Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Unsaturated zone 2 density	P	2	g/cm^3	1.95	Site-specific measured physical parameter
Unsaturated zone 3 density	P	2	g/cm^3	1.92	Site-specific measured physical parameter
Unsaturated zone 4 density	P	2	g/cm^3	1.83	Site-specific measured physical parameter
Unsaturated zone 5 density	P	2	g/cm^3	1.85	Site-specific measured physical parameter
Unsaturated zone 1 distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Mn	P	1	cm^3/g	156	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Fe	P	1	cm^3/g	206	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Co	P	1	cm^3/g	232	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Sr	P	1	cm^3/g	31.2	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Cs	P	1	cm^3/g	441	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Eu	P	1	cm^3/g	817	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Gd	P	1	cm^3/g	817	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Mn	P	1	cm^3/g	158	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Co	P	1	cm^3/g	231	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Eu	P	1	cm^3/g	809	EA-BRP-SC-0202

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Unsaturated zone 2 distribution coefficient for Gd	P	1	cm^3/g	809	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Mn	P	1	cm^3/g	157	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Fe	P	1	cm^3/g	207	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Co	P	1	cm^3/g	234	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Sr	P	1	cm^3/g	31.4	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Cs	P	1	cm^3/g	444	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Eu	P	1	cm^3/g	824	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Gd	P	1	cm^3/g	824	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Mn	P	1	cm^3/g	155	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Co	P	1	cm^3/g	231	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Eu	P	1	cm^3/g	809	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Gd	P	1	cm^3/g	809	EA-BRP-SC-0202

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Unsaturated zone 5 distribution coefficient for H-3	P	1	cm^3/g	0.043	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Mn	P	1	cm^3/g	155	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Co	P	1	cm^3/g	230	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Eu	P	1	cm^3/g	808	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Gd	P	1	cm^3/g	808	EA-BRP-SC-0202
Unsaturated zone 1 total porosity	P	2	-	0.351	Site-specific measured physical parameter
Unsaturated zone 2 total porosity	P	2	-	0.274	Site-specific measured physical parameter
Unsaturated zone 3 total porosity	P	2	-	0.267	Site-specific measured physical parameter
Unsaturated zone 4 total porosity	P	2	-	0.317	Site-specific measured physical parameter
Unsaturated zone 5 total porosity	P	2	-	0.313	Site-specific measured physical parameter
Unsaturated zone 1 effective porosity	P	2	-	0.088	Site-specific measured physical parameter
Unsaturated zone 2 effective porosity	P	2	-	0.026	Site-specific measured physical parameter
Unsaturated zone 3 effective porosity	P	2	-	0.037	Site-specific measured physical parameter
Unsaturated zone 4 effective porosity	P	2	-	0.029	Site-specific measured physical parameter

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Unsaturated zone 5 effective porosity	P	2	-	0.054	Site-specific measured physical parameter
Unsaturated zone 1 field capacity	P	3	-	0.263	Site-specific measured physical parameter
Unsaturated zone 2 field capacity	P	3	-	0.248	Site-specific measured physical parameter
Unsaturated zone 3 field capacity	P	3	-	0.250	Site-specific measured physical parameter
Unsaturated zone 4 field capacity	P	3	-	0.287	Site-specific measured physical parameter
Unsaturated zone 5 field capacity	P	3	-	0.258	Site-specific measured physical parameter
Unsaturated zone 1 hydraulic conductivity	P	2	m/yr	536	Site-specific measured physical parameter
Unsaturated zone 2 hydraulic conductivity	P	2	m/yr	554	Site-specific measured physical parameter
Unsaturated zone 3 hydraulic conductivity	P	2	m/yr	5.17	Site-specific measured physical parameter
Unsaturated zone 4 hydraulic conductivity	P	2	m/yr	1046	Site-specific measured physical parameter
Unsaturated zone 5 hydraulic conductivity	P	2	m/yr	15.6	Site-specific measured physical parameter
Unsaturated zone 1 soil-specific b parameter	P	2	-	4.05	Site-specific measured physical parameter
Unsaturated zone 2 soil-specific b parameter	P	2	-	4.38	Site-specific measured physical parameter
Unsaturated zone 3 soil-specific b parameter	P	2	-	4.90	Site-specific measured physical parameter
Unsaturated zone 4 soil-specific b parameter	P	2	-	4.05	Site-specific measured physical parameter
Unsaturated zone 5 soil-specific b parameter	P	2	-	4.90	Site-specific measured physical parameter
Water					
Density of saturated zone	P	1	g/cm^3	Truncated normal	NUREG/CR-6697, Attachment C

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Saturated zone distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Saturated zone distribution coefficient for Mn	P	1	cm^3/g	156	EA-BRP-SC-0202
Saturated zone distribution coefficient for Fe	P	1	cm^3/g	205	EA-BRP-SC-0202
Saturated zone distribution coefficient for Co	P	1	cm^3/g	232	EA-BRP-SC-0202
Saturated zone distribution coefficient for Sr	P	1	cm^3/g	31.1	EA-BRP-SC-0202
Saturated zone distribution coefficient for Cs	P	1	cm^3/g	440	EA-BRP-SC-0202
Saturated zone distribution coefficient for Eu	P	1	cm^3/g	814	EA-BRP-SC-0202
Saturated zone distribution coefficient for Gd	P	1	cm^3/g	814	EA-BRP-SC-0202
Saturated zone total porosity	P	1	-	Truncated normal	NUREG/CR-6697, Attachment C
Saturated zone effective porosity	P	1	-	Truncated normal	NUREG/CR-6697, Attachment C
Saturated zone field capacity	P	3	-	0.16	RESRAD Data Collection Handbook total porosity for limestone minus the effective porosity for limestone
Saturated zone hydraulic conductivity	P	1	m/yr	1.52E+03	Site-specific measured physical parameter
Saturated zone hydraulic gradient	P	2	-	0.0007	Site-specific measured physical parameter
Saturated zone soil-specific b parameter	P	2	-	Bounded lognormal-n	NUREG/CR-6697, Attachment C
Length of contaminated zone parallel to the aquifer flow	P	2	m	102	Diameter of an 8,094 m^2 contaminated zone
Water table drop rate	P	3	m/yr	0.001	Default Physical value
Well-pump intake depth (below water table)	P	2	m	Triangular	NUREG/CR-6697, Attachment C
Well pumping rate	B, P	2	m^3/yr	330.34	NUREG/CR-6697, Attachment C, Table 3.10-

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Model: non-dispersion or mass balance	NA	3	-	MB	The mass-balance model was chosen as the most conservative since it assumes that all of the radionuclides released from the contaminated zone are withdrawn through the well.
Evapotranspiration coefficient	P	2	-	Uniform	NUREG/CR-6697, Attachment C
Humidity in air	P	3	g/m^3	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Average annual wind speed	P	2	m/s	5	Site-specific measured physical parameter
Precipitation rate	P	2	m/yr	0.8	Site-specific measured physical parameter
Irrigation mode	B	3	-	Overhead	Behavioral value - ditch irrigation is not used in the Midwest.
Irrigation rate	B	3	m/yr	0.2	Behavioral default value
Runoff coefficient	P	2	-	Uniform	NUREG/CR-6697, Attachment C
Watershed area for nearby stream or pond	P	3	m^2	2306717	The entire BRP site drains into Lake Michigan.
Accuracy for water soil computation	NA	3	-	0.001	Default value applicable to the BRP site
Ingestion					
Fruit, vegetable, and grain consumption rate	M, B	2	kg/yr	Triangular	NUREG/CR-6697, Attachment C
Leafy vegetable consumption	M, B	3	kg/yr	14	Metabolic/Behavioral default value
Milk consumption	M, B	2	L/yr	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Meat and poultry consumption	M, B	3	kg/yr	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Fish consumption rate	M, B	3	kg/yr	5.4	Metabolic/Behavioral default value
Other seafood consumption rate	M, B	3	kg/yr	0.9	Metabolic/Behavioral default value
Aquatic food contaminated fraction	B, P	2	-	Triangular	NUREG/CR-6697, Attachment C
Soil ingestion rate	M, B	2	g/yr	Triangular	NUREG/CR-6697, Attachment C
Drinking water intake	M, B	2	L/yr	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Storage time for fruits, non-leafy vegetables, and grain	B	3	d	14	Behavioral default value

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Storage time for leafy vegetables	B	3	d	1	Behavioral default value
Storage time for milk	B	3	d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Storage time for meat	B	3	d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Storage time for fish	B	3	d	7	Behavioral default value
Storage time for crustacea and mollusks	B	3	d	7	Behavioral default value
Storage time for well water	B	3	d	1	Behavioral default value
Storage time for surface water	B	3	d	1	Behavioral default value
Storage time for livestock fodder	B	3	d	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Drinking water contaminated fraction	B, P	3	-	1	Default Behavioral/Physical value applicable to the BRP site
Household water contaminated fraction	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Livestock water contaminated fraction	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Irrigation water contaminated fraction	B, P	3	-	1	Default Behavioral/Physical value applicable to the BRP site
Plant food contaminated fraction	B, P	3	-	-1	Default Behavioral/Physical value applicable to the BRP site
Meat contaminated fraction	B, P	3	-	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Milk contaminated fraction	B, P	3	-	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Livestock fodder intake rate for meat	M	3	kg/d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Livestock fodder intake rate for milk	M	3	kg/d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Livestock water intake rate for meat	M	3	L/d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Livestock water intake rate for milk	M	3	L/d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Livestock intake of soil	M	3	kg/d	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Mass loading for foliar deposition	P	3	g/m^3	1E-4	Default Physical value applicable to the BRP site
Depth of soil mixing layer	P	2	m	Triangular	NUREG/CR-6697, Attachment C
Depth of roots	P	1	m	Uniform	NUREG/CR-6697, Attachment C
Groundwater fractional usage for drinking water	B, P	3	-	1	Default Behavioral/Physical value applicable to the BRP site
Groundwater fractional usage for household water	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Groundwater fractional usage for livestock water	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Groundwater fractional usage for irrigation water	B, P	3	-	1	Behavioral/Physical default value applicable to the BRP site
Wet weight crop yield for non-leafy plants	P	2	kg/m^2	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Wet weight crop yield for leafy plants	P	3	kg/m^2	1.5	Default Physical value applicable to the BRP site
Wet weight crop yield for fodder	P	3	kg/m^2	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Length of growing season for non-leafy vegetables	P	3	yr	0.17	Default Physical value applicable to the BRP site
Length of growing season for leafy vegetables	P	3	yr	0.25	Default Physical value applicable to the BRP site
Length of growing season for fodder	P	3	yr	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Translocation factor for non-leafy vegetables	P	3	-	0.1	Default Physical value applicable to the BRP site
Translocation factor for leafy vegetables	P	3	-	1	Default Physical value applicable to the BRP site
Translocation factor for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Weathering removal constant	P	2	1/yr	Triangular	NUREG/CR-6697, Attachment C
Dry foliar interception fraction for non-leafy vegetables	P	3	-	0.25	Default Physical value applicable to the BRP site

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Dry foliar interception fraction for leafy vegetables	P	3	-	0.25	Default Physical value applicable to the BRP site
Dry foliar interception fraction for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Wet foliar interception fraction for non-leafy vegetables	P	3	-	0.25	Default Physical value applicable to the BRP site
Wet foliar interception fraction for leafy vegetables	P	2	-	Triangular	NUREG/CR-6697, Attachment C
Wet foliar interception fraction for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Slope factor - external	M	3	(risk/yr)/ (pCi/g)	Nuclide specific	Metabolic default value
Slope factor - inhalation	M	3	risk/pCi	Nuclide specific	Metabolic default value
Slope factor - ingestion	M	3	risk/pCi	Nuclide specific	Metabolic default value
Plant transfer factor for H-3	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Mn	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Fe	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Co	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Sr	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Cs	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Eu	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Plant transfer factor for Gd	P	1	-	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for H-3	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Mn	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Fe	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Co	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Sr	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Cs	P	2	(pCi/kg)/ (pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Meat transfer factor for Eu	P	2	(pCi/kg)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Meat transfer factor for Gd	P	2	(pCi/kg)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for H-3	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Mn	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Fe	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Co	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Sr	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Cs	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Eu	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
Milk transfer factor for Gd	P	2	(pCi/L)/(pCi/d)	Truncated lognormal-n	NUREG/CR-6697, Attachment C
H-3 bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Mn bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C]
Fe bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Co bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Sr bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Cs bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Eu bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Gd bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	Lognormal-n	NUREG/CR-6697, Attachment C
Bioaccumulation factor for crustacea and mollusks	P	3	(pCi/kg)/(pCi/L)	Element specific	Default Physical value applicable to the BRP site
Occupancy (Inhalation & External Parameters)					
Inhalation rate	M, B	3	m^3/yr	Triangular	NUREG/CR-6697, Attachment C
Inhalation dose conversion factors	M	3	mrem/pCi	Nuclide Specific	Metabolic default value
Ingestion dose conversion factors	M	3	mrem/pCi	Nuclide Specific	Metabolic default value
Mass loading for inhalation	P, B	2	g/m^3	Continuous linear	NUREG/CR-6697, Attachment C
Indoor dust filtration factor	P, B	2	-	Uniform	NUREG/CR-6697, Attachment C
External gamma shielding factor	P	2	-	Bounded lognormal-n	NUREG/CR-6697, Attachment C
Building foundation thickness	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building foundation bulk density	P	3	g/m^3	Not Used	The Radon Exposure Pathway is not used
Building foundation total porosity	P	3	-	Not Used	The Radon Exposure Pathway is not used
Building foundation volumetric water content	P	3	-	Not Used	The Radon Exposure Pathway is not used
Building foundation radon diffusion coefficient	P	3	m^2/s	Not Used	The Radon Exposure Pathway is not used
Contaminated soil zone radon diffusion coefficient	P	3	m^2/s	Not Used	The Radon Exposure Pathway is not used
Radon vertical dimension of mixing	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building air exchange rate	P, B	3	1/hr	Not Used	The Radon Exposure Pathway is not used
Building (room) height	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building indoor area factor	P	3	-	Not Used	The Radon Exposure Pathway is not used
Foundation depth below ground surface	P	3	m	Not Used	The Radon Exposure Pathway is not used
Radon-222 emanation coefficient	P	3	-	Not Used	The Radon Exposure Pathway is not used
Radon-220 emanation coefficient	P	3	-	Not Used	The Radon Exposure Pathway is not used

Parameter	Class[1]	Priority[2]	Units	Value/Distribution	Basis
Indoor time fraction	B	3	-	Continuous linear	NUREG/CR-6697, Attachment C
Outdoor time fraction	B	3	-	0.25	Behavioral default value.
Exposure duration	B	3	yr	30	Behavioral default value.

Notes:

[1]P = physical, B = behavioral, M = metabolic; (see NUREG/CR-6697, Attachment B, Table 4)
[2]1 = high priority parameter, 2 = medium priority parameter, 3 = low priority parameter

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Density of saturated zone	1	Truncated normal	1.52	0.230	0.001	0.999	0.03	1.52	-	1.52
Saturated zone total porosity	1	Truncated normal	0.425	0.0867	0.001	0.999	-0.07	0.424	-	0.424
Saturated zone effective porosity	1	Truncated normal	0.355	0.0906	0.001	0.999	-0.09	0.355	-	0.355
Depth of roots	1	Uniform	0.3	4.0	-	-	-0.48	-	1.22	1.22
Plant transfer factor for H	1	Truncated lognormal-n	1.57	1.1	0.001	0.999	-0.11	4.80	-	4.80
Plant transfer factor for Mn	1	Truncated lognormal-n	-1.20	0.9	0.001	0.999	-0.01	0.299	-	0.299
Plant transfer factor for Fe	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999	-0.03	0.001	-	0.001
Plant transfer factor for Co	1	Truncated lognormal-n	-2.53	0.9	0.001	0.999	-0.04	0.079	-	0.079
Plant transfer factor for Sr	1	Truncated lognormal-n	-1.20	1.0	0.001	0.999	0.54	-	0.589	0.589
Plant transfer factor for Cs	1	Truncated lognormal-n	-3.22	1.0	0.001	0.999	0.07	0.040	-	0.040
Plant transfer factor for Eu	1	Truncated lognormal-n	-6.21	1.1	0.001	0.999	-0.09	0.002	-	0.002
Plant transfer factor for Gd	1	Truncated lognormal-n	-6.21	1.1	0.001	0.999	0.11	0.002	-	0.002
Contaminated zone erosion rate	2	Continuous logarithmic	Default[4]				-0.09	0.001	-	0.001
Saturated zone soil-specific b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30	0.06	2.88	-	2.88
Well-pump intake depth (below water table)	2	Triangular	6	30	10	-	0.03	14.5	-	14.5
Evapotranspiration coefficient	2	Uniform	0.5	0.75	-	-	0.05	0.624	-	0.624
Runoff coefficient	2	Uniform	0.1	0.8	-	-	0.00	0.449	-	0.449
Fruit, vegetable, and grain consumption rate	2	Triangular	135	318	178	-	-0.05	205	-	205
Aquatic food contaminated fraction	2	Triangular	0	1	0.39	-	-0.09	0.448	-	0.448
Soil ingestion rate	2	Triangular	0	36.5	18.3	-	0.06	18.2	-	18.2
Drinking water intake	2	Truncated lognormal-n	6.015	0.489	0.001	0.999	0.06	409	-	409
Depth of soil mixing layer	2	Triangular	0.0	0.6	0.15	-	-0.06	0.232	-	0.232
Wet weight crop yield for non-leafy plants	2	Truncated lognormal-n	0.56	0.48	0.001	0.999	0.00	1.75	-	1.75
Weathering removal constant	2	Triangular	5.1	84	18	-	-0.05	32.8	-	32.8
Wet foliar interception fraction for leafy vegetables	2	Triangular	0.06	0.95	0.67	-	-0.07	0.581	-	0.581
Meat transfer factor for H	2	Truncated lognormal-n	-4.42	1.0	0.001	0.999	0.13	0.012	-	0.012
Meat transfer factor for Mn	2	Truncated lognormal-n	-6.91	0.7	0.001	0.999	0.03	0.001	-	0.001
Meat transfer factor for Fe	2	Truncated lognormal-n	-3.51	0.4	0.001	0.999	0.04	0.030	-	0.030
Meat transfer factor for Co	2	Truncated lognormal-n	-3.51	1.0	0.001	0.999	-0.12	0.030	-	0.030
Meat transfer factor for Sr	2	Truncated lognormal-n	-4.61	0.4	0.001	0.999	0.03	0.010	-	0.010
Meat transfer factor for Cs	2	Truncated lognormal-n	-3.00	0.4	0.001	0.999	0.01	0.050	-	0.050
Meat transfer factor for Eu	2	Truncated lognormal-n	-6.21	1.0	0.001	0.999	-0.13	0.002	-	0.002
Meat transfer factor for Gd	2	Truncated lognormal-n	-6.21	1.0	0.001	0.999	0.05	0.002	-	0.002
Milk transfer factor for H	2	Truncated lognormal-n	-4.6	0.9	0.001	0.999	0.04	0.010	-	0.010
Milk transfer factor for Mn	2	Truncated lognormal-n	-8.11	0.7	0.001	0.999	0.09	0.010	-	0.010

