ENVIRON

October 17, 2006

Dr. Peter Lee
United States Nuclear Regulatory Commission
Region III
2443 Warrenville Road, Suite 210
Lisle, IL 60532-4352

Re: Response to Comments
Breckenridge Disposal Site, St. Louis, Michigan

Dear Dr. Lee:

ENVIRON International Corporation (ENVIRON), on behalf of the Custodial Trust provides the below responses to your October 2, 2006 comments to our September 19, 2006 Supplemental Site Characterization Work Plan. We have endeavored to address the NRC comments in a manor that is consistent with our discussions with NRC staff during our most recent June 22, 2006 meeting. Some of your comments raise questions on issues that we had understood to have been resolved. We hope that this response to comments letter will resolve the outstanding questions so that our Supplemental Site Characterization Field Work may proceed. In light of the fact that time is of the essence, should you not find our responses acceptable, we respectfully request that another meeting be convened with the NRC to affirmatively resolve any outstanding issues.

To facilitate your review, the NRC's comments are shown below in *italics*; ENVIRON's responses to the comments are shown in normal font.

Comment 1. Please confirm that the subsurface soil with subsurface DCGL, when brought to the surface, will not exceed the surface DCGL. In other words, the subsurface DCGL should be less than surface DCGL times dilution factor (Contaminated soil mixed with nearby clean soil when brought to the surface).

Response: As discussed in ENVIRON's August 3, 2006 letter, a reasonable scenario in which material would be brought to the surface is a construction of a house with a basement. It is reasonable to assume that that during excavation, the soil is thoroughly mixed and the resulting concentration is equal to the average activity level of the soil volume excavated. This mixing can be calculated by developing a dilution factor. The following equation will be used to calculate the dilution factor.

$$DF = \frac{V_{excavation}}{V_{impacted}}$$

Where;
$V_{excavation}$ = *Volume of the material removed to build a single family home with a basement; and*
$V_{impacted}$ = *Volume of the material at the subsurface DCGL.*

The calculation of the volume is shown on Figure 1. The calculated dilution factor is 9.1. As shown in Table 1, the subsurface 2006 DCGLs are protective of human health even if brought to the surface.

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Table 1: Calculation Results

Isotope	Surface DCGL	DF	Surface DCGL x DF	April 2006 Subsurface DCGL
Th-232	3.9	9.1	35.5	34
U-238	2.5	9.1	22.8	21.5
Ra-226	1.3	9.1	11.8	10.5

Notes:
DCGLs are in pCi/gram

Comment 2. The soil concentration at the bottom of the excavation should meet the surface DCGL, not subsurface DCGL. The dose calculation in your Work Plan is based on the 2 feet thickness of backfill soil with activity at the subsurface DCGL. If the bottom of the excavation reaches the activity of subsurface DCGL, digging stops and remediation completes, then the thickness of soil beyond the bottom of the excavation with the subsurface DCGL is unknown.

Response: ENVIRON understands your comment and respectfully disagrees. Application of the DCGLs in the manner is inconsistent with the understanding of the disposal method at the Site and contrary to the available Site data. Samples collected to date, demonstrate a sharp drop off in activity both above and below the impacted material in the disposal horizon.

Furthermore, the Work Plan submitted in September proposes that a number of borings be placed within the waste areas to develop a vertical activity profile. This data will be used to guide remediation efforts and confirm that RESRAD assumptions remain valid. Additional remedial measures will be taken if certain areas do not conform to the assumptions.

Comment 3. Please justify the input parameters used for fruit, vegetable, grain, leafy vegetable, milk consumption; and revise the values in the Table of the Work Plan.

Response: These input parameters were provided and justified in ENVIRON's August 3, 2006 letter. As stated previously, the input parameters for the ingestion pathways for the Breckenridge dose modeling were consistent with the recommendations of the USNRC and NUREG 6697; the parameters were selected from the USEPA Exposure Factor Handbook published in 1997.[1] It was observed that the values provided by the USEPA were lower than the defaults provided in the RESRAD code, Version 3.2.[2] The RESRAD defaults were selected from NCRP Report 123 and Argonne Report ANL/EAIS/TM-103.[3,4] As described in NUREG 6697, the USEPA Exposure Factor Handbook is a conservative reference to establish the ingestion pathways for radiation

[1] U.S. Environmental Protection Agency, *Exposure Factors Handbook, Volume I, General Factors*, EPA 600/P-95-002Fa, August, 1997.

