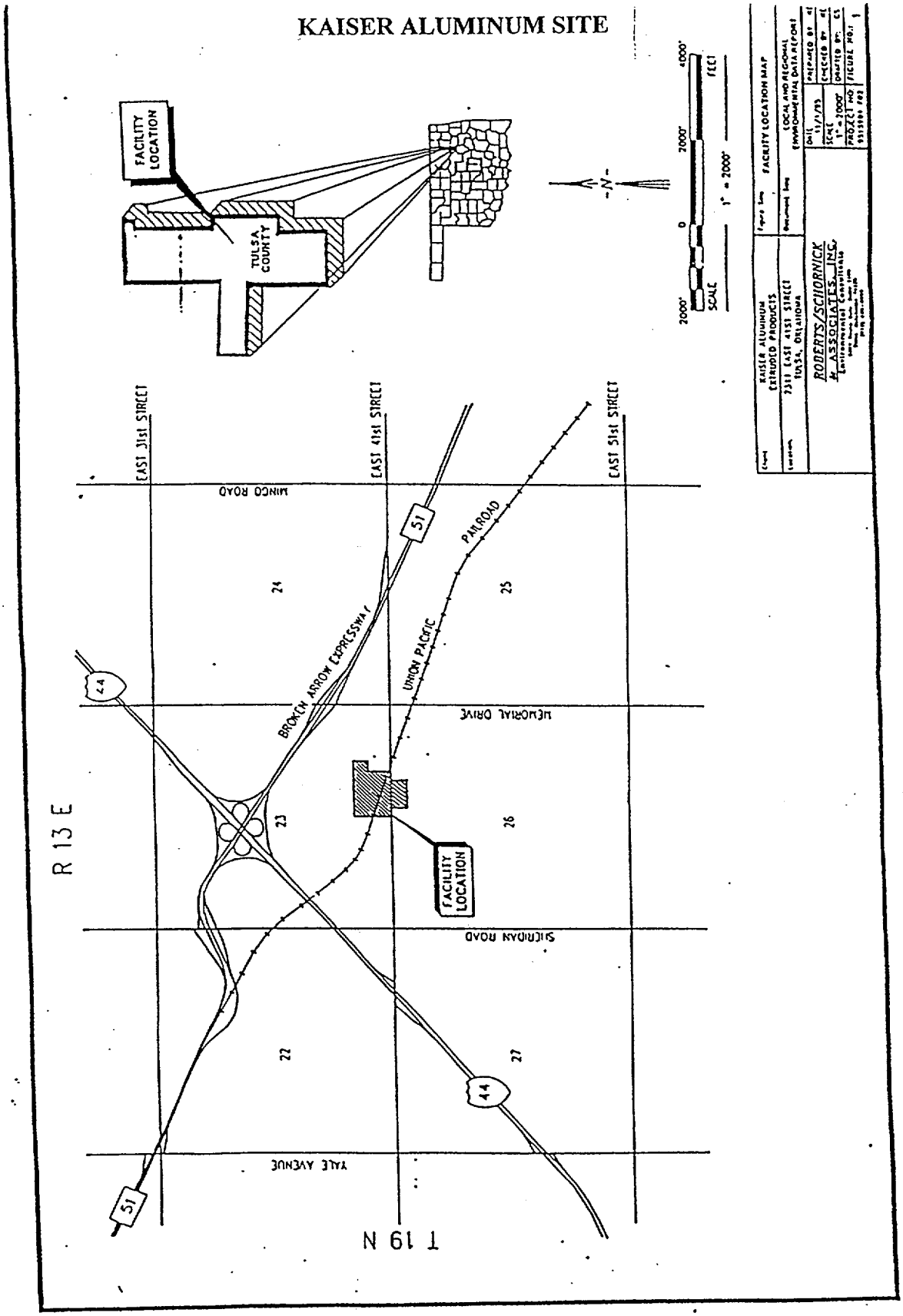
3.1 Location and Site Configuration

The plant facility is located at 7311 East 41st Street, Tulsa, Oklahoma. The plant is located along both sides of 41st Street. The majority of the plant is situated on the north side of 41st Street.