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Milk transfer factor for Fe	2	Truncated lognormal-n	-8.11	0.7	0.001	0.999	0.02	0.000	-	0.000
Milk transfer factor for Co	2	Truncated lognormal-n	-6.21	0.7	0.001	0.999	0.13	0.002	-	0.002
Milk transfer factor for Sr	2	Truncated lognormal-n	-6.21	0.5	0.001	0.999	-0.04	0.002	-	0.002
Milk transfer factor for Cs	2	Truncated lognormal-n	-4.61	0.5	0.001	0.999	-0.01	0.010	-	0.010
Milk transfer factor for Eu	2	Truncated lognormal-n	-9.72	0.9	0.001	0.999	-0.10	5.99E-05	-	5.99E-05
Milk transfer factor for Gd	2	Truncated lognormal-n	-9.72	0.9	0.001	0.999	0.03	6.01E-05	-	6.01E-05
H bioaccumulation factor for fish	2	Lognormal-n	0	0.1	-	-	-0.05	1.00	-	1.00
Mn bioaccumulation factor for fish	2	Lognormal-n	6	1.1	-	-	0.12	400	-	400
Fe bioaccumulation factor for fish	2	Lognormal-n	5.3	1.1	-	-	0.02	199	-	199
Co bioaccumulation factor for fish	2	Lognormal-n	5.7	1.1	-	-	0.04	297	-	297
Sr bioaccumulation factor for fish	2	Lognormal-n	4.1	1.1	-	-	0.02	60.0	-	60.0
Cs bioaccumulation factor for fish	2	Lognormal-n	7.6	0.7	-	-	-0.06	1990	-	1990
Eu bioaccumulation factor for fish	2	Lognormal-n	3.9	1.1	-	-	0.02	49.2	-	49.2
Gd bioaccumulation factor for fish	2	Lognormal-n	3.2	1.1	-	-	0.01	24.4	-	24.4
Mass loading for inhalation	2	Continuous linear	Default[4]				0.03	2.35E-05	-	2.35E-05
Indoor dust filtration factor	2	Uniform	0.15	0.95	-	-	-0.06	0.550	-	0.550
External gamma shielding factor	2	Bounded lognormal-n	-1.3	0.59	0.044	1	0.72	-	0.397	0.397
Humidity in air	3	Truncated lognormal-n	1.98	0.334	0.001	0.999	0.03	7.22	-	7.22
Indoor time fraction	3	Continuous linear	Default[4]				0.93	-	0.667	0.667
Inhalation rate	3	Triangular	4,380	13,100	8,400	-	0.00	8570	-	8570

Notes:

[1]1 = high priority parameter, 2 = medium priority parameter

[2]Distribution's Statistical Parameter
Lognormal-n: 1 = mean, 2 = standard deviation
Bounded lognormal-n: 1 = underlying mean value, 2 = underlying standard deviation, 3 = lower limit, 4 = upper limit
Truncated lognormal-n: 1 = underlying mean value, 2 = underlying standard deviation, 3 = lower quantile, 4 = upper quantile
Truncated normal: 1 = mean, 2 = standard deviation, 3 = lower quantile, 4 = upper quantile
Triangular: 1 = minimum, 2 = maximum, 3 = most likely
Uniform: 1 = minimum, 2 = maximum

[3]PRCC = Partial ranked correlation coefficient for peak all-pathways dose

[4]Default RESRAD v6.21 distribution parameters were used

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Contamination					
Thickness of contaminated zone	P	2	m	0.15	Assigned value
Area of contaminated zone	P	2	m^2	8,094	Assigned value
Shape of the contaminated zone	P	3	-	Circular	Default RESRAD v6.21 Physical value applicable to the BRP site
Initial concentration of principal radionuclides in soil	P	2	pCi/g	1	Assigned value
Initial concentration of radionuclides present in groundwater	P	3	pCi/L	0	Not Used
Leach rate	P	3	1/yr	0	Default Physical value to invoke the calculation of this parameter via a first-order leaching model that uses the value of the soil/water distribution coefficient in the contaminated zone.
Solubility limit	P	3	mol/L	0	Default Physical value – not used by RESRAD with leach rate flag set to 0
Time since placement of material	P	3	yr	0	Default RESRAD v6.21 Physical value assumed acceptable for purposes of DCGL generation
Times for calculation	P	3	yr	1, 3, 10, 30, 100, 300, 1000	Default RESRAD v6.21 Physical value applicable to the BRP site
Contaminated zone density	P	1	g/cm^3	1.75	Site-specific measured physical parameter
Contaminated zone distribution coefficient for H-3	P	1	cm^3/g	0.043	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Mn	P	1	cm^3/g	733	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Fe	P	1	cm^3/g	1251	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Co	P	1	cm^3/g	1284	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Sr	P	1	cm^3/g	131	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Cs	P	1	cm^3/g	2130	EA-BRP-SC-0202

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Contaminated zone distribution coefficient for Eu	P	1	cm^3/g	7194	EA-BRP-SC-0202
Contaminated zone distribution coefficient for Gd	P	1	cm^3/g	7194	EA-BRP-SC-0202
Use plant/soil ratio	NA	3	Check box	No	For purposes of the sensitivity analysis, the code should not be allowed to calculate the distribution coefficient from the plant root uptake factors.
Contaminated zone field capacity	P	3	-	0.263	Site-specific measured physical parameter
Contaminated zone erosion rate	P,B	2	m/yr	0.001	Sensitivity analysis
Contaminated zone total porosity	P	2	-	0.351	Site-specific measured physical parameter
Contaminated zone hydraulic conductivity	P	2	m/yr	536	Site-specific measured physical parameter
Contaminated zone b parameter	P	2	-	4.05	Site-specific measured physical parameter
Carbon-Model Parameters					
Thickness of evasion layer of C-14 in soil	P	2	m	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
C-14 evasion flux rate from soil	P	3	1/s	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
C-12 concentration in local water	P	3	g/cm^3	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
C-12 concentration in contaminated soil	P	3	g/g	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
Fraction of vegetation carbon absorbed from soil	P	3	-	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Fraction of vegetation carbon absorbed from air	P	3	-	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
C-12 evasion flux rate from soil	P	3	1/s	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
Grain fraction in beef cattle feed	B	3	-	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
Grain fraction in milk cow feed	B	3	-	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
DCF correction factor for gaseous forms of C-14	P	3	-	Not Used	Carbon-14 has not been identified in any contaminated surface, subsurface or aquifer samples.
Soil					
Cover depth	P	2	m	0	The contamination is assumed to be on surface soil.
Density of cover material	P	1	g/cm^3	Not Used	A cover is not used in the site-specific dose model.
Cover total porosity	P	3	-	Not Used	A cover is not used in the site-specific dose model.
Cover volumetric water content	P	3	-	Not Used	A cover is not used in the site-specific dose model.
Cover radon diffusion coefficient	P	3	m^2/s	Not Used	A cover is not used in the site-specific dose model.
Cover erosion rate	P,B	2	m/yr	Not Used	A cover is not used in the site-specific dose model.
Number of unsaturated zones	P	3	-	5	Site-specific measured physical parameter
Unsaturated zone 1 thickness	P	1	m	1.37	Site-specific measured physical parameter
Unsaturated zone 2 thickness	P	1	m	1.37	Site-specific measured physical parameter
Unsaturated zone 3 thickness	P	1	m	4.11	Site-specific measured physical parameter
Unsaturated zone 4 thickness	P	1	m	0.61	Site-specific measured physical parameter
Unsaturated zone 5 thickness	P	1	m	7.32	Site-specific measured physical parameter
Unsaturated zone 1 density	P	2	g/cm^3	1.75	Site-specific measured physical parameter

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Unsaturated zone 2 density	P	2	g/cm^3	1.95	Site-specific measured physical parameter
Unsaturated zone 3 density	P	2	g/cm^3	1.92	Site-specific measured physical parameter
Unsaturated zone 4 density	P	2	g/cm^3	1.83	Site-specific measured physical parameter
Unsaturated zone 5 density	P	2	g/cm^3	1.85	Site-specific measured physical parameter
Unsaturated zone 1 distribution coefficient for H	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Mn	P	1	cm^3/g	156	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Fe	P	1	cm^3/g	206	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Co	P	1	cm^3/g	232	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Sr	P	1	cm^3/g	31.2	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Cs	P	1	cm^3/g	441	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Eu	P	1	cm^3/g	817	EA-BRP-SC-0202
Unsaturated zone 1 distribution coefficient for Gd	P	1	cm^3/g	817	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for H	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Mn	P	1	cm^3/g	155	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Co	P	1	cm^3/g	231	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 2 distribution coefficient for Eu	P	1	cm^3/g	809	EA-BRP-SC-0202

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Unsaturated zone 2 distribution coefficient for Gd	P	1	cm^3/g	809	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for H	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Mn	P	1	cm^3/g	157	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Fe	P	1	cm^3/g	207	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Co	P	1	cm^3/g	234	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Sr	P	1	cm^3/g	31.4	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Cs	P	1	cm^3/g	444	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Eu	P	1	cm^3/g	824	EA-BRP-SC-0202
Unsaturated zone 3 distribution coefficient for Gd	P	1	cm^3/g	824	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for H	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Mn	P	1	cm^3/g	155	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Co	P	1	cm^3/g	231	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Eu	P	1	cm^3/g	809	EA-BRP-SC-0202
Unsaturated zone 4 distribution coefficient for Gd	P	1	cm^3/g	809	EA-BRP-SC-0202

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Unsaturated zone 5 distribution coefficient for H	P	1	cm^3/g	0.043	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Mn	P	1	cm^3/g	155	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Fe	P	1	cm^3/g	204	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Co	P	1	cm^3/g	230	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Sr	P	1	cm^3/g	31.0	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Cs	P	1	cm^3/g	438	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Eu	P	1	cm^3/g	808	EA-BRP-SC-0202
Unsaturated zone 5 distribution coefficient for Gd	P	1	cm^3/g	808	EA-BRP-SC-0202
Unsaturated zone 1 total porosity	P	2	-	0.351	Site-specific measured physical parameter
Unsaturated zone 2 total porosity	P	2	-	0.274	Site-specific measured physical parameter
Unsaturated zone 3 total porosity	P	2	-	0.287	Site-specific measured physical parameter
Unsaturated zone 4 total porosity	P	2	-	0.317	Site-specific measured physical parameter
Unsaturated zone 5 total porosity	P	2	-	0.313	Site-specific measured physical parameter
Unsaturated zone 1 effective porosity	P	2	-	0.088	Site-specific measured physical parameter
Unsaturated zone 2 effective porosity	P	2	-	0.026	Site-specific measured physical parameter
Unsaturated zone 3 effective porosity	P	2	-	0.037	Site-specific measured physical parameter
Unsaturated zone 4 effective porosity	P	2	-	0.029	Site-specific measured physical parameter

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Unsaturated zone 5 effective porosity	P	2	-	0.054	Site-specific measured physical parameter
Unsaturated zone 1 field capacity	P	3	-	0.263	Site-specific measured physical parameter
Unsaturated zone 2 field capacity	P	3	-	0.248	Site-specific measured physical parameter
Unsaturated zone 3 field capacity	P	3	-	0.250	Site-specific measured physical parameter
Unsaturated zone 4 field capacity	P	3	-	0.287	Site-specific measured physical parameter
Unsaturated zone 5 field capacity	P	3	-	0.258	Site-specific measured physical parameter
Unsaturated zone 1 hydraulic conductivity	P	2	m/yr	536	Site-specific measured physical parameter
Unsaturated zone 2 hydraulic conductivity	P	2	m/yr	554	Site-specific measured physical parameter
Unsaturated zone 3 hydraulic conductivity	P	2	m/yr	5.17	Site-specific measured physical parameter
Unsaturated zone 4 hydraulic conductivity	P	2	m/yr	1046	Site-specific measured physical parameter
Unsaturated zone 5 hydraulic conductivity	P	2	m/yr	15.6	Site-specific measured physical parameter
Unsaturated zone 1 soil-specific b parameter	P	2	-	4.05	Site-specific measured physical parameter
Unsaturated zone 2 soil-specific b parameter	P	2	-	4.38	Site-specific measured physical parameter
Unsaturated zone 3 soil-specific b parameter	P	2	-	4.90	Site-specific measured physical parameter
Unsaturated zone 4 soil-specific b parameter	P	2	-	4.05	Site-specific measured physical parameter
Unsaturated zone 5 soil-specific b parameter	P	2	-	4.90	Site-specific measured physical parameter
Water					
Density of saturated zone	P	1	g/cm^3	1.52	Sensitivity analysis

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Saturated zone distribution coefficient for H-3	P	1	cm^3/g	0.060	EA-BRP-SC-0202
Saturated zone distribution coefficient for Mn	P	1	cm^3/g	156	EA-BRP-SC-0202
Saturated zone distribution coefficient for Fe	P	1	cm^3/g	205	EA-BRP-SC-0202
Saturated zone distribution coefficient for Co	P	1	cm^3/g	232	EA-BRP-SC-0202
Saturated zone distribution coefficient for Sr	P	1	cm^3/g	31.1	EA-BRP-SC-0202
Saturated zone distribution coefficient for Cs	P	1	cm^3/g	440	EA-BRP-SC-0202
Saturated zone distribution coefficient for Eu	P	1	cm^3/g	814	EA-BRP-SC-0202
Saturated zone distribution coefficient for Gd	P	1	cm^3/g	814	EA-BRP-SC-0202
Saturated zone total porosity	P	1	-	0.424	Sensitivity analysis
Saturated zone effective porosity	P	1	-	0.355	Sensitivity analysis
Saturated zone field capacity	P	3	-	0.16	RESRAD Data Collection Handbook total porosity for limestone minus the effective porosity for limestone
Saturated zone hydraulic conductivity	P	1	m/yr	1.52E+03	Site-specific measured physical parameter
Saturated zone hydraulic gradient	P	2	-	0.0007	Site-specific measured physical parameter
Saturated zone soil-specific b parameter	P	2	-	2.88	Sensitivity analysis
Length of contaminated zone parallel to the aquifer flow	P	2	m	102	Diameter of an 8,094 m^2 contaminated zone
Water table drop rate	P	3	m/yr	0.001	Default RESRAD v6.21 Physical value applicable to the BRP site
Well-pump intake depth (below water table)	P	2	m	14.5	Sensitivity analysis
Well pumping rate	B, P	2	m^3/yr	330.34	NUREG/CR-6697, Attachment C, Table 3.10-1

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Model: non-dispersion or mass balance	NA	3	-	MB	The mass-balance model was chosen as the most conservative since it assumes that all of the radionuclides released from the contaminated zone are withdrawn through the well.
Evapotranspiration coefficient	P	2	-	0.624	Sensitivity analysis
Humidity in air	P	3	g/m^3	7.22	Sensitivity analysis
Average annual wind speed	P	2	m/s	5	Site-specific measured physical parameter
Precipitation rate	P	2	m/yr	0.8	Site-specific measured physical parameter
Irrigation mode	B	3	-	Overhead	Behavioral value - ditch irrigation is not used in the Midwest.
Irrigation rate	B	3	m/yr	0.2	Behavioral RESRAD v6.21 default value
Runoff coefficient	P	2	-	0.449	Sensitivity analysis
Watershed area for nearby stream or pond	P	3	m^2	2306717	The entire BRP site drains into Lake Michigan.
Accuracy for water soil computation	NA	3	-	0.001	Default RESRAD v6.21 value applicable to the BRP site
Ingestion					
Fruit, vegetable, and grain consumption rate	M, B	2	kg/yr	205	Sensitivity analysis
Leafy vegetable consumption	M, B	3	kg/yr	14	Metabolic/Behavioral RESRAD v6.21 default value
Milk consumption	M, B	2	L/yr	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Meat and poultry consumption	M, B	3	kg/yr	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Fish consumption rate	M, B	3	kg/yr	5.4	Metabolic/Behavioral RESRAD v6.21 default value
Other seafood consumption rate	M, B	3	kg/yr	0.9	Metabolic/Behavioral RESRAD v6.21 default value
Aquatic food contaminated fraction	B, P	2	-	0.448	Sensitivity analysis
Soil ingestion rate	M, B	2	g/yr	18.2	Sensitivity analysis
Drinking water intake	M, B	2	L/yr	409	Sensitivity analysis