[2] Yu, C, Zielen, A.J, et al, *User's Manual for RESRAD Version 6*, ANL/EAD-4, Argonne National Laboratory, Argonne, Illinois, July, 2001.

[3] National Council on Radiation Protection and Measurements, *Screening Models for Releases of Radionuclides to Atmosphere, Surface Water, and Ground*, NCRP 123, Volume 1 and 2, 1996.

[4] Argonne National Laboratory, *A Compilation of Radionuclide Transfer Factors for Plant, Meat, Milk, and Aquatic Food Pathways and the Suggested Default Values for the RESRAD Code*, ANL/EAIS/TM-103, 1993.

dose modeling. It represents the most recent compilation of ingestion parameters and is applicable for the Breckenridge site.

A copy of the revised input parameters tables from ENVIRON's April 2006 dose assessment have been attached to this letter.

Comment 4. Please confirm that the backfill soil with subsurface DCGL will not exceed 2 feet and the clean cover soil will not be less than 5 feet as stated in your Work Plan.

Response: This will be confirmed in a manner similar to the methods used during the Fall 2004 remedial activities. During the Fall 2004 remedial activities, ENVIRON scanned the backfill material to ensure that the assumption of the RESRAD model remained valid. This data was submitted in May 2005 and show that little, if any, of the overburden material exhibited activity levels that approached the DCGLs. Therefore it is unlikely that more than two feet of backfill at the DCGLs will be placed back in the excavation.

ENVIRON hopes that the above information satisfies the NRC's questions regarding the dose assessments and Work Plan. ENVIRON request that the NRC provides a quick response to these comments in order to move forward with implementing ENVIRON's September 2006 Work Plan.

ENVIRON will follow-up with you later this week as to discuss whether a follow-on meeting to resolve outstanding issues is necessary. In the mean time, if you have any questions and additional comments, please do not hesitate to contact us at (312) 853-9430.

Sincerely,

ENVIRON International Corporation

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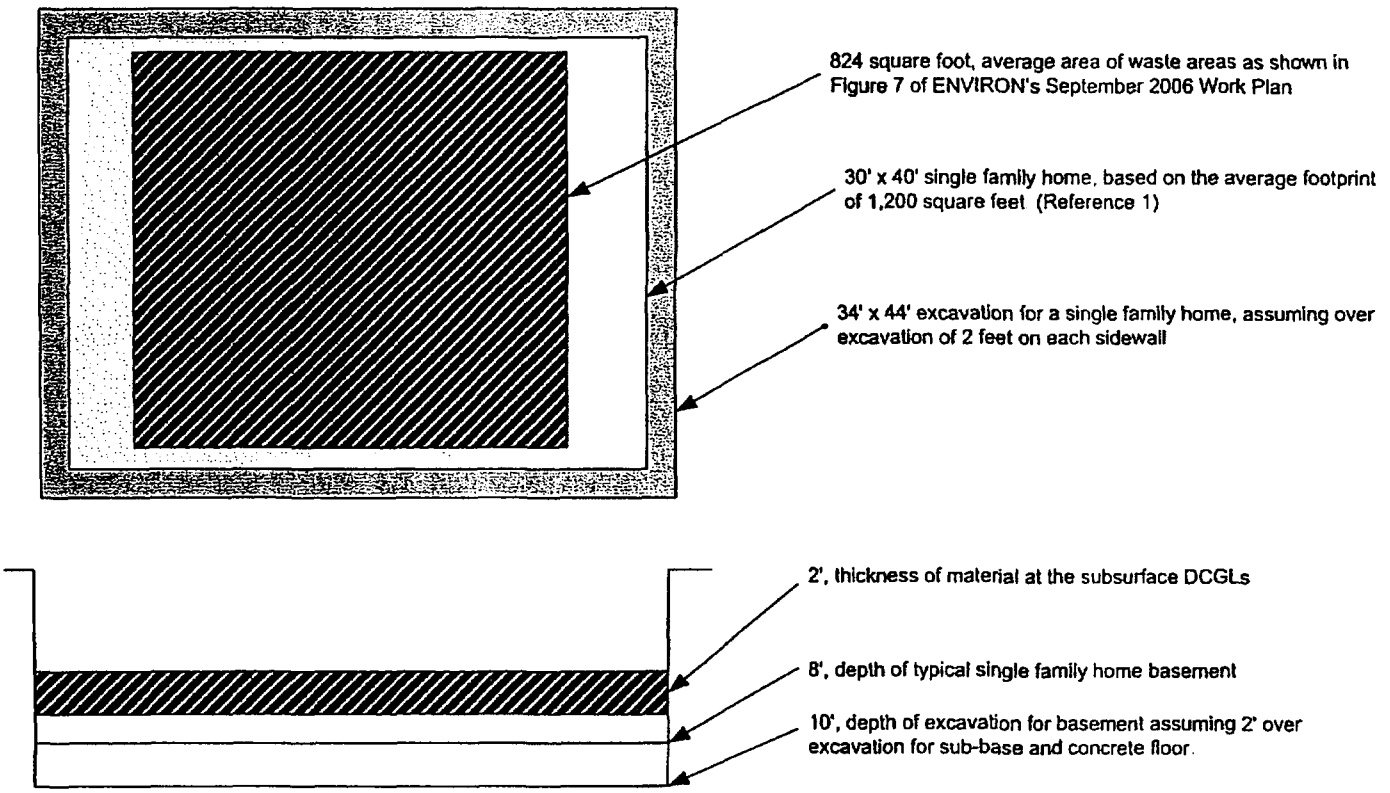
Figure 1: Dilution Factor Calculation