The remediation site is located in a fenced area north of the plant facility and the areas outside of, and adjacent to the fenced area on the south and east sides. The salient features of the project site are a fresh water pond (approximately 3.5 acres), a retention pond (approximately 6 acres), and a backfilled reserve pond (approximately 2 acres). The remediation site is nearly flat except for the bermed area north of the Retention Pond. The bermed area north of the Retention Pond drops off quickly to a perennial stream (Fulton Creek). Magnesium-thorium dross was placed in the Retention Pond and the backfilled Reserve Pond. In addition, there is dross near the land surface in the areas between Retention Pond and the property fence adjacent to the railroad track along the south side of the remediation site and directly east of the of the north-south fence at the east end of the remediation site.

FIGURE 3-1

KAISER ALUMINUM SITE



4.0 RESPONSIBILITIES

4.1 Key Personnel

The following personnel and organizations will be responsible for all health and safety aspects during site activities at the Kaiser remediation site.

NAME/TITLE/ORGANIZATION

Paul Handa Site Administrator Kaiser Aluminum	Kaiser Aluminum 7311 41st Street Tulsa, OK 74147	(918) 384-3169

(To be supplemented by contractors as applicable.)

4.2 Responsibilities

The Contractor Project Manager is responsible for the general management, oversight and administration of the project. The Contractor Project Manager, working with the Contractor HSO, is responsible for planning and controlling site activities in compliance with the project HSP, as well as notifying the Kaiser HSO of deficiencies and/or deviations.

The Contractor HSO has responsibility for developing, implementing and maintaining the Contractor Health and Safety Program. The Contractor HSO is functionally separate from project operations management, and has the authority to stop any activity which is not being conducted in a safe manner in accordance with the HSP. Specific responsibilities may be delegated in part to qualified health and safety personnel.

The Contractor HSO is responsible for on-site direction and oversight of project activities in compliance with the project HSP.

The Contractor HSO or his designee shall be present at all times during site activities. Respective functions will primarily include the following duties:

- advising on-site personnel, the Contractor Project Manager and the Kaiser HSO

of potential health and safety hazards during field investigations

- ensuring potential hazards are monitored as stipulated in this plan
- evaluating potential changes of on-site activities and personnel protective equipment as needed to ensure employee safety
- terminating field work if unsafe conditions develop or an imminent hazard is perceived
- preparing procedure deviation, variances and interim-change notices from this plan, if needed
- maintaining health and safety oversight of field activities with subcontractor personnel or visitors
- over seeing the use, handling, packaging, storage and shipment of radioactive samples and waste

4.3 Contractor Site Personnel

Report to the Contractor HSO and to the Contractor Project Manager on matters of safety. Subcontractor personnel shall be classified as site personnel. Specific responsibilities include:

- performing tasks in compliance with the project HSP, as well as, posted, verbal, and other written safety instructions
- stopping work upon discovering, and reporting to the Contractor Project Manager and/or Contractor HSO, any condition which jeopardizes industrial safety.
- stopping work and reporting to the Contractor HSO and/or Contractor Project Manager anytime he or she is unsure that their action or work environment is safe.
- promptly obeying "Stop Work" orders
- reporting to the Contractor Project Manager and Contractor HSO non-compliance with the project HSP
- assisting the Contractor HSO with investigations as necessary
- not eating, drinking, smoking, or chewing in any controlled area
- wearing protective clothing (PCs) properly and wherever required by the SWP, procedure or the Contractor HSO

- removing protective clothing properly
- reporting the presence of treated or open wounds to the Contractor Project Manager or the Contractor HSO prior to working in an area where radioactive contamination exists, and immediately exiting if a wound occurs while in such an area

5.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT

5.1 Chemical Hazards

No potential chemical hazards have been identified at the site which have the potential to be present in the subsurface soils being sampled.

5.2 Indigenous Biological Hazards

Insects, including ticks, mosquitos, ants, and spiders, at Kaiser are common to the general area as well as both poisonous and nonpoisonous snakes. However, these indigenous biological hazards are not considered likely.

In the unlikely event that an employee comes into contact with a poisonous plant or is bitten by a snake or rodent, the Contractor HSO shall immediately be notified. The employee will be transported to the nearest medical facility for medical attention, if warranted.

5.3 Adverse Weather Procedures

Adverse weather conditions can severely affect field operations. The Contractor Project Manager and/or Contractor HSO will make the determination to "stop work" if inclement weather jeopardizes employee safety or field operations.