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Storage time for fruits, non-leafy vegetables, and grain	B	3	d	14	Behavioral RESRAD v6.21 default value
Storage time for leafy vegetables	B	3	d	1	Behavioral RESRAD v6.21 default value
Storage time for milk	B	3	d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Storage time for meat	B	3	d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Storage time for fish	B	3	d	7	Behavioral RESRAD v6.21 default value
Storage time for crustacea and mollusks	B	3	d	7	Behavioral RESRAD v6.21 default value
Storage time for well water	B	3	d	1	Behavioral default value
Storage time for surface water	B	3	d	1	Behavioral default value
Storage time for livestock fodder	B	3	d	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Drinking water contaminated fraction	B, P	3	-	1	Default RESRAD v6.21 Behavioral/Physical value applicable to the BRP site
Household water contaminated fraction	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Livestock water contaminated fraction	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Irrigation water contaminated fraction	B, P	3	-	1	Default RESRAD v6.21 Behavioral/Physical value applicable to the BRP site
Plant food contaminated fraction	B, P	3	-	-1	Default RESRAD v6.21 Behavioral/Physical value applicable to the BRP site
Meat contaminated fraction	B, P	3	-	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Milk contaminated fraction	B, P	3	-	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Livestock fodder intake rate for meat	M	3	kg/d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Livestock fodder intake rate for milk	M	3	kg/d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Livestock water intake rate for meat	M	3	L/d	Not Used	The meat ingestion pathway is suppressed in the site-specific dose model.
Livestock water intake rate for milk	M	3	L/d	Not Used	The milk ingestion pathway is suppressed in the site-specific dose model.
Livestock intake of soil	M	3	kg/d	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Mass loading for foliar deposition	P	3	g/m^3	1E-4	Default RESRAD v6.21 Physical value applicable to the BRP site
Depth of soil mixing layer	P	2	m	0.232	Sensitivity analysis
Depth of roots	P	1	m	1.22	Sensitivity analysis
Groundwater fractional usage for drinking water	B, P	3	-	1	Default RESRAD v6.21 Behavioral/Physical value applicable to the BRP site
Groundwater fractional usage for household water	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Groundwater fractional usage for livestock water	B, P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Groundwater fractional usage for irrigation water	B, P	3	-	1	Behavioral/Physical default value applicable to the BRP site
Wet weight crop yield for non-leafy plants	P	2	kg/m^2	1.75	Sensitivity analysis
Wet weight crop yield for leafy plants	P	3	kg/m^2	1.5	Default RESRAD v6.21 Physical value applicable to the BRP site
Wet weight crop yield for fodder	P	3	kg/m^2	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Length of growing season for non-leafy vegetables	P	3	yr	0.17	Default RESRAD v6.21 Physical value applicable to the BRP site
Length of growing season for leafy vegetables	P	3	yr	0.25	Default RESRAD v6.21 Physical value applicable to the BRP site
Length of growing season for fodder	P	3	yr	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Translocation factor for non-leafy vegetables	P	3	-	0.1	Default RESRAD v6.21 Physical value applicable to the BRP site
Translocation factor for leafy vegetables	P	3	-	1	Default RESRAD v6.21 Physical value applicable to the BRP site

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Translocation factor for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Weathering removal constant	P	2	1/yr	32.8	Sensitivity analysis
Dry foliar interception fraction for non-leafy vegetables	P	3	-	0.25	Default RESRAD v6.21 Physical value applicable to the BRP site
Dry foliar interception fraction for leafy vegetables	P	3	-	0.25	Default RESRAD v6.21 Physical value applicable to the BRP site
Dry foliar interception fraction for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Wet foliar interception fraction for non-leafy vegetables	P	3	-	0.25	Default RESRAD v6.21 Physical value applicable to the BRP site
Wet foliar interception fraction for leafy vegetables	P	2	-	0.581	Sensitivity analysis
Wet foliar interception fraction for fodder	P	3	-	Not Used	The meat and milk ingestion pathways are suppressed in the site-specific dose model.
Slope factor - external	M	3	(risk/yr)/ (pCi/g)	Nuclide specific	Metabolic RESRAD v6.21 default value
Slope factor - inhalation	M	3	risk/pCi	Nuclide specific	Metabolic RESRAD v6.21 default value
Slope factor - ingestion	M	3	risk/pCi	Nuclide specific	Metabolic RESRAD v6.21 default value
Plant transfer factor for H	P	1	-	4.80	Sensitivity analysis
Plant transfer factor for Mn	P	1	-	0.299	Sensitivity analysis
Plant transfer factor for Fe	P	1	-	0.001	Sensitivity analysis
Plant transfer factor for Co	P	1	-	0.079	Sensitivity analysis
Plant transfer factor for Sr	P	1	-	0.589	Sensitivity analysis
Plant transfer factor for Cs	P	1	-	0.040	Sensitivity analysis
Plant transfer factor for Eu	P	1	-	0.002	Sensitivity analysis
Plant transfer factor for Gd	P	1	-	0.002	Sensitivity analysis
Meat transfer factor for H	P	2	(pCi/kg)/ (pCi/d)	0.012	Sensitivity analysis
Meat transfer factor for Mn	P	2	(pCi/kg)/ (pCi/d)	0.001	Sensitivity analysis
Meat transfer factor for Fe	P	2	(pCi/kg)/ (pCi/d)	0.030	Sensitivity analysis
Meat transfer factor for Co	P	2	(pCi/kg)/ (pCi/d)	0.030	Sensitivity analysis

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Meat transfer factor for Sr	P	2	(pCi/kg)/(pCi/d)	0.010	Sensitivity analysis
Meat transfer factor for Cs	P	2	(pCi/kg)/(pCi/d)	0.050	Sensitivity analysis
Meat transfer factor for Eu	P	2	(pCi/kg)/(pCi/d)	0.002	Sensitivity analysis
Meat transfer factor for Gd	P	2	(pCi/kg)/(pCi/d)	0.002	Sensitivity analysis
Milk transfer factor for H	P	2	(pCi/L)/(pCi/d)	0.010	Sensitivity analysis
Milk transfer factor for Mn	P	2	(pCi/L)/(pCi/d)	0.010	Sensitivity analysis
Milk transfer factor for Fe	P	2	(pCi/L)/(pCi/d)	0.000	Sensitivity analysis
Milk transfer factor for Co	P	2	(pCi/L)/(pCi/d)	0.002	Sensitivity analysis
Milk transfer factor for Sr	P	2	(pCi/L)/(pCi/d)	0.002	Sensitivity analysis
Milk transfer factor for Cs	P	2	(pCi/L)/(pCi/d)	0.010	Sensitivity analysis
Milk transfer factor for Eu	P	2	(pCi/L)/(pCi/d)	5.99E-05	Sensitivity analysis
Milk transfer factor for Gd	P	2	(pCi/L)/(pCi/d)	6.01E-05	Sensitivity analysis
H bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	1.00	Sensitivity analysis
Mn bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	400	Sensitivity analysis
Fe bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	199	Sensitivity analysis
Co bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	297	Sensitivity analysis
Sr bioaccumulation factor for fish	P	2	(pCi/kg)/(pCi/L)	60.0	Sensitivity analysis

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Cs bioaccumulation factor for fish	P	2	(pCi/kg)/ (pCi/L)	1990	Sensitivity analysis
Eu bioaccumulation factor for fish	P	2	(pCi/kg)/ (pCi/L)	49.2	Sensitivity analysis
Gd bioaccumulation factor for fish	P	2	(pCi/kg)/ (pCi/L)	24.4	Sensitivity analysis
Bioaccumulation factor for crustacea and mollusks	P	3	(pCi/kg)/ (pCi/L)	Element specific	Default RESRAD v6.21 Physical value applicable to the BRP site
Occupancy (Inhalation & External Parameters)					
Inhalation rate	M, B	3	m^3/yr	8570	Sensitivity analysis
Inhalation dose conversion factors	M	3	mrem/pCi	Nuclide Specific	Metabolic default value
Ingestion dose conversion factors	M	3	mrem/pCi	Nuclide Specific	Metabolic RESRAD v6.21 default value
Mass loading for inhalation	P, B	2	g/m^3	2.35E-05	Sensitivity analysis
Indoor dust filtration factor	P, B	2	-	0.550	Sensitivity analysis
External gamma shielding factor	P	2	-	0.397	Sensitivity analysis
Building foundation thickness	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building foundation bulk density	P	3	g/m^3	Not Used	The Radon Exposure Pathway is not used
Building foundation total porosity	P	3	-	Not Used	The Radon Exposure Pathway is not used
Building foundation volumetric water content	P	3	-	Not Used	The Radon Exposure Pathway is not used
Building foundation radon diffusion coefficient	P	3	m^2/s	Not Used	The Radon Exposure Pathway is not used
Contaminated soil zone radon diffusion coefficient	P	3	m^2/s	Not Used	The Radon Exposure Pathway is not used
Radon vertical dimension of mixing	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building air exchange rate	P, B	3	1/hr	Not Used	The Radon Exposure Pathway is not used
Building (room) height	P	3	m	Not Used	The Radon Exposure Pathway is not used
Building indoor area factor	P	3	-	Not Used	The Radon Exposure Pathway is not used
Foundation depth below ground surface	P	3	m	Not Used	The Radon Exposure Pathway is not used

Parameter	Class[1]	Priority[2]	Units	Parameter Value	Basis for Parameter Selection
Radon-222 emanation coefficient	P	3	-	Not Used	The Radon Exposure Pathway is not used
Radon-220 emanation coefficient	P	3	-	Not Used	The Radon Exposure Pathway is not used
Indoor time fraction	B	3	-	0.667	Sensitivity analysis
Outdoor time fraction	B	3	-	0.25	Behavioral RESRAD v6.21 default value.
Exposure duration	B	3	yr	30	Behavioral RESRAD v6.21 default value.

Notes:

[1]P = physical, B = behavioral, M = metabolic; (see NUREG/CR-6697, Attachment B, Table 4)
[2]1 = high priority parameter, 2 = medium priority parameter, 3 = low priority parameter

Appendix 6-G, RESRAD v6.21 Sensitivity Analysis Distribution Parameters and Results for Discounted Radionuclides

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Contaminated Zone distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	0.40		95.7	95.7[4]
Contaminated Zone distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	1.00		1130	1130[4]
Contaminated Zone distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	0.97		21200	21200[4]
Contaminated Zone distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	-0.73		0.061	0.061[4]
Contaminated Zone distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	1.00		888	888[4]
Contaminated Zone distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.84		1.05	1.05[4]
Contaminated Zone distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	1.00		2130	2130[4]
Contaminated Zone distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	0.99		3360	3360[4]
Contaminated Zone distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.96		11700	11700[4]
Contaminated Zone distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	0.97		23000	23000[4]
Contaminated Zone distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	0.06	824		824[4]
Contaminated Zone distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	-0.01	17.1		17.1[4]
Contaminated Zone distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	0.00	379		379[4]
Contaminated Zone distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.06	5720		5720[4]
Contaminated Zone distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	-0.01	126		126[4]
Unsaturated Zone 1 distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	-0.26		1.25	1.25[4]
Unsaturated Zone 1 distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	0.09	421		421[4]
Unsaturated Zone 1 distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	0.04	1054		1054[4]
Unsaturated Zone 1 distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	-0.18	0.505		0.505[4]
Unsaturated Zone 1 distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	0.08	215		215[4]
Unsaturated Zone 1 distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.08	4.53		4.53[4]

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Unsaturated Zone 1 distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	-0.05	441		441[4]
Unsaturated Zone 1 distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	-0.05	947		947[4]
Unsaturated Zone 1 distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.03	1440		1440[4]
Unsaturated Zone 1 distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	-0.04	6710		6710[4]
Unsaturated Zone 1 distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	-0.01	823		823[4]
Unsaturated Zone 1 distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	-0.03	16.9		16.9[4]
Unsaturated Zone 1 distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	-0.02	375		375[4]
Unsaturated Zone 1 distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.02	5810		5810[4]
Unsaturated Zone 1 distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	0.05	126		126[4]
Unsaturated Zone 2 distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	-0.18	10.8		10.8[4]
Unsaturated Zone 2 distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	-0.02	420		420[4]
Unsaturated Zone 2 distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	-0.03	1040		1040[4]
Unsaturated Zone 2 distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	-0.14	0.500		0.500[4]
Unsaturated Zone 2 distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	0.07	214		214[4]
Unsaturated Zone 2 distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.09	4.49		4.49[4]
Unsaturated Zone 2 distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	0.06	438		438[4]
Unsaturated Zone 2 distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	0.03	947		947[4]
Unsaturated Zone 2 distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.01	1420		1420[4]
Unsaturated Zone 2 distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	0.00	6680		6680[4]
Unsaturated Zone 2 distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	0.06	812		812[4]
Unsaturated Zone 2 distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	0.03	16.8		16.8[4]

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Unsaturated Zone 2 distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	0.04	371		371[4]
Unsaturated Zone 2 distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.04	5810		5810[4]
Unsaturated Zone 2 distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	0.07	124		124[4]
Unsaturated Zone 3 distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	-0.25		1.26	1.26[4]
Unsaturated Zone 3 distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	0.03	423		423[4]
Unsaturated Zone 3 distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	-0.07	1066		1066[4]
Unsaturated Zone 3 distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	-0.17	0.509		0.509[4]
Unsaturated Zone 3 distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	0.04	216		216[4]
Unsaturated Zone 3 distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.12	4.55		4.55[4]
Unsaturated Zone 3 distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	-0.13	444		444[4]
Unsaturated Zone 3 distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	0.01	953		953[4]
Unsaturated Zone 3 distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.05	1430		1430[4]
Unsaturated Zone 3 distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	0.03	6740		6740[4]
Unsaturated Zone 3 distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	-0.03	828		828[4]
Unsaturated Zone 3 distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	-0.03	828		828[4]
Unsaturated Zone 3 distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	0.08	378		378[4]
Unsaturated Zone 3 distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.01	5880		5880[4]
Unsaturated Zone 3 distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	0.14	126		126[4]
Unsaturated Zone 4 distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	0.01	10.8		10.8[4]
Unsaturated Zone 4 distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	0.07	419		419[4]
Unsaturated Zone 4 distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	-0.05	1039		1039[4]

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Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Unsaturated Zone 4 distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	0.01	0.499		0.499[4]
Unsaturated Zone 4 distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	-0.03	214		214[4]
Unsaturated Zone 4 distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.05	4.50		4.50[4]
Unsaturated Zone 4 distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	0.05	438		430[4]
Unsaturated Zone 4 distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	0.06	943		943[4]
Unsaturated Zone 4 distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.13	1430		1430[4]
Unsaturated Zone 4 distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	-0.05	6670		6670[4]
Unsaturated Zone 4 distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	0.04	825		825[4]
Unsaturated Zone 4 distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	0.04	16.8		16.8[4]
Unsaturated Zone 4 distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	0.02	371		371[4]
Unsaturated Zone 4 distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.02	371		371[4]
Unsaturated Zone 4 distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	0.03	126		126[4]
Unsaturated Zone 5 distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	-0.25		1.25	1.25[4]
Unsaturated Zone 5 distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	-0.01	421		421[4]
Unsaturated Zone 5 distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	0.11	1037		1037[4]
Unsaturated Zone 5 distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	-0.23	0.499		0.499[4]
Unsaturated Zone 5 distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	0.11	213		213[4]
Unsaturated Zone 5 distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.20	4.49		4.49[4]
Unsaturated Zone 5 distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	0.07	438		438[4]
Unsaturated Zone 5 distribution coefficient for Pu	1	Truncated lognormal-n	6.86	1.89	0.001	0.999	-0.03	944		944[4]
Unsaturated Zone 5 distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.01	1410		1410[4]

Appendix 6-G, RESRAD v6.21 Sensitivity Analysis Distribution Parameters and Results for Discounted Radionuclides

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Unsaturated Zone 5 distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	0.02	6670		6670[4]
Unsaturated Zone 5 distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	0.06	812		812[4]
Unsaturated Zone 5 distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	0.05	16.8		16.8[4]
Unsaturated Zone 5 distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	-0.01	370		370[4]
Unsaturated Zone 5 distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	0.10	5780		5780[4]
Unsaturated Zone 5 distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	0.04	124		124[4]
Saturated Zone distribution coefficient for C	1	Truncated lognormal-n	2.4	3.22	0.001	0.999	-0.15	10.8		10.8
Saturated Zone distribution coefficient for Ni	1	Truncated lognormal-n	6.05	1.46	0.001	0.999	0.06	419		419
Saturated Zone distribution coefficient for Zn	1	Truncated lognormal-n	6.98	4.44	0.001	0.999	-0.07	1049		1049
Saturated Zone distribution coefficient for Tc	1	Truncated lognormal-n	-0.67	3.16	0.001	0.999	0.01	0.503		0.503
Saturated Zone distribution coefficient for Ag	1	Truncated lognormal-n	5.38	2.10	0.001	0.999	0.05	215		215
Saturated Zone distribution coefficient for I	1	Truncated lognormal-n	1.52	2.19	0.001	0.999	-0.06	4.52		4.52
Saturated Zone distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999	0.00	440		440
Saturated Zone distribution coefficient for Pu	1	Truncated lognormal-n	6.66	1.89	0.001	0.999	-0.06	943		943
Saturated Zone distribution coefficient for Am	1	Truncated lognormal-n	7.28	3.15	0.001	0.999	0.02	1430		1430
Saturated Zone distribution coefficient for Cm	1	Truncated lognormal-n	8.82	1.82	0.001	0.999	0.00	6700		6700
Saturated Zone distribution coefficient for Ac	1	Truncated lognormal-n	6.72	3.22	0.001	0.999	-0.04	817		817
Saturated Zone distribution coefficient for Np	1	Truncated lognormal-n	2.84	2.25	0.001	0.999	-0.08	16.9		16.9
Saturated Zone distribution coefficient for Pa	1	Truncated lognormal-n	5.94	3.22	0.001	0.999	0.18	373		373
Saturated Zone distribution coefficient for Th	1	Truncated lognormal-n	8.68	3.62	0.001	0.999	-0.01	5770		5770
Saturated Zone distribution coefficient for U	1	Truncated lognormal-n	4.84	3.13	0.001	0.999	-0.07	125		125