$V_{excavation}$ = 34' x 44' x 10' = 14,960 cubic feet

$V_{impacted}$ = 824 square feet x 2' = 1,648 cubic feet

DF = 14,960 cubic feet / 1,648 cubic feet = 9.1

Reference 1: *Guidelines for Completion of Footing Drain Disconnections*, City of Ann Arbor - Developer Offset-Mitigation Program, Updated November 30, 2005

Table 5 - Common Input Parameters

Parameter			Default	Value Selected	Justification
Description	**Code**	**Unit**			
Dose Conversion Factors	DCFX(n)	mrem/pCi	All DCFs used are RESRAD defaults		RESRAD defaults from FGR#11 and FGR#12 and are derived using ICRP 30 dosimetry model.[36,37] Short-lived (<180 days) radioactive progeny isotopes are accounted for through the use of the "parent+D" DCFs.
Time since placement	T(n)	Yrs.	1 10 100 300 500 700 900 1000	1 10 100 300 500 700 900 1000	Evaluation at these time segments allows for consideration of the potential for conditions at the Site to evolve from the initial conditions specified (e.g., soil erosion impacts the cover thickness) and projects the changing Site conditions to the required 1000-year outlook.[38,39]
Radionuclide concentration in groundwater *(for each isotope)*	TI	pCi/L	Not assigned	Not assigned	This parameter was not used for the calculation. Partition coefficients were used assuming placement at t=0 years while the filtercake has been placed in the waste pits for more than 30 years.
Cover Depth (thickness)	COVER0	*m*	Not assigned	1.5	A cover is assumed for the subsurface soil. Each waste pit is filled with at least five feet of soil after the filtercake is excavated. No cover is present for the surface soil.
Density of cover material	DENSCV	g/cm^3	1.5	1.5	A cover is assumed for the subsurface soil. No cover is present for the surface soil.

[36] U.S. Environmental Protection Agency, *Limiting Values of Radionuclide Intake and Air Concentrations and Dose Conversion Factors for Inhalation, Submersion, and Ingestion*, Federal Guidance Report Number 11, EPA 520/1-88-020, September, 1988.

[37] U.S. Environmental Protection Agency, *External Exposure to Radionuclides in Air, Water and Soil*, Federal Guidance Report Number 12, EPA 402 R-93-081, September, 1993.

[38] U.S. Nuclear Regulatory Commission, *Radiological Criteria for License Termination*, Volume 62, Federal Register, page 39058, July 21, 1997.

[39] U.S. Nuclear Regulatory Commission, *NMSS Decommissioning Standard Review Plan*, NUREG-1727, September, 2000.