6.0 PERSONAL PROTECTIVE EQUIPMENT

This section describes the general requirements of the EPA designated Levels of Protection (A-D), and the specific levels of protection required for each task at the Kaiser site. The rationale for selected levels of protection and modification procedures are also discussed. The need for respiratory equipment is considered unlikely; however, identification and procedures are specified. Should respiratory equipment be required, this plan shall be modified as necessary to conform with applicable regulations.

Disposable Personal Protection Equipment (PPE), such as gloves and coveralls, will be of a type suitable for disposal at a sanitary landfill. Specifically, PPE will not be of a color or bear markings identifying it as hazardous or radioactive waste.

6.1 Designated Levels of Protection

Personnel shall wear protective equipment when activities involve known or suspected atmospheric contamination; when vapors, gases, or particulates may be generated by site activities; or when direct contact with skin-affecting substances may occur. Full face-piece respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals.

The specific levels of protection and necessary components have been established by the US EPA (EPA, 1984) into four categories, according to the degrees of protection afforded.

Level A: Should be worn when the highest level of respiratory, skin and eye protection is needed.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B is the primary level of choice when encountering unknown environments.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

Level D: Should be worn only as a work uniform and not on any site with respiratory or skin hazards. It provides minimal protection against chemical hazards.

The level of protection selected for this project is based upon the following criteria:

- type and measured concentration of hazardous chemical
- potential for exposure to hazardous chemicals in air, splashes of liquids, or other direct contact with material due to work being done

6.2 Modification of Protection Program

The prescribed level of protection shall be upgraded or diminished as warranted by a change in site conditions or findings of investigations. When a significant change occurs, the hazards shall be reassessed. Some examples of the need for reassessment include:

- contaminants other than those previously identified are encountered
- change in work scope which effects the degree of contact with contaminants
- temperature extremes or individual medical considerations limit the effectiveness of PPE
- change of season/weather
- change in job tasks during a work phase

A modified Level D is expected to be required. The following is a description of the modified Level D PPEs:

- PVC steel toed boots
- safety glasses
- gloves
- leather gloves for heavy labor

Should a one-step upgrade in PPE prove necessary (i.e., Level D to Level C), site activities shall be temporarily halted until the appropriate PPE upgrade is accomplished. The Contractor HSO shall provide documentation of such action, and shall notify both the Contractor Project Manager and Kaiser HSO. Should a two-step upgrade be necessary (i.e., Level D to Level B), site activities shall be halted until such time that both the Contractor Project Manager and Kaiser HSO have been advised of the situation and have provided written concurrence that work may proceed with the upgraded level of protection.

NOTE:

Half-face respirator with particulate cartridges will be provided to

personnel to be used only at the direction of the Contractor HSO.

7.0 ACCIDENT/INCIDENT REPORTS

Accidents or incidents that occur during activities at the Kaiser remediation site shall be reported in writing to the Kaiser HSO and the Contractor Project Manager, and investigated where appropriate to prevent reoccurrance. Examples of incident reports include:

- a recordable occupational injury, i.e., a cut, fracture or sprain which results from a work accident or from an exposure involving a single incident
- animal bites and one-time exposure to chemicals
- a recordable occupational illness caused by exposure to environmental factors associated with employment including acute and chronic illnesses that may be caused by inhalation, absorption, ingestion or direct contact
- in the event of an accident, a medical accident/incident form shall be completed and sent to the Contractor Medical Program Coordinator

7.1 Employee Information

The standards concerning employee's right-to-know OSHA requirements of 29 CFR 1910.120 will be available at the work site.

8.0 CHEMICAL MONITORING

No chemical hazards have been identified to date by Kaiser. However, since the site has not been completely characterized for potential chemical hazard, limited organic monitoring with a photoionization detector (HNu PID) will be performed if suspected organic contamination is discovered.

9.0 MATERIAL MANAGEMENT

Kaiser and its contractors shall be aware of the potential hazards attributable to handling of radioactive material. Material handling shall be performed so that exposures to radioactive materials are minimized and personnel safety is ensured.

9.1 Waste Management

Material designated as waste will be managed and characterized with sufficient accuracy to permit proper segregation, containment, storage, shipment and disposal meeting NRC, EPA, OSHA and DOT regulations.