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Plant transfer factor for C	1	Truncated lognormal-n	-0.36	0.9	0.001	0.999	0.06	1.59E-01		1.59E-01[5]
Plant transfer factor for Zn	1	Truncated lognormal-n	-0.92	0.9	0.001	0.999	-0.13	3.97E-01		3.97E-01[5]
Plant transfer factor for Tc	1	Truncated lognormal-n	1.61	0.9	0.001	0.999	0.00	4.97E+00		4.97E+00[5]
Plant transfer factor for Ag	1	Truncated lognormal-n	-5.52	0.9	0.001	0.999	0.03	4.00E-03		4.00E-03[5]
Plant transfer factor for I	1	Truncated lognormal-n	-3.91	0.9	0.001	0.999	0.73		3.67E-02	3.67E-02[5]
Plant transfer factor for Pu	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999	0.59		1.82E-03	1.82E-03[5]
Plant transfer factor for Am	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999	0.48		1.82E-03	1.82E-03[5]
Plant transfer factor for Cm	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999	-0.02	9.91E-04		9.91E-04[5]
Plant transfer factor for Ac	1	Truncated lognormal-n	-6.91	1.1	0.001	0.999	0.04	9.94E-04		9.94E-04[5]
Plant transfer factor for Np	1	Truncated lognormal-n	-3.91	0.9	0.001	0.999	0.08	2.00E-02		2.00E-02[5]
Plant transfer factor for Pa	1	Truncated lognormal-n	-4.61	1.1	0.001	0.999	-0.03	9.95E-03		9.95E-03[5]
Plant transfer factor for Th	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999	0.04	9.93E-04		9.93E-04[5]
Plant transfer factor for U	1	Truncated lognormal-n	-6.21	0.9	0.001	0.999	0.01	2.00E-03		2.00E-03[5]
Meat transfer factor for C	2	Truncated lognormal-n	-3.47	1.0	0.001	0.999	0.01	3.09E-02		3.09E-02[6]
Meat transfer factor for Zn	2	Truncated lognormal-n	-2.30	0.3	0.001	0.999	0.06	1.00E-01		1.00E-01[6]
Meat transfer factor for Tc	2	Truncated lognormal-n	-9.21	0.7	0.001	0.999	-0.09	9.99E-05		9.99E-05[6]
Meat transfer factor for Ag	2	Truncated lognormal-n	-6.21	0.7	0.001	0.999	0.06	2.00E-03		2.00E-03[6]
Meat transfer factor for I	2	Truncated lognormal-n	-3.22	0.4	0.001	0.999	0.05	3.99E-02		3.99E-02[6]
Meat transfer factor for Pu	2	Truncated lognormal-n	-9.21	0.2	0.001	0.999	0.03	1.00E-04		1.00E-04[6]
Meat transfer factor for Am	2	Truncated lognormal-n	-9.90	0.2	0.001	0.999	-0.05	5.01E-05		5.01E-05[6]
Meat transfer factor for Cm	2	Truncated lognormal-n	-10.82	1.0	0.001	0.999	-0.05	1.99E-05		1.99E-05[6]
Meat transfer factor for Ac	2	Truncated lognormal-n	-10.82	1.0	0.001	0.999	-0.12	1.99E-05		1.99E-05[6]
Meat transfer factor for Np	2	Truncated lognormal-n	-6.91	0.7	0.001	0.999	0.02	9.96E-04		9.96E-04[6]
Meat transfer factor for Pa	2	Truncated lognormal-n	-12.21	1.0	0.001	0.999	0.08	4.95E-06		4.95E-06[6]
Meat transfer factor for Th	2	Truncated lognormal-n	-9.21	1.0	0.001	0.999	0.09	9.97E-05		9.97E-05[6]
Meat transfer factor for U	2	Truncated lognormal-n	-7.13	0.7	0.001	0.999	0.06	9.98E-04		9.98E-04[6]
Milk transfer factor for C	2	Truncated lognormal-n	-4.4	0.9	0.001	0.999	-0.02	1.22E-02		1.22E-02[7]
Milk transfer factor for Zn	2	Truncated lognormal-n	-4.61	0.9	0.001	0.999	0.06	9.91E-03		9.91E-03[7]
Milk transfer factor for Tc	2	Truncated lognormal-n	-6.91	0.7	0.001	0.999	-0.02	9.95E-04		9.95E-04[7]
Milk transfer factor for Ag	2	Truncated lognormal-n	-5.12	0.7	0.001	0.999	0.04	5.95E-03		5.95E-03[7]
Milk transfer factor for I	2	Truncated lognormal-n	-4.61	0.5	0.001	0.999	0.04	9.93E-03		9.93E-03[7]
Milk transfer factor for Pu	2	Truncated lognormal-n	-13.82	0.5	0.001	0.999	-0.12	9.92E-07		9.92E-07[7]
Milk transfer factor for Am	2	Truncated lognormal-n	-13.12	0.7	0.001	0.999	0.04	1.99E-06		1.99E-06[7]
Milk transfer factor for Cm	2	Truncated lognormal-n	-13.12	0.9	0.001	0.999	-0.03	1.99E-06		1.99E-06[7]
Milk transfer factor for Ac	2	Truncated lognormal-n	-13.12	0.9	0.001	0.999	0.05	1.99E-06		1.99E-06[7]

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]				PRCC[3]	50% Quartile	25% or 75% Quartile	Assigned Parameter Value
			1	2	3	4				
Milk transfer factor for Np	2	Truncated lognormal-n	-11.51	0.7	0.001	0.999	0.08	1.00E-05		1.00E-05[7]
Milk transfer factor for Pa	2	Truncated lognormal-n	-12.21	0.9	0.001	0.999	0.13	4.95E-06		4.95E-06[7]
Milk transfer factor for Th	2	Truncated lognormal-n	-12.21	0.9	0.001	0.999	-0.05	4.96E-06		4.96E-06[7]
Milk transfer factor for U	2	Truncated lognormal-n	-7.82	0.6	0.001	0.999	0.00	4.00E-04		4.00E-04[7]
C bioaccumulation factor for fish	2	Lognormal-n	12	1.1			0.09	1.62E+04		1.62E+04[8]
Zn bioaccumulation factor for fish	2	Lognormal-n	6.9	1.1			-0.10	9.88E+02		9.88E+02[8]
Tc bioaccumulation factor for fish	2	Lognormal-n	3.0	1.1			0.03	2.01E+01		2.01E+01[8]
Ag bioaccumulation factor for fish	2	Lognormal-n	1.6	1.1			0.04	4.95E+00		4.95E+00[8]
I bioaccumulation factor for fish	2	Lognormal-n	3.7	1.1			0.68		8.45E+01	8.45E+01[8]
Pu bioaccumulation factor for fish	2	Lognormal-n	3.4	1.1			0.06	2.98E+01		2.98E+01[8]
Am bioaccumulation factor for fish	2	Lognormal-n	3.4	1.1			0.03	2.97E+01		2.97E+01[8]
Cm bioaccumulation factor for fish	2	Lognormal-n	3.4	1.1			-0.21	2.98E+01		2.98E+01[8]
Ac bioaccumulation factor for fish	2	Lognormal-n	2.7	1.1			-0.01	1.48E+01		1.48E+01[8]
Np bioaccumulation factor for fish	2	Lognormal-n	3.4	1.1			0.05	2.98E+01		2.98E+01[8]
Pa bioaccumulation factor for fish	2	Lognormal-n	2.3	1.1			-0.08	9.93E+00		9.93E+00[8]
Th bioaccumulation factor for fish	2	Lognormal-n	4.6	1.1			0.10	9.94E+01		9.94E+01[8]
U bioaccumulation factor for fish	2	Lognormal-n	2.3	1.1			0.09	9.94E+00		9.94E+00[8]

Notes:

[1]1 = high priority parameter, 2 = medium priority parameter

[2]Distribution's Statistical Parameter
Lognormal-n: 1 = mean, 2 = standard deviation
Truncated lognormal-n: 1 = underlying mean value, 2 = underlying standard deviation, 3 = lower quantile, 4 = upper quantile

[3]PRCC = Partial ranked correlation coefficient

[4]cm^3/g

[5]Unit less

[6](pCi/kg)/(pCi/d)

[7](pCi/L)/(pCi/d)

[8](pCi/kg)/(pCi/L)

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Summary : Evaluation of Potential Dose from Discarded Radionuclides

File : DiscDose.RAD

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Part I: Mixture Sums and Single Radionuclide Guidelines

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Ag-110m+D	8.030E-05	8.030E-05	DCF2(2)
B-1	Am-241	4.440E-01	4.440E-01	DCF2(3)
B-1	Am-243+D	4.400E-01	4.400E-01	DCF2(4)
B-1	C-14	2.090E-06	2.090E-06	DCF2(5)
B-1	Cm-243	3.070E-01	3.070E-01	DCF2(6)
B-1	Cm-244	2.480E-01	2.480E-01	DCF2(8)
B-1	Cs-134	4.630E-05	4.630E-05	DCF2(9)
B-1	I-129	1.740E-04	1.740E-04	DCF2(10)
B-1	Ni-59	2.700E-06	2.700E-06	DCF2(11)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(12)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(13)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(14)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(15)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(16)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(17)
B-1	Pu-240	4.290E-01	4.290E-01	DCF2(18)
B-1	Pu-241+D	8.250E-03	8.250E-03	DCF2(19)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(21)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(22)
B-1	Tc-99	8.330E-06	8.330E-06	DCF2(23)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(24)
B-1	Th-229+D	2.160E+00	2.160E+00	DCF2(25)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(26)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(27)
B-1	U-233	1.350E-01	1.350E-01	DCF2(28)
B-1	U-234	1.320E-01	1.320E-01	DCF2(29)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(30)
B-1	U-236	1.250E-01	1.250E-01	DCF2(31)
B-1	Zn-65	2.040E-05	2.040E-05	DCF2(32)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Ag-110m+D	1.080E-05	1.080E-05	DCF3(2)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(3)
D-1	Am-243+D	3.630E-03	3.630E-03	DCF3(4)
D-1	C-14	2.090E-06	2.090E-06	DCF3(5)
D-1	Cm-243	2.510E-03	2.510E-03	DCF3(6)
D-1	Cm-244	2.020E-03	2.020E-03	DCF3(8)
D-1	Cs-134	7.330E-05	7.330E-05	DCF3(9)
D-1	I-129	2.760E-04	2.760E-04	DCF3(10)
D-1	Ni-59	2.100E-07	2.100E-07	DCF3(11)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(12)
D-1	Np-237+D	4.440E-03	4.440E-03	DCF3(13)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(14)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(15)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(16)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(17)
D-1	Pu-240	3.540E-03	3.540E-03	DCF3(18)

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-1	Pu-241+D	6.850E-05	6.850E-05	DCF3(19)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(21)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(22)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(23)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(24)
D-1	Th-229+D	4.030E-03	4.030E-03	DCF3(25)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(26)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(27)
D-1	U-233	2.890E-04	2.890E-04	DCF3(28)
D-1	U-234	2.830E-04	2.830E-04	DCF3(29)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(30)
D-1	U-236	2.690E-04	2.690E-04	DCF3(31)
D-1	Zn-65	1.440E-05	1.440E-05	DCF3(32)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	9.940E-04	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.990E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.990E-06	2.000E-05	RTF(1,3)
D-34				
D-34	Ag-110m+D, plant/soil concentration ratio, dimensionless	4.000E-03	1.500E-01	RTF(2,1)
D-34	Ag-110m+D, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	3.000E-03	RTF(2,2)
D-34	Ag-110m+D, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.950E-03	2.500E-02	RTF(2,3)
D-34				
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(3,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.010E-05	5.000E-05	RTF(3,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.990E-06	2.000E-06	RTF(3,3)
D-34				
D-34	Am-243+D , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(4,1)
D-34	Am-243+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.010E-05	5.000E-05	RTF(4,2)
D-34	Am-243+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.990E-06	2.000E-06	RTF(4,3)
D-34				
D-34	C-14 , plant/soil concentration ratio, dimensionless	1.590E-01	5.500E+00	RTF(5,1)
D-34	C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.090E-02	3.100E-02	RTF(5,2)
D-34	C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.220E-02	1.200E-02	RTF(5,3)
D-34				
D-34	Cm-243 , plant/soil concentration ratio, dimensionless	9.910E-04	1.000E-03	RTF(6,1)
D-34	Cm-243 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.990E-05	2.000E-05	RTF(6,2)
D-34	Cm-243 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.990E-06	2.000E-06	RTF(6,3)
D-34				
D-34	Cm-244 , plant/soil concentration ratio, dimensionless	9.910E-04	1.000E-03	RTF(8,1)
D-34	Cm-244 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.990E-05	2.000E-05	RTF(8,2)
D-34	Cm-244 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.990E-06	2.000E-06	RTF(8,3)
D-34				
D-34	Cs-134 , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(9,1)
D-34	Cs-134 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-02	3.000E-02	RTF(9,2)
D-34	Cs-134 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	8.000E-03	RTF(9,3)
D-34				
D-34	I-129 , plant/soil concentration ratio, dimensionless	3.670E-02	2.000E-02	RTF(10,1)
D-34	I-129 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.990E-02	7.000E-03	RTF(10,2)
D-34	I-129 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.930E-03	1.000E-02	RTF(10,3)

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Ni-59 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(11,1)
D-34	Ni-59 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(11,2)
D-34	Ni-59 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(11,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(12,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(12,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(12,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(13,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.960E-04	1.000E-03	RTF(13,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	5.000E-06	RTF(13,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	9.950E-03	1.000E-02	RTF(14,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	4.950E-06	5.000E-03	RTF(14,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.950E-06	5.000E-06	RTF(14,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(15,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(15,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(15,3)
D-34				
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(16,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(16,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.920E-07	1.000E-06	RTF(16,3)
D-34				
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(17,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(17,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.920E-07	1.000E-06	RTF(17,3)
D-34				
D-34	Pu-240 , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(18,1)
D-34	Pu-240 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(18,2)
D-34	Pu-240 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.920E-07	1.000E-06	RTF(18,3)
D-34				
D-34	Pu-241+D , plant/soil concentration ratio, dimensionless	1.820E-03	1.000E-03	RTF(19,1)
D-34	Pu-241+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(19,2)
D-34	Pu-241+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.920E-07	1.000E-06	RTF(19,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(21,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(22,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,3)
D-34				
D-34	Tc-99 , plant/soil concentration ratio, dimensionless	4.970E+00	5.000E+00	RTF(23,1)
D-34	Tc-99 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.990E-05	1.000E-04	RTF(23,2)
D-34	Tc-99 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.950E-04	1.000E-03	RTF(23,3)
D-34				

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Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	9.930E-04	1.000E-03	RTF(24,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.970E-05	1.000E-04	RTF(24,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.960E-06	5.000E-06	RTF(24,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	9.930E-04	1.000E-03	RTF(25,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.970E-05	1.000E-04	RTF(25,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.960E-06	5.000E-06	RTF(25,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	9.930E-04	1.000E-03	RTF(26,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.970E-05	1.000E-04	RTF(26,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.960E-06	5.000E-06	RTF(26,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	9.930E-04	1.000E-03	RTF(27,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.970E-05	1.000E-04	RTF(27,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.960E-06	5.000E-06	RTF(27,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(28,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.980E-04	3.400E-04	RTF(28,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.000E-04	6.000E-04	RTF(28,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(29,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.980E-04	3.400E-04	RTF(29,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.000E-04	6.000E-04	RTF(29,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(30,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.980E-04	3.400E-04	RTF(30,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.000E-04	6.000E-04	RTF(30,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(31,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	9.980E-04	3.400E-04	RTF(31,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	4.000E-04	6.000E-04	RTF(31,3)
D-34				
D-34	Zn-65 , plant/soil concentration ratio, dimensionless	3.970E-01	4.000E-01	RTF(32,1)
D-34	Zn-65 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-01	1.000E-01	RTF(32,2)
D-34	Zn-65 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	9.910E-03	1.000E-02	RTF(32,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.480E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Ag-110m+D, fish	4.950E+00	5.000E+00	BIOFAC(2,1)
D-5	Ag-110m+D, crustacea and mollusks	7.700E+02	7.700E+02	BIOFAC(2,2)
D-5				
D-5	Am-241 , fish	2.970E+01	3.000E+01	BIOFAC(3,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
D-5				
D-5	Am-243+D , fish	2.970E+01	3.000E+01	BIOFAC(4,1)
D-5	Am-243+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(4,2)
D-5				