Parameter			Default	Value Selected	Justification
Description	**Code**	**Unit**			
Cover depth erosion rate	VCV	m/yr	0.001	0.001	The erosion of the surface soil was selected as a default of the RESRAD code. This value is conservative and likely to be lower at Breckenridge because the area is relatively flat and humid ambient conditions. A value of $3x10^{-6}$ was predicted for humid sites including, Michigan, Ohio and New York.
Contaminated Zone Density	DENSCZ	g/cm^3	1.3	1.4	The density of the soil in the waste pits. Scientech, 2004
Contaminated Zone Erosion Rate	VCZ	m/yr	0.001	0.001	The erosion of the surface soil was selected as a default of the RESRAD code.[40] This value is conservative and likely to be lower at Breckenridge because the area is relatively flat and humid ambient conditions. A value of $3x10^{-6}$ was predicted for humid sites including, Michigan, Ohio and New York.[41]
Contaminated Zone Total Porosity	TPCZ	Unitless 0 to 1	0.4	0.4	Porosity of sandy soil is used to model the surface soil. RESRAD default. This value is likely to be lower because it is assumed that the physical properties are equivalent to clay rather than sandy soil.
Contaminated Zone Field Capacity	FCCZ	Unitless, 0 to 1	0.2	0.2	Field capacity for sandy soil is calculated using total and effective porosity. RESRAD default
Contaminated Zone Hydraulic Conductivity	HCCZ	m/yr	10	89	The default value, 10 m/yr, corresponds to the measured hydraulic conductivity in sandy soils. The subsurface geology is more typical of clayey silt rather than sandy soil. Scientech, 2002.
Contaminated Zone B-Parameter	BCZ	Unitless	2.88	5.3	The B-parameter was selected for clay. The value is likely to be higher; empirical data ranges from 4 to 22. NUREG 6697

[40] Argonne National Laboratory, *User's Manual for RESRAD Version 6*, July, 2001.

[41] Argonne National Laboratory, *The Effects of Soil Erosion on the Long Term Stability of FUSRAP Near Surface Waste Burial Sites*, ANL/EIS-18, 1983.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Average Annual Wind Speed	WIND	m/sec	4.25	4.65	The site- specific annual average value is used for this input value.[42]
Humidity in air	HUMID	g/m^3	Not assigned	NA	Tritium is not present at the site.
Evapotranspiration Coefficient	EVAPTR	Unitless, 0 to 1	0.5	0.5	Typical values in humid climates east of the Mississippi River are approximately 0.7.[43] RESRAD Default
Precipitation Rate	PRECIP	m/year	1.05	0.754	Annual average in the Michigan area. Equals 29 inches per year.[44]
Irrigation rate	RI	m/yr	0.2	0.5	USNRC, 1999.[45]
Irrigation mode	IDITCH	unitless	Overhead	Overhead	Site specific mode of irrigation
Runoff Coefficient	RUNOFF	Unitless, 0 to 1	0.45	0.2	The fraction of total annual precipitation that sheds off the surface and drains to Site watershed drainage without percolating through the soil. The value typically ranges from 0.3 to 0.5. For conservatism, the value is reduced. NUREG 6697
Watershed Area for Nearby Stream or Pond	WAREA	m^2	1,000,000	1,000,000	The watershed area is used to calculate dilution factors for contaminant concentrations in surface water bodies in the vicinity of the site. NUREG 6697
Accuracy for water/soil computations	EPS	unitless	0.001	0.001	RESRAD default parameter
Density, Saturated Zone	DENSAQ	g/cm^3	1.52	1.4	The unsaturated zone was determined to be a clay soil type soil during the Remedial Investigation. Scientech, 2004

[42] U.S. Department of Agriculture, Soil Conservation Service, *Soil Survey of Gratiot County, Michigan*, 1979.

[43] Argonne National Laboratory, *User's Manual for RESRAD Version 6*, July, 2001.

[44] National Climate Data Center.