Waste(s) generated during the sampling campaign will be characterized by a combination of generator's knowledge(site history), process knowledge and direct field measurement.

9.2 Material Storage

The method(s) of waste storage shall be based on the physical form and quantity of material and radionuclide concentration. Regardless of the method(s) selected, the contractor Project Manager and Contractor HSO shall ensure that waste is stored in a manner which will minimize personnel exposure and environmental impact during handling, packaging, storage, and ultimate disposal, as well as meeting applicable regulatory requirements.

Stored materials awaiting disposition should include, when necessary and possible, provision for

- protection from the elements
- primary and secondary containment for liquids
- proper posting and control of the storage areas
- regular inspection routines

10.0 SHIPPING REQUIREMENTS

Sample shipments shall meet the shipping requirements of 10 CFR 71, and 49 CFR 171-173, including:

- General Transportation Requirements
- Shipping Papers and EPA Hazardous Waste Manifesting
- Packaging Requirements
- Type A Packaging Determinations and Quantity Limits
- A2 Value Determinations
- Radiation Level Limitations and Contamination Control
- Labeling and Placarding Requirements

All samples are expected to meet the requirements for Radioactive Material, Limited Quantity, N.O.S. UN2910 (49 CFR 173.421).

11.0 STANDARD SAFETY PROCEDURES

11.1 Buddy System

The potential hazards associated with field activities at the Kaiser remediation site do not warrant utilizing the buddy system concept. However, as an additional safety precaution, and as a means of expediting field activities, a team of at least two people will be used when the supervisor or HSO specifies so.

11.2 Communications

Due to the nature of planned field activities, the use of communication devices such as radios, megaphones, and air horns will not be necessary. However, all personnel shall be familiar with the following hand signals.

SIGNAL	DEFINITION
Hands clutching throat	Out of air/can't breath
Hands on top of head	Need assistance
Thumbs up	OK/I'm alright/I understand
Thumbs down	No/negative
Arms waving upright	Send back support
Grip partners wrist	Exit area immediately

11.3 Safe Work Practices

The following safe work practices shall be followed:

- designated personal protective and safety equipment shall be worn while working within control zone and decontamination areas
- eating, drinking, chewing gum or tobacco, smoking, or applying cosmetics is prohibited in the contaminated or potentially contaminated areas
- contact with potentially contaminated substances shall be avoided to the extent practicable;placing monitoring equipment on potentially contaminated surfaces should be avoided
- field staff will be alert for potentially dangerous situations (e.g., presence of strong, irritating or nauseating odors), and immediately take appropriate measures
- good housekeeping shall be practiced; equipment and materials shall be kept orderly and out of potentially harmful situations

- field staff shall be familiar with the physical characteristics of the site, including:
  - the nearest emergency assistance
  - prevailing wind direction
  - access to associates, equipment and vehicles
  - communication facilities at and near the site
  - areas of known or suspected contamination
  - site access and egress
- the number of personnel and amount of equipment in the contaminated area shall be minimized to the extent consistent with safety requirements
- waste generated during activities at the site shall be contained appropriately
- injuries shall be reported, regardless of how minor
- periodic Health and Safety meetings shall be conducted by the Contractor HSO or his designee for personnel involved in field activities, and prior to commencing a new task; these meetings shall address health and safety concerns related to the planned activities and shall review emergency response plans

11.4 Site Map

The Kaiser Health and Safety Manager shall provide a site map to field personnel to familiarize them with the work area. The map shall be detailed with important features, such as the location of medical facilities and evacuation routes.

12.0 ROUTINE AND SPECIAL TRAINING

12.1 Site Orientation

Site orientation concerning site-specific health and safety, hazards shall be administered to all personnel. Health and Safety Plan acceptance forms shall be completed by site personnel to document their understanding of the health and safety requirements.