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Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-5	C-14 , fish	1.620E+04	5.000E+04	BIOFAC(5,1)
D-5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(5,2)
D-5				
D-5	Cm-243 , fish	2.980E+01	3.000E+01	BIOFAC(6,1)
D-5	Cm-243 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(6,2)
D-5				
D-5	Cm-244 , fish	2.980E+01	3.000E+01	BIOFAC(8,1)
D-5	Cm-244 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(8,2)
D-5				
D-5	Cs-134 , fish	1.990E+03	2.000E+03	BIOFAC(9,1)
D-5	Cs-134 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(9,2)
D-5				
D-5	I-129 , fish	8.450E+01	4.000E+01	BIOFAC(10,1)
D-5	I-129 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(10,2)
D-5				
D-5	Ni-59 , fish	9.900E+01	1.000E+02	BIOFAC(11,1)
D-5	Ni-59 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(11,2)
D-5				
D-5	Ni-63 , fish	9.900E+01	1.000E+02	BIOFAC(12,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(12,2)
D-5				
D-5	Np-237+D , fish	2.980E+01	3.000E+01	BIOFAC(13,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(13,2)
D-5				
D-5	Pa-231 , fish	9.930E+00	1.000E+01	BIOFAC(14,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(14,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(15,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(15,2)
D-5				
D-5	Pu-238 , fish	2.980E+01	3.000E+01	BIOFAC(16,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(16,2)
D-5				
D-5	Pu-239 , fish	2.980E+01	3.000E+01	BIOFAC(17,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(17,2)
D-5				
D-5	Pu-240 , fish	2.980E+01	3.000E+01	BIOFAC(18,1)
D-5	Pu-240 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5				
D-5	Pu-241+D , fish	2.980E+01	3.000E+01	BIOFAC(19,1)
D-5	Pu-241+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(21,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(21,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(22,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(22,2)
D-5				
D-5	Tc-99 , fish	2.010E+01	2.000E+01	BIOFAC(23,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(23,2)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-5	Th-228+D , fish	9.940E+01	1.000E+02	BIOFAC(24,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(24,2)
D-5				
D-5	Th-229+D , fish	9.940E+01	1.000E+02	BIOFAC(25,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(25,2)
D-5				
D-5	Th-230 , fish	9.940E+01	1.000E+02	BIOFAC(26,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(26,2)
D-5				
D-5	Th-232 , fish	9.940E+01	1.000E+02	BIOFAC(27,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(27,2)
D-5				
D-5	U-233 , fish	9.940E+00	1.000E+01	BIOFAC(28,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(28,2)
D-5				
D-5	U-234 , fish	9.940E+00	1.000E+01	BIOFAC(29,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(29,2)
D-5				
D-5	U-235+D , fish	9.940E+00	1.000E+01	BIOFAC(30,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(30,2)
D-5				
D-5	U-236 , fish	9.940E+00	1.000E+01	BIOFAC(31,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(31,2)
D-5				
D-5	Zn-65 , fish	9.880E+02	1.000E+03	BIOFAC(32,1)
D-5	Zn-65 , crustacea and mollusks	1.000E+04	1.000E+04	BIOFAC(32,2)

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
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Site-Specific Parameter Summary

Menu	Parameter		User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)		1.500E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)		3.000E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)		1.380E+01	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):	Ag-110m	3.000E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g):	Am-241	6.650E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g):	C-14	4.700E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g):	Cm-243	6.010E-02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g):	Cm-244	6.010E-02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g):	Cs-134	2.220E-02	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g):	I-129	2.600E-01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g):	Ni-59	2.350E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g):	Ni-63	4.000E-01	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g):	Pu-238	4.500E-02	0.000E+00	---	S1(16)
R012	Initial principal radionuclide (pCi/g):	Pu-239	4.000E-02	0.000E+00	---	S1(17)
R012	Initial principal radionuclide (pCi/g):	Pu-240	4.000E-02	0.000E+00	---	S1(18)
R012	Initial principal radionuclide (pCi/g):	Pu-241	7.250E+00	0.000E+00	---	S1(19)
R012	Initial principal radionuclide (pCi/g):	Tc-99	3.100E-01	0.000E+00	---	S1(23)
R012	Initial principal radionuclide (pCi/g):	Zn-65	6.870E-02	0.000E+00	---	S1(32)
R012	Concentration in groundwater (pCi/L):	Ag-110m	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L):	Am-241	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L):	C-14	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L):	Cm-243	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L):	Cm-244	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L):	Cs-134	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L):	I-129	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L):	Ni-59	not used	0.000E+00	---	W1(11)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(16)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(17)
R012	Concentration in groundwater (pCi/L): Pu-240	not used	0.000E+00	---	W1(18)
R012	Concentration in groundwater (pCi/L): Pu-241	not used	0.000E+00	---	W1(19)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(23)
R012	Concentration in groundwater (pCi/L): Zn-65	not used	0.000E+00	---	W1(32)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.750E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.510E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.630E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	5.360E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	5.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	6.240E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.000E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	4.490E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	2.307E+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)	1.520E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.240E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.550E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.600E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.520E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	7.000E-04	2.000E-02	---	HGWT
R014	Saturated zone b parameter	2.880E+00	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)	MB	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	3.303E+02	2.500E+02	---	UW

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Number of unsaturated zone strata	5	1	---	NS
R015	Unsat. zone 1, thickness (m)	1.220E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.750E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	3.510E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	8.800E-02	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.630E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	5.360E+02	1.000E+01	---	HCUZ(1)
R015	Unsat. zone 2, thickness (m)	1.370E+00	0.000E+00	---	H(2)
R015	Unsat. zone 2, soil density (g/cm**3)	1.950E+00	1.500E+00	---	DENSUZ(2)
R015	Unsat. zone 2, total porosity	2.740E-01	4.000E-01	---	TPUZ(2)
R015	Unsat. zone 2, effective porosity	2.600E-02	2.000E-01	---	EPUZ(2)
R015	Unsat. zone 2, field capacity	2.480E-01	2.000E-01	---	FCUZ(2)
R015	Unsat. zone 2, soil-specific b parameter	4.380E+00	5.300E+00	---	BUZ(2)
R015	Unsat. zone 2, hydraulic conductivity (m/yr)	5.540E+02	1.000E+01	---	HCUZ(2)
R015	Unsat. zone 3, thickness (m)	4.110E+00	0.000E+00	---	H(3)
R015	Unsat. zone 3, soil density (g/cm**3)	1.920E+00	1.500E+00	---	DENSUZ(3)
R015	Unsat. zone 3, total porosity	2.870E-01	4.000E-01	---	TPUZ(3)
R015	Unsat. zone 3, effective porosity	3.700E-02	2.000E-01	---	EPUZ(3)
R015	Unsat. zone 3, field capacity	2.500E-01	2.000E-01	---	FCUZ(3)
R015	Unsat. zone 3, soil-specific b parameter	4.900E+00	5.300E+00	---	BUZ(3)
R015	Unsat. zone 3, hydraulic conductivity (m/yr)	5.170E+00	1.000E+01	---	HCUZ(3)
R015	Unsat. zone 4, thickness (m)	6.100E-01	0.000E+00	---	H(4)
R015	Unsat. zone 4, soil density (g/cm**3)	1.830E+00	1.500E+00	---	DENSUZ(4)
R015	Unsat. zone 4, total porosity	3.170E-01	4.000E-01	---	TPUZ(4)
R015	Unsat. zone 4, effective porosity	2.900E-02	2.000E-01	---	EPUZ(4)
R015	Unsat. zone 4, field capacity	2.870E-01	2.000E-01	---	FCUZ(4)
R015	Unsat. zone 4, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(4)
R015	Unsat. zone 4, hydraulic conductivity (m/yr)	1.046E+03	1.000E+01	---	HCUZ(4)
R015	Unsat. zone 5, thickness (m)	7.320E+00	0.000E+00	---	H(5)
R015	Unsat. zone 5, soil density (g/cm**3)	1.850E+00	1.500E+00	---	DENSUZ(5)
R015	Unsat. zone 5, total porosity	3.130E-01	4.000E-01	---	TPUZ(5)
R015	Unsat. zone 5, effective porosity	5.400E-02	2.000E-01	---	EPUZ(5)
R015	Unsat. zone 5, field capacity	2.580E-01	2.000E-01	---	FCUZ(5)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Unsat. zone 5, soil-specific b parameter	4.900E+00	5.300E+00	---	BUZ(5)
R015	Unsat. zone 5, hydraulic conductivity (m/yr)	1.560E+01	1.000E+01	---	HCUZ(5)
R016	Distribution coefficients for Ag-110m				
R016	Contaminated zone (cm**3/g)	8.880E+02	0.000E+00	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	2.150E+02	0.000E+00	---	DCNUCU(2,1)
R016	Unsaturated zone 2 (cm**3/g)	2.140E+02	0.000E+00	---	DCNUCU(2,2)
R016	Unsaturated zone 3 (cm**3/g)	2.160E+02	0.000E+00	---	DCNUCU(2,3)
R016	Unsaturated zone 4 (cm**3/g)	2.140E+02	0.000E+00	---	DCNUCU(2,4)
R016	Unsaturated zone 5 (cm**3/g)	2.130E+02	0.000E+00	---	DCNUCU(2,5)
R016	Saturated zone (cm**3/g)	2.150E+02	0.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.167E-04	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm**3/g)	1.170E+04	2.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	1.440E+03	2.000E+01	---	DCNUCU(3,1)
R016	Unsaturated zone 2 (cm**3/g)	1.420E+03	2.000E+01	---	DCNUCU(3,2)
R016	Unsaturated zone 3 (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCU(3,3)
R016	Unsaturated zone 4 (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCU(3,4)
R016	Unsaturated zone 5 (cm**3/g)	1.410E+03	2.000E+01	---	DCNUCU(3,5)
R016	Saturated zone (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.922E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for C-14				
R016	Contaminated zone (cm**3/g)	9.570E+01	0.000E+00	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	1.250E+00	0.000E+00	---	DCNUCU(5,1)
R016	Unsaturated zone 2 (cm**3/g)	1.080E+01	0.000E+00	---	DCNUCU(5,2)
R016	Unsaturated zone 3 (cm**3/g)	1.260E+00	0.000E+00	---	DCNUCU(5,3)
R016	Unsaturated zone 4 (cm**3/g)	1.080E+01	0.000E+00	---	DCNUCU(5,4)
R016	Unsaturated zone 5 (cm**3/g)	1.250E+00	0.000E+00	---	DCNUCU(5,5)
R016	Saturated zone (cm**3/g)	1.080E+01	0.000E+00	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.788E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Cm-243				
R016	Contaminated zone (cm**3/g)	2.300E+04	-1.000E+00	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	6.710E+03	-1.000E+00	---	DCNUCU(6,1)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsaturated zone 2 (cm**3/g)	6.680E+03	-1.000E+00	---	DCNUCU(6,2)
R016	Unsaturated zone 3 (cm**3/g)	6.740E+03	-1.000E+00	---	DCNUCU(6,3)
R016	Unsaturated zone 4 (cm**3/g)	6.670E+03	-1.000E+00	---	DCNUCU(6,4)
R016	Unsaturated zone 5 (cm**3/g)	6.670E+03	-1.000E+00	---	DCNUCU(6,5)
R016	Saturated zone (cm**3/g)	6.700E+03	-1.000E+00	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.995E-05	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Cm-244				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCU(8,1)
R016	Unsaturated zone 2 (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCU(8,2)
R016	Unsaturated zone 3 (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCU(8,3)
R016	Unsaturated zone 4 (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCU(8,4)
R016	Unsaturated zone 5 (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCU(8,5)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	1.385E+03	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.313E-04	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Cs-134				
R016	Contaminated zone (cm**3/g)	2.130E+03	1.000E+03	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	4.410E+02	1.000E+03	---	DCNUCU(9,1)
R016	Unsaturated zone 2 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(9,2)
R016	Unsaturated zone 3 (cm**3/g)	4.440E+02	1.000E+03	---	DCNUCU(9,3)
R016	Unsaturated zone 4 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(9,4)
R016	Unsaturated zone 5 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(9,5)
R016	Saturated zone (cm**3/g)	4.400E+02	1.000E+03	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.154E-04	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for I-129				
R016	Contaminated zone (cm**3/g)	1.050E+00	1.000E-01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	4.530E+00	1.000E-01	---	DCNUCU(10,1)
R016	Unsaturated zone 2 (cm**3/g)	4.490E+00	1.000E-01	---	DCNUCU(10,2)
R016	Unsaturated zone 3 (cm**3/g)	4.550E+00	1.000E-01	---	DCNUCU(10,3)
R016	Unsaturated zone 4 (cm**3/g)	4.500E+00	1.000E-01	---	DCNUCU(10,4)
R016	Unsaturated zone 5 (cm**3/g)	4.490E+00	1.000E-01	---	DCNUCU(10,5)
R016	Saturated zone (cm**3/g)	4.520E+00	1.000E-01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.824E-01	ALEACH(10)

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R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for Ni-59				
R016	Contaminated zone (cm**3/g)	1.130E+03	1.000E+03	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	4.210E+02	1.000E+03	---	DCNUCU(11,1)
R016	Unsaturated zone 2 (cm**3/g)	4.200E+02	1.000E+03	---	DCNUCU(11,2)
R016	Unsaturated zone 3 (cm**3/g)	4.230E+02	1.000E+03	---	DCNUCU(11,3)
R016	Unsaturated zone 4 (cm**3/g)	4.190E+02	1.000E+03	---	DCNUCU(11,4)
R016	Unsaturated zone 5 (cm**3/g)	4.210E+02	1.000E+03	---	DCNUCU(11,5)
R016	Saturated zone (cm**3/g)	4.190E+02	1.000E+03	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.061E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(12,1)
R016	Unsaturated zone 2 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(12,2)
R016	Unsaturated zone 3 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(12,3)
R016	Unsaturated zone 4 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(12,4)
R016	Unsaturated zone 5 (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCU(12,5)
R016	Saturated zone (cm**3/g)	1.000E+03	1.000E+03	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.589E-04	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(16,1)
R016	Unsaturated zone 2 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(16,2)
R016	Unsaturated zone 3 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(16,3)
R016	Unsaturated zone 4 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(16,4)
R016	Unsaturated zone 5 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(16,5)
R016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.295E-04	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	3.360E+03	2.000E+03	---	DCNUCC(17)
R016	Unsaturated zone 1 (cm**3/g)	9.470E+02	2.000E+03	---	DCNUCU(17,1)
R016	Unsaturated zone 2 (cm**3/g)	9.470E+02	2.000E+03	---	DCNUCU(17,2)

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R016	Unsaturated zone 3 (cm**3/g)	9.530E+02	2.000E+03	---	DCNUCU(17,3)
R016	Unsaturated zone 4 (cm**3/g)	9.430E+02	2.000E+03	---	DCNUCU(17,4)
R016	Unsaturated zone 5 (cm**3/g)	9.440E+02	2.000E+03	---	DCNUCU(17,5)
R016	Saturated zone (cm**3/g)	9.430E+02	2.000E+03	---	DCNUCS(17)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.366E-04	ALEACH(17)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(17)
R016	Distribution coefficients for Pu-240				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(18)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(18,1)
R016	Unsaturated zone 2 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(18,2)
R016	Unsaturated zone 3 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(18,3)
R016	Unsaturated zone 4 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(18,4)
R016	Unsaturated zone 5 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(18,5)
R016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.295E-04	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
R016	Distribution coefficients for Pu-241				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(19)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(19,1)
R016	Unsaturated zone 2 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(19,2)
R016	Unsaturated zone 3 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(19,3)
R016	Unsaturated zone 4 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(19,4)
R016	Unsaturated zone 5 (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCU(19,5)
R016	Saturated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCS(19)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.295E-04	ALEACH(19)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	6.100E-02	0.000E+00	---	DCNUCC(23)
R016	Unsaturated zone 1 (cm**3/g)	5.050E-01	0.000E+00	---	DCNUCU(23,1)
R016	Unsaturated zone 2 (cm**3/g)	5.000E-01	0.000E+00	---	DCNUCU(23,2)
R016	Unsaturated zone 3 (cm**3/g)	5.090E-01	0.000E+00	---	DCNUCU(23,3)
R016	Unsaturated zone 4 (cm**3/g)	4.990E-01	0.000E+00	---	DCNUCU(23,4)
R016	Unsaturated zone 5 (cm**3/g)	4.990E-01	0.000E+00	---	DCNUCU(23,5)
R016	Saturated zone (cm**3/g)	5.030E-01	0.000E+00	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.172E+00	ALEACH(23)