[45] U.S. Nuclear Regulatory Commission, *Preliminary Guidelines for Evaluating Dose Assessment in Support of Decommissioning*, March, 1999.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Total Porosity Saturated Zone	TPSZ	Unitless,0 to 1	0.4	0.4	The total porosity was selected for sandy soil. RESRAD Default. This value is likely to be lower because of the presence of clay in the unsaturated layer. Scientech, 2004
Effective Porosity, Saturated Zone	EPSZ	Unitless, 0 to 1	0.2	0.2	The total porosity was selected for sandy soil. RESRAD Default. This value is likely to be lower because of the presence of clay in the unsaturated layer. Scientech, 2004
Field Capacity, Saturated Zone	FCSZ	Unitless, 0 to 1	0.2	0.2	Field capacity of sandy soil was derived for the effective and total porosity. RESRAD Default
Hydraulic Conductivity, Saturated Zone	HCSZ	m/yr	10	289	Scientech, 2004
Hydraulic Gradient	HGWT	Unitless	0.02	0.02	NUREG 6697
Saturated Zone B-Parameter	BSZ	Unitless	5.3	5.3	The B-parameter was selected for clay soil type RESRAD Default NUREG 6697
Water table drop rate	VWT	m/yr	0.001	0.001	NUREG 6697
Water model: non dispersion or mass balance	Model	Unitless	ND	ND	The non dispersal model applies to the site.
Water table intake depth below the water table	DWIBWT	m	10	35.3	Oberlitner Well Drilling, Gratiot County, 1999. Scientech, 2004.
water well pumping rate	UW	m^3/yr	250	250	NUREG 6697
Thickness Unsaturated Layer	H1	m	4	6	ORAU, 1982.
Density, Unsaturated Layer	DENSUZ	g/cm^3	1.5	1.4	The unsaturated zone was determined to be a clayey silt soil type during the Remedial Investigation. Scientech, 2004

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Total Porosity Unsaturated Layer	TPUZ	Unitless 0 to 1	0.4	0.4	The total porosity was selected for sandy soil. RESRAD Default. This value is likely to be lower because of the presence of clay in the unsaturated layer. Scientech, 2004
Effective Porosity of Unsaturated Layer	EPUZ	Unitless, 0 to 1	0.2	0.2	The total porosity was selected for sandy soil. RESRAD Default. This value is likely to be lower because of the presence of clay in the unsaturated layer. Scientech, 2004
Field Capacity Unsaturated Layer	FCUZ	Unitless, 0 to 1	0.2	0.2	The field capacity was derived using the values for total and effective porosity for sandy soil. RESRAD Default
Unsaturated Layer 1, B-Parameter	BUZ(1)	Unitless	5.3	5.3	The B-parameter was selected for clay soil type RESRAD Default NUREG 6697
Hydraulic Conductivity Unsaturated Layer	HCUZ	m/yr	10	89	Scientech, 2004
Kd (Lead)	DCACT (n)	cm^3/g	100	550	Selected the published value for clay soil type. Sheppard and Thibault 1990 NUREG 6697
Kd (Uranium)	DCACT(n)	cm^3/g	50	1600	Selected the published value for clay soil type. Sheppard and Thibault 1990 NUREG 6697
Kd (Radium)	DCACT(n)	cm^3/g	70	9100	Selected the published value for clay soil type. Sheppard and Thibault 1990 NUREG 6697
Kd (Thorium)	DCACT(n)	cm^3/g	60,000	5800	Selected the published value for clay soil type. Sheppard and Thibault 1990 NUREG 6697
Inhalation Rate	INHALR	m^3/yr	8400	11,690	Assume adult breathing 20 liters /min for 365 days, 24 hours per day [46] This value is conservative; more typical breathing rate is 8,400 m^3 based on different breathing rates according to different activities. NUREG 6697. NUREG 5512