12.2 Training

If on-site personnel engage in hazardous waste activities they shall receive classroom training and supervised field experience as required by 29 CFR 1910.120. The training they will receive will cover hazard awareness, personnel protection, toxic properties of hazardous materials, site control and sampling hazardous materials as per 29 CFR 1910.120. A training outline for site activities is provided below:

TRAINING OUTLINE - SITE ACTIVITIES

I. Purpose and objectives of training.

II. Recognizing and identifying health and safety hazards at the Kaiser remediation site.

A. Physical hazards
- structures
- equipment
- terrain
- weather

B. Biological hazards
- indigenous site hazards (insect, snake, plant)

C. Potential health effects

III. Safety and monitoring requirements

A. Controlled area restrictions
- eating/drinking/smoking
- access control points

B. Protective equipment requirements
- clothing, boots, gloves, coveralls, goggles

C. Procedures for using protective equipment
- clothing
- respirator

D. Personal contamination monitoring and decontamination

IV. Emergency response requirements

A. Getting emergency assistance

B. Emergency notification procedures

C. Names of personnel and alternates responsible for site safety and health

13.0 EMERGENCY RESPONSE AND NOTIFICATION

The purpose of this section is to provides guidance for responses to emergency situations.

13.1 Contingency Plans and Emergency Contacts

Emergency response contingency plans in this section shall be followed during field investigations. A copy of this plan will be available at the work site, and personnel working on the site shall be familiar with the plan. Evacuation plans and routes shall be discussed with field personnel before field activities begin.

Persons and services to contact in case of emergencies are identified in Figure 13-1. This emergency contact form will be posted at the work site.

13.1.1 Fire/Explosion

A fire emergency will be handled by evacuating the work area and immediately notifying the Tulsa Fire Department (911). Field personnel should attempt to put out the fire only if it appears to be small and easily extinguishable. The fire department shall be notified of such an occurrence. In the event of an explosion, personnel will be evacuated and no one shall enter the work area until clearance is given by the appropriate Tulsa authorities.

13.1.2 Personnel Injuries

In case of minor injuries to personnel, first aid treatment shall be initiated in the field. In case of serious injuries, the victim shall be transported to the nearest hospital as soon as possible.

13.2 Notification Requirements

Should any doubt be encountered as to who or what authority should be contacted, a conservative approach shall be used so as to contact all appropriate authorities. The Kaiser Aluminum HSO shall also be informed of any emergency situation.

Any reporting and notification of emergency situations shall be documented. The Contractor HSO has the major responsibility for overseeing the response

to emergency situations and shall ensure that the appropriate actions are taken.

13.3 Emergency Route to Hospital

A map of the emergency route will be provided to each field staff member. (see Figure 13-2 and 13-3).

FIGURE 13-1
EMERGENCY CONTACTS

CONTRACTOR HEALTH AND SAFETY OFFICER
TO BE COMPLETED BY CONTRACTOR
KAISER ALUMINUM (Paul Handa)
Call: (918) 384-3169
FIRE - Call: 911
AMBULANCE - Call: 911
POISON CENTERS
National Poison Control Center, 404-588-4400
Regional Poison Control Center, 1-800-672-1697
Medical Center Poison Control Center, 716-5900
POLICE - Call: 911
YOU ARE LOCATED AT:
7311 East 41st Street, Tulsa, Oklahoma

THE NEAREST EMERGENCY MEDICAL SERVICES ARE LOCATED AT:

St. Francis Hospital
6161 S. Yale Ave. Phone Number: 494-1225

THE NEAREST NON-EMERGENCY MEDICAL SERVICES ARE LOCATED AT:

Med Center
2929 S. GarnettStreet Phone Number: 665-1520

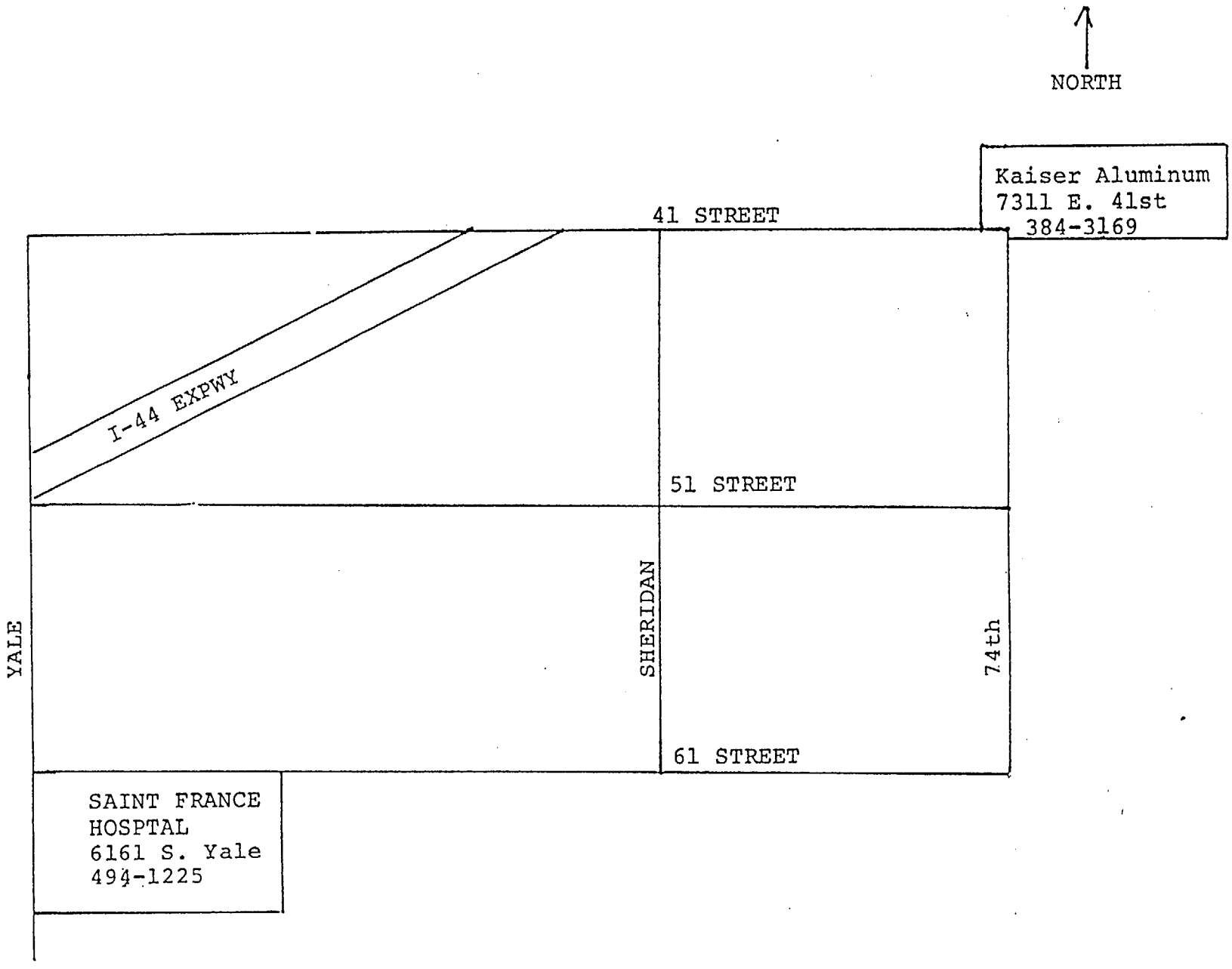
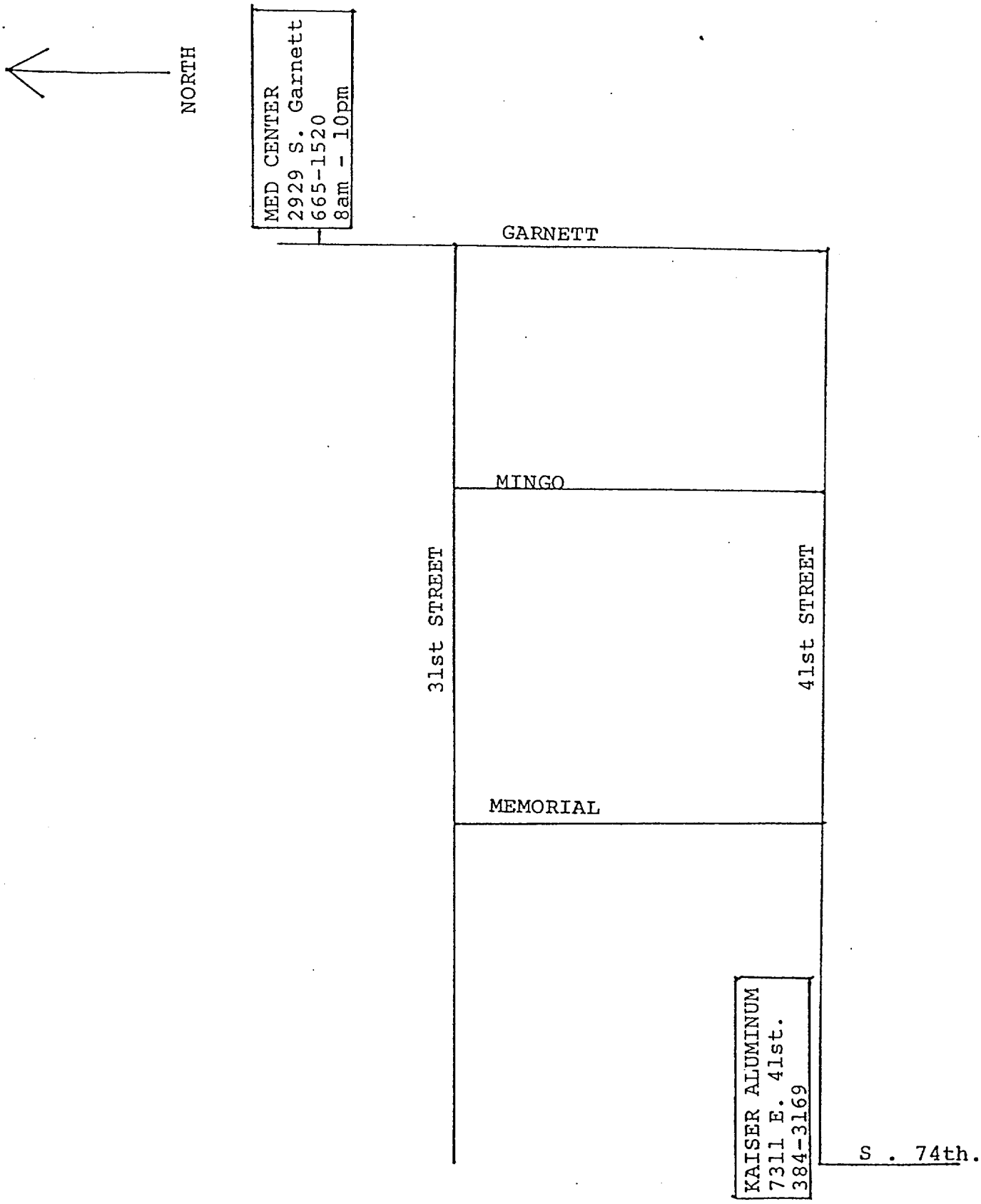