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R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
R016	Distribution coefficients for Zn-65				
R016	Contaminated zone (cm**3/g)	2.120E+04	0.000E+00	---	DCNUCC(32)
R016	Unsaturated zone 1 (cm**3/g)	1.054E+03	0.000E+00	---	DCNUCU(32,1)
R016	Unsaturated zone 2 (cm**3/g)	1.040E+03	0.000E+00	---	DCNUCU(32,2)
R016	Unsaturated zone 3 (cm**3/g)	1.066E+03	0.000E+00	---	DCNUCU(32,3)
R016	Unsaturated zone 4 (cm**3/g)	1.039E+03	0.000E+00	---	DCNUCU(32,4)
R016	Unsaturated zone 5 (cm**3/g)	1.037E+03	0.000E+00	---	DCNUCU(32,5)
R016	Saturated zone (cm**3/g)	1.049E+03	0.000E+00	---	DCNUCS(32)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.165E-05	ALEACH(32)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(32)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	8.240E+02	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	8.230E+02	2.000E+01	---	DCNUCU(1,1)
R016	Unsaturated zone 2 (cm**3/g)	8.120E+02	2.000E+01	---	DCNUCU(1,2)
R016	Unsaturated zone 3 (cm**3/g)	8.280E+02	2.000E+01	---	DCNUCU(1,3)
R016	Unsaturated zone 4 (cm**3/g)	8.250E+02	2.000E+01	---	DCNUCU(1,4)
R016	Unsaturated zone 5 (cm**3/g)	8.120E+02	2.000E+01	---	DCNUCU(1,5)
R016	Saturated zone (cm**3/g)	8.170E+02	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.569E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Am-243				
R016	Contaminated zone (cm**3/g)	1.170E+04	2.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	1.440E+03	2.000E+01	---	DCNUCU(4,1)
R016	Unsaturated zone 2 (cm**3/g)	1.420E+03	2.000E+01	---	DCNUCU(4,2)
R016	Unsaturated zone 3 (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCU(4,3)
R016	Unsaturated zone 4 (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCU(4,4)
R016	Unsaturated zone 5 (cm**3/g)	1.410E+03	2.000E+01	---	DCNUCU(4,5)
R016	Saturated zone (cm**3/g)	1.430E+03	2.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.922E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	1.710E+01	-1.000E+00	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	1.690E+01	-1.000E+00	---	DCNUCU(13,1)
R016	Unsaturated zone 2 (cm**3/g)	1.680E+01	-1.000E+00	---	DCNUCU(13,2)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsaturated zone 3 (cm**3/g)	1.700E+01	-1.000E+00	---	DCNUCU(13,3)
R016	Unsaturated zone 4 (cm**3/g)	1.680E+01	-1.000E+00	---	DCNUCU(13,4)
R016	Unsaturated zone 5 (cm**3/g)	1.680E+01	-1.000E+00	---	DCNUCU(13,5)
R016	Saturated zone (cm**3/g)	1.690E+01	-1.000E+00	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.660E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	3.790E+02	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	3.750E+02	5.000E+01	---	DCNUCU(14,1)
R016	Unsaturated zone 2 (cm**3/g)	3.710E+02	5.000E+01	---	DCNUCU(14,2)
R016	Unsaturated zone 3 (cm**3/g)	3.780E+02	5.000E+01	---	DCNUCU(14,3)
R016	Unsaturated zone 4 (cm**3/g)	3.710E+02	5.000E+01	---	DCNUCU(14,4)
R016	Unsaturated zone 5 (cm**3/g)	3.700E+02	5.000E+01	---	DCNUCU(14,5)
R016	Saturated zone (cm**3/g)	3.730E+02	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.210E-03	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(15,1)
R016	Unsaturated zone 2 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(15,2)
R016	Unsaturated zone 3 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(15,3)
R016	Unsaturated zone 4 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(15,4)
R016	Unsaturated zone 5 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(15,5)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.582E-03	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(21)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,1)
R016	Unsaturated zone 2 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,2)
R016	Unsaturated zone 3 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,3)
R016	Unsaturated zone 4 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,4)
R016	Unsaturated zone 5 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(21,5)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.542E-03	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(22)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,1)
R016	Unsaturated zone 2 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,2)
R016	Unsaturated zone 3 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,3)
R016	Unsaturated zone 4 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,4)
R016	Unsaturated zone 5 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(22,5)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.542E-03	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(24)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,1)
R016	Unsaturated zone 2 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,3)
R016	Unsaturated zone 4 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,4)
R016	Unsaturated zone 5 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(24,5)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.649E-06	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	5.720E+03	6.000E+04	---	DCNUCC(25)
R016	Unsaturated zone 1 (cm**3/g)	5.810E+03	6.000E+04	---	DCNUCU(25,1)
R016	Unsaturated zone 2 (cm**3/g)	5.810E+03	6.000E+04	---	DCNUCU(25,2)
R016	Unsaturated zone 3 (cm**3/g)	5.880E+03	6.000E+04	---	DCNUCU(25,3)
R016	Unsaturated zone 4 (cm**3/g)	5.770E+03	6.000E+04	---	DCNUCU(25,4)
R016	Unsaturated zone 5 (cm**3/g)	5.780E+03	6.000E+04	---	DCNUCU(25,5)
R016	Saturated zone (cm**3/g)	5.770E+03	6.000E+04	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.023E-05	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(26)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,1)
R016	Unsaturated zone 2 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,3)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsaturated zone 4 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,4)
R016	Unsaturated zone 5 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(26,5)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(26)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.649E-06	ALEACH(26)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(26)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(27)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,1)
R016	Unsaturated zone 2 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,3)
R016	Unsaturated zone 4 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,4)
R016	Unsaturated zone 5 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(27,5)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.649E-06	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCC(28)
R016	Unsaturated zone 1 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(28,1)
R016	Unsaturated zone 2 (cm**3/g)	1.240E+02	5.000E+01	---	DCNUCU(28,2)
R016	Unsaturated zone 3 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(28,3)
R016	Unsaturated zone 4 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(28,4)
R016	Unsaturated zone 5 (cm**3/g)	1.240E+02	5.000E+01	---	DCNUCU(28,5)
R016	Saturated zone (cm**3/g)	1.250E+02	5.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.638E-03	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(29)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,1)
R016	Unsaturated zone 2 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,3)
R016	Unsaturated zone 4 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,4)
R016	Unsaturated zone 5 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(29,5)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.151E-03	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter U-235				
R016	Contaminated zone (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCC(30)
R016	Unsaturated zone 1 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(30,1)
R016	Unsaturated zone 2 (cm**3/g)	1.240E+02	5.000E+01	---	DCNUCU(30,2)
R016	Unsaturated zone 3 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(30,3)
R016	Unsaturated zone 4 (cm**3/g)	1.260E+02	5.000E+01	---	DCNUCU(30,4)
R016	Unsaturated zone 5 (cm**3/g)	1.240E+02	5.000E+01	---	DCNUCU(30,5)
R016	Saturated zone (cm**3/g)	1.250E+02	5.000E+01	---	DCNUCS(30)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.638E-03	ALEACH(30)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
R016	Distribution coefficients for daughter U-236				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(31)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(31,1)
R016	Unsaturated zone 2 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(31,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(31,3)
R016	Unsaturated zone 4 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(31,4)
R016	Unsaturated zone 5 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(31,5)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(31)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	9.151E-03	ALEACH(31)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
R017	Inhalation rate (m**3/yr)	8.570E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.350E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.500E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	3.970E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.670E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	2.050E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	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)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.820E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	4.090E+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	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	4.480E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.750E-01	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

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	2.320E-01	1.500E-01	---	DM
R019	Depth of roots (m)	1.220E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from groundwater	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from groundwater	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from groundwater	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from groundwater	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	1.750E+00	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	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)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-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	5.810E-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	3.280E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	7.000E-07	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	1.000E-10	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	8.000E-01	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	8.894E+01	8.894E+01	---	CO2F

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Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	1024	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

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Summary of Pathway Selections

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

Contaminated Zone Dimensions

Area:	150.00 square meters
Thickness:	0.30 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g

Ag-110m	3.000E-02
Am-241	6.650E-02
C-14	4.700E-01
Cm-243	6.010E-02
Cm-244	6.010E-02
Cs-134	2.220E-02
I-129	2.600E-01
Ni-59	2.350E+00
Ni-63	4.000E-01
Pu-238	4.500E-02
Pu-239	4.000E-02
Pu-240	4.000E-02
Pu-241	7.250E+00
Tc-99	3.100E-01
Zn-65	6.870E-02

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	3.238E-01	1.653E-01	7.090E-02	3.267E-02	2.646E-02	2.199E-02	1.043E-08	1.488E-07
M(t):	1.295E-02	6.610E-03	2.836E-03	1.307E-03	1.058E-03	8.797E-04	4.173E-10	5.953E-09

Maximum TDOSE(t): 2.232E+00 mrem/yr at t = 84.0 ñ 0.2 years

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.402E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	1.114E-03	0.0005	1.259E-04	0.0001	0.000E+00	0.0000	1.113E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	4.899E-04	0.0002
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	1.958E-03	0.0009	1.168E-05	0.0000	0.000E+00	0.0000	5.663E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.534E-05	0.0000
Cm-244	1.550E-07	0.0000	3.121E-06	0.0000	0.000E+00	0.0000	1.628E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.209E-05	0.0000
Cs-134	3.933E-14	0.0000	2.279E-21	0.0000	0.000E+00	0.0000	8.549E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.713E-18	0.0000
I-129	1.391E-17	0.0000	2.060E-21	0.0000	0.000E+00	0.0000	7.206E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.552E-18	0.0000
Ni-59	0.000E+00	0.0000	3.000E-08	0.0000	0.000E+00	0.0000	6.913E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.108E-06	0.0000
Ni-63	0.000E+00	0.0000	6.439E-09	0.0000	0.000E+00	0.0000	1.750E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.804E-07	0.0000
Pu-238	1.637E-06	0.0000	4.346E-05	0.0000	0.000E+00	0.0000	3.827E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.684E-04	0.0001
Pu-239	5.200E-06	0.0000	8.288E-05	0.0000	0.000E+00	0.0000	7.376E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	3.247E-04	0.0001
Pu-240	2.720E-06	0.0000	8.169E-05	0.0000	0.000E+00	0.0000	7.271E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	3.200E-04	0.0001
Pu-241	4.090E-03	0.0018	4.668E-04	0.0002	0.000E+00	0.0000	4.129E-03	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	1.817E-03	0.0008
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
ttttttt	tttttttt	tttttt	tttttttt	tttttt	tttttttt	tttttt	tttttttt	tttttt	tttttttt	tttttt	tttttttt	tttttt	tttttttt	tttttt
Total	7.171E-03	0.0032	8.156E-04	0.0004	0.000E+00	0.0000	7.249E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	3.179E-03	0.0014

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.402E+01 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.843E-03	0.0013
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.072E-03	0.0009
Cm-244	0.000E+00	0.0000	0.000E+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-05	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.942E-14	0.0000
I-129	2.193E+00	0.9821	6.584E-04	0.0003	0.000E+00	0.0000	2.079E-02	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	2.214E+00	0.9918
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.027E-05	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.779E-05	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.962E-04	0.0003
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.150E-03	0.0005
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.132E-03	0.0005
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.050E-02	0.0047
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	2.193E+00	0.9821	6.584E-04	0.0003	0.000E+00	0.0000	2.079E-02	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	2.232E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	1.360E-01	0.4202	7.984E-09	0.0000	0.000E+00	0.0000	3.287E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.098E-07	0.0000
Am-241	1.279E-03	0.0039	1.556E-04	0.0005	0.000E+00	0.0000	1.776E-03	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	6.055E-04	0.0019
C-14	1.272E-07	0.0000	8.975E-07	0.0000	0.000E+00	0.0000	2.286E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.130E-07	0.0000
Cm-243	1.519E-02	0.0469	9.612E-05	0.0003	0.000E+00	0.0000	5.958E-04	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	3.731E-04	0.0012
Cm-244	3.693E-06	0.0000	7.710E-05	0.0002	0.000E+00	0.0000	4.762E-04	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	2.982E-04	0.0009
Cs-134	7.499E-02	0.2316	4.603E-09	0.0000	0.000E+00	0.0000	2.229E-04	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	3.459E-06	0.0000
I-129	1.243E-03	0.0038	1.982E-07	0.0000	0.000E+00	0.0000	8.929E-03	0.0276	0.000E+00	0.0000	0.000E+00	0.0000	1.493E-04	0.0005
Ni-59	0.000E+00	0.0000	3.345E-08	0.0000	0.000E+00	0.0000	9.949E-05	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.235E-06	0.0000
Ni-63	0.000E+00	0.0000	1.322E-08	0.0000	0.000E+00	0.0000	4.636E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.756E-07	0.0000
Pu-238	3.238E-06	0.0000	9.264E-05	0.0003	0.000E+00	0.0000	1.053E-03	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	3.590E-04	0.0011
Pu-239	5.288E-06	0.0000	9.048E-05	0.0003	0.000E+00	0.0000	1.039E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	3.545E-04	0.0011
Pu-240	2.798E-06	0.0000	9.047E-05	0.0003	0.000E+00	0.0000	1.039E-03	0.0032	0.000E+00	0.0000	0.000E+00	0.0000	3.544E-04	0.0011
Pu-241	1.692E-04	0.0005	3.213E-04	0.0010	0.000E+00	0.0000	3.712E-03	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	1.266E-03	0.0039
Tc-99	7.049E-06	0.0000	5.555E-09	0.0000	0.000E+00	0.0000	3.913E-03	0.0121	0.000E+00	0.0000	0.000E+00	0.0000	4.622E-07	0.0000
Zn-65	6.602E-02	0.2039	4.598E-09	0.0000	0.000E+00	0.0000	9.858E-04	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	1.541E-06	0.0000
Total	2.949E-01	0.9110	9.248E-04	0.0029	0.000E+00	0.0000	2.412E-02	0.0745	0.000E+00	0.0000	0.000E+00	0.0000	3.768E-03	0.0116

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.360E-01	0.4202
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.815E-03	0.0118
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.298E-04	0.0007
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.625E-02	0.0502
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.551E-04	0.0026
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.522E-02	0.2323
I-129	0.000E+00	0.0000	0.000E+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-02	0.0319
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.008E-04	0.0003
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.695E-05	0.0001
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.508E-03	0.0047
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.490E-03	0.0046
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.487E-03	0.0046
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.468E-03	0.0169
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.921E-03	0.0121
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.701E-02	0.2070
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	3.238E-01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-110m	4.936E-02	0.2987	2.898E-09	0.0000	0.000E+00	0.0000	1.189E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.850E-07	0.0000
Am-241	1.277E-03	0.0077	1.553E-04	0.0009	0.000E+00	0.0000	1.767E-03	0.0107	0.000E+00	0.0000	0.000E+00	0.0000	6.045E-04	0.0037
C-14	3.131E-17	0.0000	2.202E-16	0.0000	0.000E+00	0.0000	1.432E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.781E-17	0.0000
Cm-243	1.482E-02	0.0897	9.381E-05	0.0006	0.000E+00	0.0000	5.796E-04	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	3.641E-04	0.0022
Cm-244	3.554E-06	0.0000	7.420E-05	0.0004	0.000E+00	0.0000	4.568E-04	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	2.869E-04	0.0017
Cs-134	5.357E-02	0.3242	3.288E-09	0.0000	0.000E+00	0.0000	1.587E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	2.471E-06	0.0000
I-129	8.482E-04	0.0051	1.353E-07	0.0000	0.000E+00	0.0000	6.086E-03	0.0368	0.000E+00	0.0000	0.000E+00	0.0000	1.019E-04	0.0006
Ni-59	0.000E+00	0.0000	3.344E-08	0.0000	0.000E+00	0.0000	9.911E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	1.235E-06	0.0000
Ni-63	0.000E+00	0.0000	1.311E-08	0.0000	0.000E+00	0.0000	4.585E-05	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	5.712E-07	0.0000
Pu-238	3.212E-06	0.0000	9.189E-05	0.0006	0.000E+00	0.0000	1.041E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	3.561E-04	0.0022
Pu-239	5.287E-06	0.0000	9.046E-05	0.0005	0.000E+00	0.0000	1.036E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	3.544E-04	0.0021
Pu-240	2.797E-06	0.0000	9.044E-05	0.0005	0.000E+00	0.0000	1.036E-03	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	3.543E-04	0.0021
Pu-241	3.793E-04	0.0023	3.326E-04	0.0020	0.000E+00	0.0000	3.827E-03	0.0232	0.000E+00	0.0000	0.000E+00	0.0000	1.309E-03	0.0079
Tc-99	8.032E-07	0.0000	6.329E-10	0.0000	0.000E+00	0.0000	4.550E-04	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	5.266E-08	0.0000
Zn-65	2.338E-02	0.1415	1.628E-09	0.0000	0.000E+00	0.0000	3.480E-04	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	5.457E-07	0.0000
ffffffff	fffffffff	ffffff	fffffffff	ffffff	fffffffff	ffffff	fffffffff	ffffff	fffffffff	ffffff	fffffffff	ffffff	fffffffff	ffffff
Total	1.437E-01	0.8693	9.289E-04	0.0056	0.000E+00	0.0000	1.694E-02	0.1025	0.000E+00	0.0000	0.000E+00	0.0000	3.737E-03	0.0226

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.937E-02	0.2987
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.803E-03	0.0230
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.435E-13	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.586E-02	0.0960
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.215E-04	0.0050
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.373E-02	0.3251
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.036E-03	0.0426
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.004E-04	0.0006
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.644E-05	0.0003
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.492E-03	0.0090
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.486E-03	0.0090
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.483E-03	0.0090
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.848E-03	0.0354
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.559E-04	0.0028
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.373E-02	0.1436
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	1.653E-01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+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.
Ag-110m	6.500E-03	0.0917	3.816E-10	0.0000	0.000E+00	0.0000	1.555E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.437E-08	0.0000
Am-241	1.272E-03	0.0179	1.548E-04	0.0022	0.000E+00	0.0000	1.749E-03	0.0247	0.000E+00	0.0000	0.000E+00	0.0000	6.025E-04	0.0085
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	1.412E-02	0.1991	8.936E-05	0.0013	0.000E+00	0.0000	5.485E-04	0.0077	0.000E+00	0.0000	0.000E+00	0.0000	3.469E-04	0.0049
Cm-244	3.290E-06	0.0000	6.871E-05	0.0010	0.000E+00	0.0000	4.203E-04	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	2.657E-04	0.0037
Cs-134	2.733E-02	0.3855	1.678E-09	0.0000	0.000E+00	0.0000	8.045E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	1.261E-06	0.0000
I-129	3.948E-04	0.0056	6.296E-08	0.0000	0.000E+00	0.0000	2.814E-03	0.0397	0.000E+00	0.0000	0.000E+00	0.0000	4.741E-05	0.0007
Ni-59	0.000E+00	0.0000	3.341E-08	0.0000	0.000E+00	0.0000	9.837E-05	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	1.234E-06	0.0000
Ni-63	0.000E+00	0.0000	1.292E-08	0.0000	0.000E+00	0.0000	4.485E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	5.625E-07	0.0000
Pu-238	3.160E-06	0.0000	9.041E-05	0.0013	0.000E+00	0.0000	1.017E-03	0.0143	0.000E+00	0.0000	0.000E+00	0.0000	3.504E-04	0.0049
Pu-239	5.285E-06	0.0001	9.043E-05	0.0013	0.000E+00	0.0000	1.029E-03	0.0145	0.000E+00	0.0000	0.000E+00	0.0000	3.543E-04	0.0050
Pu-240	2.795E-06	0.0000	9.038E-05	0.0013	0.000E+00	0.0000	1.028E-03	0.0145	0.000E+00	0.0000	0.000E+00	0.0000	3.541E-04	0.0050
Pu-241	7.691E-04	0.0108	3.536E-04	0.0050	0.000E+00	0.0000	4.034E-03	0.0569	0.000E+00	0.0000	0.000E+00	0.0000	1.390E-03	0.0196
Tc-99	1.043E-08	0.0000	8.216E-12	0.0000	0.000E+00	0.0000	5.867E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.836E-10	0.0000
Zn-65	2.932E-03	0.0414	2.043E-10	0.0000	0.000E+00	0.0000	4.336E-05	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	6.846E-08	0.0000
†††††††	†††††††††	†††††	†††††††††	†††††	†††††††††	†††††	†††††††††	†††††	†††††††††	†††††	†††††††††	†††††	†††††††††	†††††
Total	5.333E-02	0.7522	9.378E-04	0.0132	0.000E+00	0.0000	1.291E-02	0.1821	0.000E+00	0.0000	0.000E+00	0.0000	3.714E-03	0.0524