[46] U.S. Environmental Protection Agency, *Exposure Factors Handbook, Volume I, General Factors*, EPA 600/P-95-002Fa, August, 1997.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Mass Loading for Inhalation	MLINH	g/m^3	0.00003	3.14e-6	Site specific value for this parameter is not available. Selected parameter for outdoor airborne dust NUREG 5512
Shielding factor inhalation	SHF3	unitless	0.4	0.4	Filtration of dust indoors. RESRAD default. NUREG 6697
Shielding factor external gamma	SHF1	unitless	0.7	0.55	Attenuation of external radiation inside the occupied building. This value, as calculated using Microshield, is less than 0.01. This value is conservative likely to result in a lower radiation exposure. Selected value from USEPA[47]
Exposure Frequency (Total)	EF	Days per year	Not assigned	350	Assumes number of days per year of time living at the Breckenridge site
Exposure Time	ET	hours per day	Not assigned	24	Assumes that each day is 24 hours long.
Indoor Time Fraction	FIND	Unitless, 0 to 1	0.5	0.657	The fraction of a total year (8,760hr) that is spent indoors on site. Assumes that 66% (15.77 hr/day for 350 days/yr) of the exposure occur indoors. NUREG 5512
Outdoor Time Fraction	FOTD	Unitless, 0 to 1	0.25	0.12	The fraction of a total year (8760hr) that is spent outdoors on Site. Equals 2.9 hrs/day for 350 days per year) outdoors on Site divided by 8760 hours. NUREG 5512
shape factor flag, external gamma	FS	unitless	Circular	Circular	RESRAD default. Representative of the impacted area with an area factor
Fractions of annular areas within AREA	RADSHAPE(n)	unitless	Not assigned	Not assigned	The shape of the impacted area is modeled as a circle. This parameter is not used in the calculation of the DCGL.
Fruits, vegetables and grain consumption	Diet(1)	kg/yr	160	42.7	No site specific value is available. Guidance for radionuclides in soil selected from USEPA. USEPA, 2000
leafy vegetable consumption	DIET(2)	kg/yr	14	4.66	USEPA, 2000

[47] U.S. Environmental Protection Agency, *Soil Screening Guidance for Radionuclides: User Guide*, EPA/540-R-00-007, October, 2000.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
milk consumption	DIET(3)	L/yr	92	92	NUREG 6697
meat and poultry consumption	DIET(4)	kg/yr	63	65.1	NUREG 6697
Fish consumption	DIET(5)	kg/yr	5.4	7.34	No site specific value is available for the site. No value is provided in the USEPA Soil Screening Guidance. Value selected from the USEPA Exposure Factor Handbook, USEPA, 1997[48]
Other seafood consumption	DIET(6)	kg/yr	0.9	0	No other seafood is likely to be consumed by members of the resident farm family
Soil Ingestion Rate	SOIL	g/y	36.5	18.2	A member of the resident farm family may ingest soil as a result of incidental contact with the soil. USNRC default for adults engaged in non contact intensive activities. NUREG 6697
drinking water intake	DWI	L/yr	510	478.5	Average intake by member of the resident farm family. 1.3 L/day NUREG 6697
contamination fraction drinking water	FIRW	unitless	1	1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction household water	FIRW	unitless	1	1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction livestock water	FIRW	unitless	1	1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction irrigation water	FIRW	unitless	1	1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction aquatic food	FIRW	unitless	0.5	0.5	RESRAD default for resident farm family scenario. NUREG 6697

[48] U.S. Environmental Protection Agency, *Exposure Factors Handbook, Volume I, General Factors*, EPA 600/P-95-002Fa, August, 1997.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
contamination fraction plant food	FIRW	unitless	-1	-1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction meat	FIRW	unitless	-1	-1	RESRAD default for resident farm family scenario. NUREG 6697
contamination fraction milk	FIRW	unitless	-1	-1	RESRAD default for resident farm family scenario. NUREG 6697
livestock fodder intake for meat	LW15	kg/day	68	68	RESRAD Default. NUREG 6697
livestock fodder intake for milk	LF16	kg/day	55	55	RESRAD Default. NUREG 6697
livestock water intake for meat	LW15	L/day	50	50	RESRAD Default. NUREG 6697
livestock water intake for milk	LW16	L/day	160	160	RESRAD Default. NUREG 6697
livestock soil intake	LSI	kg/day	0.5	0.5	RESRAD Default. NUREG 6697
mass loading for foliar deposition	MLFD	g/m^3	0.0001	0.0001	RESRAD Default. NUREG 6697
Depth of Soil Mixing Layer	DM	m	0.15	0.15	NUREG 6697. RESRAD Default.[49]
Depth of Roots	DROOT	m	0.9	0.9	There are no restrictions for plants and the depth of roots in the impacted area. The depth of roots for edible plants is less than 0.9 m. Grass on the impacted area likely to be less than 0.3 m.[50] NUREG 6697
drinking water fraction from ground water	FGWDW	unitless	1	1	RESRAD default for resident farm family

[49] Argonne National Laboratory, *User's Manual for RESRAD Version 6*, July, 2001.