FIGURE 13-2

MAP TO ST. FRANCIS HOSPITAL

FIGURE 13-3

MAP TO MED CENTER



ATTACHMENT 1

Safety Work Permit

****Copy To Be Posted In The Work Area****

Project Name:	Start Date:	Expiration Date:
Emergency Contact(s):		Phone No.:
Job Description:		

Personnel Monitoring	Protective Equipment and Clothing
Whole Body Count:	Respiratory Protection:
SRD/TLD	
Other	Protection Clothing:
	Other:

Waste Disposal Instructions	Radiological Conditions
	Exposure Rate:
	Contamination:
	Air Sample Results:

Access Control Instructions	Survey Requirements

Review and Approvals

RSO Review:	**Date:**
Project RSO Approval:	**Date:**

ATTACHMENT 2

SWP Authorized Personnel List

****To Be Signed By All Personnel Performing Work On-Site****

By signing the form below, the Radiation Worker agrees to comply with all of the requirements listed in the Safety Work Permit and the instructions given by the RSO or Project RSO.

Name (Print):	Signature:	ID Number	Date

Attach to SWP

ATTACHMENT 3

KAISER ALUMINUM AND CHEMICAL CORPORATION
THORIUM REMEDIATION PROJECT

HEALTH AND SAFETY PLAN
ACCEPTANCE FORM

Instructions: This form is to be completed by each person prior to working on the subject project work site and returned to the Project Radiation Safety Officer or Health and Safety Officer.

Project: _____

Date of
Project: _____

I understand my health and safety responsibilities and agree to perform my work in accordance with those responsibilities.

_____
Signed

_____
Print Name

_____
Company Name

_____
Date