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.501E-03	0.0917
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.779E-03	0.0533
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+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	0.2130
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.581E-04	0.0107
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.741E-02	0.3867
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.256E-03	0.0459
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.964E-05	0.0014
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.543E-05	0.0006
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.461E-03	0.0206
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E-03	0.0209
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.475E-03	0.0208
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.547E-03	0.0923
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.879E-06	0.0001
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.975E-03	0.0420
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	7.090E-02	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-110m	5.386E-06	0.0002	3.164E-13	0.0000	0.000E+00	0.0000	1.259E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.020E-11	0.0000
Am-241	1.258E-03	0.0385	1.530E-04	0.0047	0.000E+00	0.0000	1.688E-03	0.0517	0.000E+00	0.0000	0.000E+00	0.0000	5.956E-04	0.0182
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	1.190E-02	0.3644	7.539E-05	0.0023	0.000E+00	0.0000	4.519E-04	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	2.926E-04	0.0090
Cm-244	2.514E-06	0.0001	5.253E-05	0.0016	0.000E+00	0.0000	3.142E-04	0.0096	0.000E+00	0.0000	0.000E+00	0.0000	2.031E-04	0.0062
Cs-134	2.593E-03	0.0794	1.593E-10	0.0000	0.000E+00	0.0000	7.458E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.197E-07	0.0000
I-129	2.717E-05	0.0008	4.332E-09	0.0000	0.000E+00	0.0000	1.890E-04	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	3.262E-06	0.0001
Ni-59	0.000E+00	0.0000	3.331E-08	0.0000	0.000E+00	0.0000	9.577E-05	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	1.230E-06	0.0000
Ni-63	0.000E+00	0.0000	1.224E-08	0.0000	0.000E+00	0.0000	4.150E-05	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	5.330E-07	0.0000
Pu-238	2.986E-06	0.0001	8.541E-05	0.0026	0.000E+00	0.0000	9.382E-04	0.0287	0.000E+00	0.0000	0.000E+00	0.0000	3.310E-04	0.0101
Pu-239	5.279E-06	0.0002	9.033E-05	0.0028	0.000E+00	0.0000	1.003E-03	0.0307	0.000E+00	0.0000	0.000E+00	0.0000	3.539E-04	0.0108
Pu-240	2.789E-06	0.0001	9.017E-05	0.0028	0.000E+00	0.0000	1.001E-03	0.0306	0.000E+00	0.0000	0.000E+00	0.0000	3.532E-04	0.0108
Pu-241	1.861E-03	0.0570	4.118E-04	0.0126	0.000E+00	0.0000	4.570E-03	0.1399	0.000E+00	0.0000	0.000E+00	0.0000	1.612E-03	0.0493
Tc-99	2.601E-15	0.0000	2.049E-18	0.0000	0.000E+00	0.0000	1.429E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.705E-16	0.0000
Zn-65	2.047E-06	0.0001	1.428E-13	0.0000	0.000E+00	0.0000	2.959E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.785E-11	0.0000
Total	1.766E-02	0.5407	9.587E-04	0.0293	0.000E+00	0.0000	1.030E-02	0.3153	0.000E+00	0.0000	0.000E+00	0.0000	3.747E-03	0.1147

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.386E-06	0.0002
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.695E-03	0.1131
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.272E-02	0.3894
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.724E-04	0.0175
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.601E-03	0.0796
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.195E-04	0.0067
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.703E-05	0.0030
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.205E-05	0.0013
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.358E-03	0.0416
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.453E-03	0.0445
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.447E-03	0.0443
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.456E-03	0.2588
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.431E-12	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.077E-06	0.0001
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	3.267E-02	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	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.
Ag-110m	8.433E-15	0.0000	4.969E-22	0.0000	0.000E+00	0.0000	1.841E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.173E-20	0.0000
Am-241	1.217E-03	0.0460	1.481E-04	0.0056	0.000E+00	0.0000	1.521E-03	0.0575	0.000E+00	0.0000	0.000E+00	0.0000	5.764E-04	0.0218
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	7.314E-03	0.2765	4.639E-05	0.0018	0.000E+00	0.0000	2.592E-04	0.0098	0.000E+00	0.0000	0.000E+00	0.0000	1.801E-04	0.0068
Cm-244	1.168E-06	0.0000	2.447E-05	0.0009	0.000E+00	0.0000	1.372E-04	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	9.464E-05	0.0036
Cs-134	3.100E-06	0.0001	1.908E-13	0.0000	0.000E+00	0.0000	8.315E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.434E-10	0.0000
I-129	1.297E-08	0.0000	2.068E-12	0.0000	0.000E+00	0.0000	8.402E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.557E-09	0.0000
Ni-59	0.000E+00	0.0000	3.304E-08	0.0000	0.000E+00	0.0000	8.842E-05	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	1.220E-06	0.0000
Ni-63	0.000E+00	0.0000	1.050E-08	0.0000	0.000E+00	0.0000	3.313E-05	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	4.571E-07	0.0000
Pu-238	2.538E-06	0.0001	7.259E-05	0.0027	0.000E+00	0.0000	7.424E-04	0.0281	0.000E+00	0.0000	0.000E+00	0.0000	2.813E-04	0.0106
Pu-239	5.260E-06	0.0002	9.003E-05	0.0034	0.000E+00	0.0000	9.307E-04	0.0352	0.000E+00	0.0000	0.000E+00	0.0000	3.527E-04	0.0133
Pu-240	2.770E-06	0.0001	8.956E-05	0.0034	0.000E+00	0.0000	9.259E-04	0.0350	0.000E+00	0.0000	0.000E+00	0.0000	3.509E-04	0.0133
Pu-241	3.473E-03	0.1313	4.930E-04	0.0186	0.000E+00	0.0000	5.073E-03	0.1918	0.000E+00	0.0000	0.000E+00	0.0000	1.922E-03	0.0727
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	1.967E-15	0.0000	1.377E-22	0.0000	0.000E+00	0.0000	2.657E-17	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.615E-20	0.0000
Total	1.202E-02	0.4543	9.642E-04	0.0364	0.000E+00	0.0000	9.711E-03	0.3671	0.000E+00	0.0000	0.000E+00	0.0000	3.760E-03	0.1421

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.433E-15	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.463E-03	0.1309
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.800E-03	0.2948
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.575E-04	0.0097
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.108E-06	0.0001
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.855E-08	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.967E-05	0.0034
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.360E-05	0.0013
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.099E-03	0.0415
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.379E-03	0.0521
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.369E-03	0.0518
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.096E-02	0.4144
Tc-99	1.124E-19	0.0000	8.579E-24	0.0000	0.000E+00	0.0000	3.352E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-19	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.993E-15	0.0000
Total	1.124E-19	0.0000	8.579E-24	0.0000	0.000E+00	0.0000	3.352E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.646E-02	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	1.085E-03	0.0493	1.135E-04	0.0052	0.000E+00	0.0000	1.004E-03	0.0456	0.000E+00	0.0000	0.000E+00	0.0000	4.418E-04	0.0201
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	1.324E-03	0.0602	7.372E-06	0.0003	0.000E+00	0.0000	3.592E-05	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	2.862E-05	0.0013
Cm-244	8.878E-08	0.0000	1.702E-06	0.0001	0.000E+00	0.0000	9.407E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	6.599E-06	0.0003
Cs-134	1.805E-16	0.0000	9.755E-24	0.0000	0.000E+00	0.0000	3.660E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.332E-21	0.0000
I-129	3.084E-20	0.0000	4.229E-24	0.0000	0.000E+00	0.0000	1.479E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.185E-21	0.0000
Ni-59	0.000E+00	0.0000	2.759E-08	0.0000	0.000E+00	0.0000	6.358E-05	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	1.019E-06	0.0000
Ni-63	0.000E+00	0.0000	5.273E-09	0.0000	0.000E+00	0.0000	1.433E-05	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	2.296E-07	0.0000
Pu-238	1.437E-06	0.0001	3.534E-05	0.0016	0.000E+00	0.0000	3.111E-04	0.0141	0.000E+00	0.0000	0.000E+00	0.0000	1.369E-04	0.0062
Pu-239	5.176E-06	0.0002	7.653E-05	0.0035	0.000E+00	0.0000	6.811E-04	0.0310	0.000E+00	0.0000	0.000E+00	0.0000	2.998E-04	0.0136
Pu-240	2.705E-06	0.0001	7.523E-05	0.0034	0.000E+00	0.0000	6.696E-04	0.0304	0.000E+00	0.0000	0.000E+00	0.0000	2.947E-04	0.0134
Pu-241	4.024E-03	0.1830	4.230E-04	0.0192	0.000E+00	0.0000	3.741E-03	0.1701	0.000E+00	0.0000	0.000E+00	0.0000	1.646E-03	0.0749
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.443E-03	0.2929	7.327E-04	0.0333	0.000E+00	0.0000	6.530E-03	0.2969	0.000E+00	0.0000	0.000E+00	0.0000	2.856E-03	0.1299

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.644E-03	0.1202
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.396E-03	0.0635
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.780E-05	0.0008
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.808E-16	0.0000
I-129	5.379E-03	0.2446	1.624E-06	0.0001	0.000E+00	0.0000	5.132E-05	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	5.431E-03	0.2470
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.462E-05	0.0029
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.456E-05	0.0007
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.848E-04	0.0220
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-03	0.0483
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.042E-03	0.0474
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.835E-03	0.4472
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	5.379E-03	0.2446	1.624E-06	0.0001	0.000E+00	0.0000	5.132E-05	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	2.199E-02	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.558E-09	0.1494	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.138E-12	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.622E-12	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.261E-10	0.0121	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.673E-12	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.324E-10	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-09	0.1361	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.349E-09	0.1293	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.831E-09	0.5590	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+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	1.043E-08	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.558E-09	0.1494
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.138E-12	0.0003
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.622E-12	0.0005
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.261E-10	0.0121
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.673E-12	0.0006
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.324E-10	0.0127
Pu-239	0.000E+00	0.0000	0.000E+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-09	0.1361
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.349E-09	0.1293
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.831E-09	0.5590
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+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	1.043E-08	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+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

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Ag-110m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Am-241	2.059E-08	0.1384	6.972E-12	0.0000	0.000E+00	0.0000	1.938E-10	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	2.079E-08	0.1397
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cm-244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-134	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
I-129	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-59	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-241	1.268E-07	0.8520	4.296E-11	0.0003	0.000E+00	0.0000	1.194E-09	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	1.280E-07	0.8603
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Zn-65	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.474E-07	0.9903	4.994E-11	0.0003	0.000E+00	0.0000	1.387E-09	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	1.488E-07	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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

Parent (i)	Product (j)	Branch Fraction*	t=	DSR(j,t) (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ag-110m	Ag-110m	1.000E+00		4.535E+00	1.646E+00	2.167E-01	1.795E-04	2.811E-13	4.064E-44	0.000E+00	0.000E+00
Am-241	Am-241	1.000E+00		5.737E-02	5.719E-02	5.682E-02	5.556E-02	5.207E-02	3.976E-02	2.343E-08	0.000E+00
Am-241	Np-237	1.000E+00		1.330E-07	3.993E-07	9.086E-07	2.458E-06	5.346E-06	7.319E-06	4.072E-12	3.120E-07
Am-241	U-233	1.000E+00		1.511E-15	8.635E-15	4.017E-14	3.107E-13	2.025E-12	9.670E-12	2.344E-17	6.652E-10
Am-241	Th-229	1.000E+00		4.055E-18	6.017E-17	6.903E-16	1.731E-14	3.633E-13	7.978E-12	2.547E-18	1.311E-11
Am-241	ΣDSR(j)			5.737E-02	5.719E-02	5.682E-02	5.556E-02	5.207E-02	3.976E-02	2.343E-08	3.126E-07
C-14	C-14	1.000E+00		4.888E-04	3.052E-13	1.838E-32	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cm-243	Cm-243	9.976E-01		2.697E-01	2.632E-01	2.507E-01	2.112E-01	1.294E-01	2.313E-02	9.689E-12	0.000E+00
Cm-243	Pu-239	9.976E-01		5.202E-07	1.559E-06	3.552E-06	9.666E-06	2.136E-05	2.879E-05	4.215E-11	0.000E+00
Cm-243	U-235	9.976E-01		1.572E-15	1.091E-14	5.666E-14	4.754E-13	3.358E-12	2.109E-11	5.832E-19	0.000E+00
Cm-243	Pa-231	9.976E-01		1.230E-20	1.916E-19	2.244E-18	5.626E-17	1.138E-15	2.082E-14	3.347E-19	0.000E+00
Cm-243	Ac-227	9.976E-01		1.707E-22	5.043E-21	1.214E-19	8.592E-18	4.775E-16	2.598E-14	3.836E-20	0.000E+00
Cm-243	ΣDSR(j)			2.697E-01	2.632E-01	2.507E-01	2.112E-01	1.295E-01	2.316E-02	5.184E-11	0.000E+00
Cm-243	Cm-243	2.400E-03		6.489E-04	6.332E-04	6.030E-04	5.081E-04	3.114E-04	5.566E-05	2.331E-14	0.000E+00
Cm-243	Am-243	2.400E-03		4.842E-08	1.438E-07	3.277E-07	9.037E-07	2.088E-06	3.538E-06	3.419E-13	0.000E+00
Cm-243	Pu-239	2.400E-03		4.000E-14	2.777E-13	1.438E-12	1.197E-11	8.263E-11	4.484E-10	2.476E-15	0.000E+00
Cm-243	U-235	2.400E-03		8.891E-23	1.326E-21	1.526E-20	3.856E-19	8.249E-18	1.937E-16	2.007E-23	0.000E+00
Cm-243	Pa-231	2.400E-03		5.449E-28	1.772E-26	4.520E-25	3.387E-23	2.043E-21	1.335E-19	7.475E-24	0.000E+00
Cm-243	Ac-227	2.400E-03		6.517E-30	3.903E-28	1.994E-26	4.184E-24	6.991E-22	1.409E-19	7.759E-25	0.000E+00
Cm-243	ΣDSR(j)			6.490E-04	6.334E-04	6.033E-04	5.090E-04	3.135E-04	5.920E-05	3.677E-13	0.000E+00
Cm-244	Cm-244	1.000E+00		1.423E-02	1.366E-02	1.260E-02	9.491E-03	4.219E-03	2.255E-04	1.083E-13	0.000E+00
Cm-244	Pu-240	1.000E+00		1.907E-06	5.682E-06	1.276E-05	3.314E-05	6.530E-05	7.065E-05	9.344E-11	0.000E+00
Cm-244	U-236	1.000E+00		1.849E-15	1.279E-14	6.540E-14	5.179E-13	3.121E-12	1.139E-11	2.379E-17	0.000E+00
Cm-244	Th-232	1.000E+00		1.798E-25	2.593E-24	2.907E-23	6.982E-22	1.327E-20	2.011E-19	1.154E-24	0.000E+00
Cm-244	Ra-228	1.000E+00		4.093E-25	1.240E-23	2.936E-22	1.831E-20	7.298E-19	2.000E-17	2.221E-23	0.000E+00
Cm-244	Th-228	1.000E+00		3.691E-26	2.151E-24	9.803E-23	1.331E-20	8.544E-19	2.898E-17	4.740E-25	0.000E+00
Cm-244	ΣDSR(j)			1.423E-02	1.367E-02	1.261E-02	9.524E-03	4.284E-03	2.961E-04	9.355E-11	0.000E+00
Cs-134	Cs-134	1.000E+00		3.388E+00	2.420E+00	1.235E+00	1.172E-01	1.400E-04	8.146E-15	0.000E+00	0.000E+00
I-129	I-129	1.000E+00		3.970E-02	2.706E-02	1.252E-02	8.441E-04	3.790E-07	2.089E-02	2.604E-35	0.000E+00
Ni-59	Ni-59	1.000E+00		4.287E-05	4.272E-05	4.240E-05	4.129E-05	3.816E-05	2.750E-05	5.365E-11	0.000E+00
Ni-63	Ni-63	1.000E+00		1.174E-04	1.161E-04	1.136E-04	1.051E-04	8.400E-05	3.641E-05	1.668E-11	0.000E+00