[50] Argonne National Laboratory, *Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil*, ANL/EAIS-8, April, 1993.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
household water fraction from ground water	FGWHH	unitless	1	1	RESRAD Default. NUREG 5512
livestock water fraction from ground water	FGWLW	unitless	1	1	RESRAD Default. NUREG 6697
irrigation fraction from ground water	FGWIR	unitless	1	1	It is assumed that the property will be irrigated with rainwater, surface runoff and supplemented by impacted groundwater
wet weight crop yield for non leafy plants	YV(1)	kg/m^2	0.7	0.7	RESRAD Default. NUREG 6697
wet weight crop yield for leafy plants	YV(2)	kg/m^2	1.5	1.5	RESRAD Default. NUREG 6697
wet weight crop yield for fodder	YV(3)	kg/m^2	1.1	1.1	RESRAD Default. NUREG 6697
growing season for non leafy years	TE(1)	years	0.17	0.17	RESRAD Default. NUREG 6697
growing season for leafy years	TE(2)	years	1.5	1.58	RESRAD Default. NUREG 6697
growing season for fodder years	TE(3)	years	1.1	1.1	RESRAD Default. NUREG 6697
translocation factor for non-leaf plants	TIV(1)	unitless	0.1	0.1	RESRAD Default. NUREG 5512
translocation factor for leafy plants	TIV(2)	unitless	0.25	0.25	RESRAD Default. NUREG 5512
translocation factor for fodder	TIV(3)	unitless	0.25	0.25	RESRAD Default. NUREG 5512
dry foliar interception fraction for non leafy vegetables	RDRY(1)	unitless	0.25	0.25	RESRAD Default. NUREG 6697
dry foliar interception fraction for leafy plants	RDRY(2)	unitless	0.25	0.25	RESRAD Default. NUREG 6697

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
dry foliar interception fraction for fodder	RDRY(3)	unitless	0.25	0.25	RESRAD Default. NUREG 6697
wet foliar interception fraction for non leafy plants	RWET(1)	unitless	0.25	0.25	RESRAD Default
wet foliar interception fraction for leafy plants	RWET(2)	unitless	0.25	0.25	RESRAD Default
wet foliar interception fraction for fodder	RWET(3)	unitless	0.25	0.25	RESRAD Default
weathering removal constant for vegetation	WLAM	unitless	20	20	RESRAD Default. NUREG 6697
Storage time fruits, non-leafy vegetables and grain	STOR_T(1)	days	14	14	RESRAD Default. NUREG 5512
Storage time leafy vegetables	STOR_T(2)	days	1	1	RESRAD Default. NUREG 5512
Storage time milk	STOR_T(3)	days	1	1	RESRAD Default. NUREG 5512
Storage time meat and poultry	STOR_T(4)	days	20	20	RESRAD Default. NUREG 5512
Storage time fish	STOR_T(5)	days	7	7	RESRAD Default. NUREG 5512
Storage time crustacea and mollusks	STOR_T(6)	days	7	7	RESRAD Default. NUREG 5512
Storage time well water	STOR_T(7)	days	1	1	RESRAD Default. NUREG 5512
Storage time surface water	STOR_T(8)	days	1	1	RESRAD Default. NUREG 5512
Storage time livestock fodder	STOR_T(9)	days	45	45	RESRAD Default. NUREG 5512

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Radon, building interior area factor	FAI	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, total porosity of the cover material	TPCV	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, total porosity of the building foundation	TPFL	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, diffusion coefficient for radon in foundation material	DIFFL	m/sec	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, volumetric water content of the foundation	PH2OFL	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, bulk density of building foundation	DENSFL	g/cm^3	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, thickness of building foundation	FLOOR1	m	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, volumetric water content of the cover material	PH2OCV	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, diffusion coefficient for radon in cover material	DIFCV	m/sec	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, building depth below ground surface	DMFL	m	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, emanating power of Rn 220 gas	EMANA(2)	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.

Parameter			Default	Value Selected	Justification
Description	Code	Unit			
Radon, *emanating* power of Rn 222 gas	EMANA(1)	unitless	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, height of the building room	HRM	m	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, average *building air* exchange rate	REXG	*L/hr*	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
Radon, diffusion coefficient for radon in contaminated zone soil	DIFCZ	m/sec	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.
radon vertical dimension of mixing	HMIX	m	Not assigned	Not assigned	No pathway for radon gas. This parameter is not applicable.