RESRAD, Version 6.21 T« Limit = 0.5 year 01/16/2003 14:43 Page 43
Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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
Pu-238	Pu-238	1.000E+00	3.351E-02	3.316E-02	3.247E-02	3.017E-02	2.442E-02	1.077E-02	2.943E-09	0.000E+00
Pu-238	U-234	1.000E+00	5.432E-09	1.618E-08	3.699E-08	1.031E-07	2.418E-07	3.479E-07	2.094E-13	0.000E+00
Pu-238	Th-230	1.000E+00	2.561E-14	1.745E-13	9.011E-13	7.638E-12	5.593E-11	3.436E-10	7.863E-16	0.000E+00
Pu-238	Ra-226	1.000E+00	2.237E-15	3.347E-14	3.864E-13	9.812E-12	2.114E-10	4.805E-09	2.819E-15	0.000E+00
Pu-238	Pb-210	1.000E+00	1.269E-18	3.343E-17	7.410E-16	4.886E-14	2.516E-12	1.052E-10	2.910E-15	0.000E+00
Pu-238	ΣDSR(j)		3.351E-02	3.316E-02	3.247E-02	3.017E-02	2.442E-02	1.077E-02	2.943E-09	0.000E+00
Pu-239	Pu-239	1.000E+00	3.724E-02	3.715E-02	3.696E-02	3.631E-02	3.447E-02	2.656E-02	3.549E-08	0.000E+00
Pu-239	U-235	1.000E+00	1.650E-10	4.943E-10	1.149E-09	3.401E-09	9.509E-09	2.736E-08	5.399E-16	0.000E+00
Pu-239	Pa-231	1.000E+00	1.759E-15	1.273E-14	6.780E-14	5.935E-13	4.592E-12	3.513E-11	3.540E-16	0.000E+00
Pu-239	Ac-227	1.000E+00	2.939E-17	4.232E-16	4.762E-15	1.172E-13	2.391E-12	4.922E-11	4.168E-17	0.000E+00
Pu-239	ΣDSR(j)		3.724E-02	3.715E-02	3.696E-02	3.631E-02	3.447E-02	2.656E-02	3.549E-08	0.000E+00
Pu-240	Pu-240	1.000E+00	3.718E-02	3.708E-02	3.688E-02	3.619E-02	3.423E-02	2.606E-02	3.373E-08	0.000E+00
Pu-240	U-236	1.000E+00	5.294E-11	1.582E-10	3.645E-10	1.044E-09	2.651E-09	5.132E-09	8.787E-15	0.000E+00
Pu-240	Th-232	1.000E+00	6.744E-21	4.596E-20	2.383E-19	2.054E-18	1.581E-17	1.143E-16	4.758E-22	0.000E+00
Pu-240	Ra-228	1.000E+00	1.938E-20	2.841E-19	3.120E-18	6.692E-17	9.901E-16	1.175E-14	9.196E-21	0.000E+00
Pu-240	Th-228	1.000E+00	2.074E-21	5.909E-20	1.249E-18	5.573E-17	1.238E-15	1.726E-14	1.965E-22	0.000E+00
Pu-240	ΣDSR(j)		3.718E-02	3.708E-02	3.688E-02	3.619E-02	3.423E-02	2.606E-02	3.373E-08	0.000E+00
Pu-241	Pu-241	1.000E+00	7.089E-04	6.739E-04	6.089E-04	4.270E-04	1.546E-04	4.092E-06	3.610E-16	0.000E+00
Pu-241	Am-241	1.000E+00	4.527E-05	1.327E-04	2.941E-04	7.393E-04	1.357E-03	1.352E-03	8.041E-10	0.000E+00
Pu-241	Np-237	1.000E+00	6.928E-11	4.846E-10	2.456E-09	1.839E-08	9.401E-08	2.286E-07	1.397E-13	1.764E-08
Pu-241	U-233	1.000E+00	6.581E-19	7.835E-18	7.664E-17	1.607E-15	2.532E-14	2.417E-13	7.515E-19	1.945E-11
Pu-241	Th-229	1.000E+00	1.295E-21	3.937E-20	9.603E-19	6.723E-17	3.530E-15	1.666E-13	7.459E-20	3.769E-13
Pu-241	ΣDSR(j)		7.542E-04	8.066E-04	9.030E-04	1.166E-03	1.512E-03	1.356E-03	8.043E-10	1.766E-08
Pu-241	Pu-241	2.450E-05	1.737E-08	1.651E-08	1.492E-08	1.046E-08	3.788E-09	1.002E-10	8.844E-21	0.000E+00
Pu-241	Np-237	2.450E-05	3.208E-12	9.436E-12	2.051E-11	4.710E-11	6.389E-11	1.618E-11	6.407E-20	1.599E-23
Pu-241	U-233	2.450E-05	3.655E-20	2.060E-19	9.296E-19	6.466E-18	3.154E-17	6.439E-17	3.784E-23	2.640E-15
Pu-241	Th-229	2.450E-05	9.842E-23	1.446E-21	1.623E-20	3.762E-19	6.382E-18	7.653E-17	9.167E-24	5.643E-17
Pu-241	ΣDSR(j)		1.737E-08	1.652E-08	1.494E-08	1.051E-08	3.852E-09	1.164E-10	7.296E-20	2.697E-15
Tc-99	Tc-99	1.000E+00	1.265E-02	1.471E-03	1.896E-05	4.618E-12	3.735E-19	0.000E+00	0.000E+00	0.000E+00
Zn-65	Zn-65	1.000E+00	9.754E-01	3.454E-01	4.331E-02	3.023E-05	2.902E-14	0.000E+00	0.000E+00	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 6 0.5 yr) daughters.

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
AAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA	AAAAAAAAA
Ag-110m	5.513E+00	1.519E+01	1.154E+02	1.393E+05	8.893E+13	*4.752E+15	*4.752E+15	*4.752E+15
Am-241	4.358E+02	4.371E+02	4.400E+02	4.499E+02	4.801E+02	6.287E+02	1.067E+09	7.996E+07
C-14	5.114E+04	*4.454E+12	*4.454E+12	*4.454E+12	*4.454E+12	*4.454E+12	*4.454E+12	*4.454E+12
Cm-243	9.246E+01	9.475E+01	9.950E+01	1.181E+02	1.926E+02	1.077E+03	4.788E+11	*5.159E+13
Cm-244	1.757E+03	1.829E+03	1.982E+03	2.625E+03	5.835E+03	8.442E+04	2.672E+11	*8.086E+13
Cs-134	7.379E+00	1.033E+01	2.024E+01	2.134E+02	1.786E+05	*1.294E+15	*1.294E+15	*1.294E+15
I-129	6.297E+02	9.238E+02	1.996E+03	2.962E+04	6.596E+07	1.197E+03	*1.766E+08	*1.766E+08
Ni-59	5.831E+05	5.853E+05	5.896E+05	6.055E+05	6.552E+05	9.091E+05	*8.085E+10	*8.085E+10
Ni-63	2.130E+05	2.153E+05	2.201E+05	2.378E+05	2.976E+05	6.866E+05	1.499E+12	*5.916E+13
Pu-238	7.462E+02	7.540E+02	7.699E+02	8.286E+02	1.024E+03	2.320E+03	8.496E+09	*1.711E+13
Pu-239	6.713E+02	6.730E+02	6.764E+02	6.884E+02	7.253E+02	9.411E+02	7.044E+08	*6.212E+10
Pu-240	6.725E+02	6.743E+02	6.779E+02	6.909E+02	7.304E+02	9.595E+02	7.413E+08	*2.277E+11
Pu-241	3.315E+04	3.099E+04	2.769E+04	2.144E+04	1.653E+04	1.843E+04	3.108E+10	1.416E+09
Tc-99	1.977E+03	1.700E+04	1.318E+06	*1.696E+10	*1.696E+10	*1.696E+10	*1.696E+10	*1.696E+10
Zn-65	2.563E+01	7.238E+01	5.773E+02	8.269E+05	8.616E+14	*8.241E+15	*8.241E+15	*8.241E+15
fffffff	fffffffff	fffffffff	fffffffff	fffffffff	fffffffff	fffffffff	fffffffff	fffffffff

*At specific activity limit

RESRAD, Version 6.21 T« Limit = 0.5 year 01/16/2003 14:43 Page 45
Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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 = 84.0 ñ 0.2 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ag-110m	3.000E-02	0.000E+00	4.535E+00	5.513E+00	0.000E+00	*4.752E+15
Am-241	6.650E-02	0.000E+00	5.737E+02	4.358E+02	4.275E-02	5.848E+02
C-14	4.700E-01	0.000E+00	4.888E-04	5.114E+04	0.000E+00	*4.454E+12
Cm-243	6.010E-02	0.000E+00	2.704E-01	9.246E+01	3.447E-02	7.253E+02
Cm-244	6.010E-02	0.000E+00	1.423E-02	1.757E+03	5.265E-04	4.748E+04
Cs-134	2.220E-02	0.000E+00	3.388E+00	7.379E+00	1.776E-12	1.408E+13
I-129	2.600E-01	84.0 ñ 0.2	8.516E+00	2.936E+00	8.516E+00	2.936E+00
Ni-59	2.350E+00	0.000E+00	4.287E-05	5.831E+05	2.990E-05	8.361E+05
Ni-63	4.000E-01	0.000E+00	1.174E-04	2.130E+05	4.446E-05	5.623E+05
Pu-238	4.500E-02	0.000E+00	3.351E-02	7.462E+02	1.325E-02	1.887E+03
Pu-239	4.000E-02	0.000E+00	3.724E-02	6.713E+02	2.876E-02	8.693E+02
Pu-240	4.000E-02	0.000E+00	3.718E-02	6.725E+02	2.829E-02	8.838E+02
Pu-241	7.250E+00	48.00 ñ 0.10	1.572E-03	1.591E+04	1.449E-03	1.726E+04
Tc-99	3.100E-01	11.35 ñ 0.02	1.287E-01	1.942E+02	0.000E+00	*1.696E+10
Zn-65	6.870E-02	0.000E+00	9.754E-01	2.563E+01	0.000E+00	*8.241E+15

*At specific activity limit

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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
Ag-110m	Ag-110m	1.000E+00	1.360E-01	4.937E-02	6.501E-03	5.386E-06	8.433E-15	0.000E+00	0.000E+00	0.000E+00
Am-241	Am-241	1.000E+00	3.815E-03	3.803E-03	3.779E-03	3.695E-03	3.462E-03	2.644E-03	1.558E-09	0.000E+00
Am-241	Pu-241	1.000E+00	3.282E-04	9.619E-04	2.132E-03	5.360E-03	9.841E-03	9.803E-03	5.830E-09	0.000E+00
Am-241	ΣDOSE(j)		4.143E-03	4.765E-03	5.911E-03	9.055E-03	1.330E-02	1.245E-02	7.388E-09	0.000E+00
Np-237	Am-241	1.000E+00	8.842E-09	2.655E-08	6.043E-08	1.635E-07	3.555E-07	4.867E-07	2.708E-13	2.075E-08
Np-237	Pu-241	1.000E+00	5.023E-10	3.513E-09	1.781E-08	1.333E-07	6.816E-07	1.657E-06	1.013E-12	1.279E-07
Np-237	Pu-241	2.450E-05	2.326E-11	6.841E-11	1.487E-10	3.415E-10	4.632E-10	1.173E-10	4.645E-19	1.159E-22
Np-237	ΣDOSE(j)		9.368E-09	3.013E-08	7.838E-08	2.971E-07	1.038E-06	2.144E-06	1.284E-12	1.486E-07
U-233	Am-241	1.000E+00	1.005E-16	5.742E-16	2.672E-15	2.066E-14	1.347E-13	6.431E-13	1.559E-18	4.423E-11
U-233	Pu-241	1.000E+00	4.771E-18	5.680E-17	5.556E-16	1.165E-14	1.836E-13	1.752E-12	5.449E-18	1.410E-10
U-233	Pu-241	2.450E-05	2.650E-19	1.493E-18	6.739E-18	4.688E-17	2.287E-16	4.668E-16	2.744E-22	1.914E-14
U-233	ΣDOSE(j)		1.055E-16	6.325E-16	3.234E-15	3.236E-14	3.185E-13	2.396E-12	7.008E-18	1.853E-10
Th-229	Am-241	1.000E+00	2.696E-19	4.001E-18	4.590E-17	1.151E-15	2.416E-14	5.305E-13	1.694E-19	8.715E-13
Th-229	Pu-241	1.000E+00	9.388E-21	2.854E-19	6.962E-18	4.874E-16	2.559E-14	1.208E-12	5.408E-19	2.732E-12
Th-229	Pu-241	2.450E-05	7.135E-22	1.048E-20	1.176E-19	2.727E-18	4.627E-17	5.549E-16	6.646E-23	4.091E-16
Th-229	ΣDOSE(j)		2.797E-19	4.297E-18	5.298E-17	1.642E-15	4.980E-14	1.739E-12	7.102E-19	3.604E-12
C-14	C-14	1.000E+00	2.298E-04	1.435E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cm-243	Cm-243	9.976E-01	1.621E-02	1.582E-02	1.506E-02	1.269E-02	7.780E-03	1.390E-03	5.823E-13	0.000E+00
Cm-243	Cm-243	2.400E-03	3.900E-05	3.806E-05	3.624E-05	3.054E-05	1.872E-05	3.345E-06	1.401E-15	0.000E+00
Cm-243	ΣDOSE(j)		1.625E-02	1.586E-02	1.510E-02	1.272E-02	7.798E-03	1.394E-03	5.837E-13	0.000E+00
Pu-239	Cm-243	9.976E-01	3.126E-08	9.372E-08	2.135E-07	5.809E-07	1.284E-06	1.730E-06	2.533E-12	0.000E+00
Pu-239	Cm-243	2.400E-03	2.404E-15	1.669E-14	8.644E-14	7.195E-13	4.966E-12	2.695E-11	1.488E-16	0.000E+00
Pu-239	Pu-239	1.000E+00	1.490E-03	1.486L-03	1.478E-03	1.453E-03	1.379E-03	1.063E-03	1.420E-09	0.000E+00
Pu-239	ΣDOSE(j)		1.490E-03	1.486E-03	1.479E-03	1.453E-03	1.380E-03	1.064E-03	1.422E-09	0.000E+00
U-235	Cm-243	9.976E-01	9.446E-17	6.560E-16	3.405E-15	2.857E-14	2.018E-13	1.268E-12	3.505E-20	0.000E+00
U-235	Cm-243	2.400E-03	5.343E-24	7.967E-23	9.170E-22	2.317E-20	4.958E-19	1.164E-17	1.206E-24	0.000E+00
U-235	Pu-239	1.000E+00	6.602E-12	1.977E-11	4.596E-11	1.361E-10	3.804E-10	1.094E-09	2.160E-17	0.000E+00
U-235	ΣDOSE(j)		6.602E-12	1.977E-11	4.597E-11	1.361E-10	3.806E-10	1.096E-09	2.163E-17	0.000E+00
Pa-231	Cm-243	9.976E-01	7.392E-22	1.152E-20	1.349E-19	3.381E-18	6.838E-17	1.251E-15	2.012E-20	0.000E+00
Pa-231	Cm-243	2.400E-03	3.275E-29	1.065E-27	2.716E-26	2.036E-24	1.228E-22	8.025E-21	4.492E-25	0.000E+00
Pa-231	Pu-239	1.000E+00	7.035E-17	5.091E-16	2.712E-15	2.374E-14	1.837E-13	1.405E-12	1.416E-17	0.000E+00
Pa-231	ΣDOSE(j)		7.035E-17	5.091E-16	2.712E-15	2.374E-14	1.838E-13	1.407E-12	1.418E-17	0.000E+00

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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
Ac-227	Cm-243	9.976E-01	1.026E-23	3.031E-22	7.295E-21	5.164E-19	2.870E-17	1.561E-15	2.305E-21	0.000E+00
Ac-227	Cm-243	2.400E-03	3.101E-31	2.346E-29	1.198E-27	2.514E-25	4.202E-23	8.466E-21	4.663E-26	0.000E+00
Ac-227	Pu-239	1.000E+00	1.176E-18	1.693E-17	1.905E-16	4.686E-15	9.565E-14	1.969E-12	1.667E-18	0.000E+00
Ac-227	ΣDOSE(j)		1.176E-18	1.693E-17	1.905E-16	4.687E-15	9.568E-14	1.971E-12	1.670E-18	0.000E+00
Am-243	Cm-243	2.400E-03	2.910E-09	8.645E-09	1.970E-08	5.431E-08	1.255E-07	2.126E-07	2.055E-14	0.000E+00
Cm-244	Cm-244	1.000E+00	8.550E-04	8.211E-04	7.573E-04	5.704E-04	2.536E-04	1.355E-05	6.509E-15	0.000E+00
Pu-240	Cm-244	1.000E+00	1.146E-07	3.415E-07	7.671E-07	1.992E-06	3.925E-06	4.246E-06	5.616E-12	0.000E+00
Pu-240	Pu-240	1.000E+00	1.487E-03	1.483E-03	1.475E-03	1.447E-03	1.369E-03	1.042E-03	1.349E-09	0.000E+00
Pu-240	ΣDOSE(j)		1.487E-03	1.483E-03	1.476E-03	1.449E-03	1.373E-03	1.046E-03	1.355E-09	0.000E+00
U-236	Cm-244	1.000E+00	1.111E-16	7.688E-16	3.931E-15	3.113E-14	1.876E-13	6.844E-13	1.430E-18	0.000E+00
U-236	Pu-240	1.000E+00	2.117E-12	6.327E-12	1.458E-11	4.175E-11	1.061E-10	2.053E-10	3.515E-16	0.000E+00
U-236	ΣDOSE(j)		2.118E-12	6.328E-12	1.458E-11	4.178E-11	1.062E-10	2.060E-10	3.529E-16	0.000E+00
Th-232	Cm-244	1.000E+00	1.081E-26	1.559E-25	1.747E-24	4.196E-23	7.978E-22	1.209E-20	6.934E-26	0.000E+00
Th-232	Pu-240	1.000E+00	2.698E-22	1.839E-21	9.533E-21	8.218E-20	6.324E-19	4.570E-18	1.903E-23	0.000E+00
Th-232	ΣDOSE(j)		2.698E-22	1.839E-21	9.535E-21	8.222E-20	6.332E-19	4.582E-18	1.910E-23	0.000E+00
Ra-228	Cm-244	1.000E+00	2.460E-26	7.450E-25	1.764E-23	1.100E-21	4.386E-20	1.202E-18	1.335E-24	0.000E+00
Ra-228	Pu-240	1.000E+00	7.754E-22	1.137E-20	1.248E-19	2.677E-18	3.960E-17	4.701E-16	3.679E-22	0.000E+00
Ra-228	ΣDOSE(j)		7.754E-22	1.137E-20	1.248E-19	2.678E-18	3.965E-17	4.713E-16	3.692E-22	0.000E+00
Th-228	Cm-244	1.000E+00	2.218E-27	1.293E-25	5.891E-24	7.997E-22	5.135E-20	1.742E-18	2.848E-26	0.000E+00
Th-228	Pu-240	1.000E+00	8.298E-23	2.364E-21	4.995E-20	2.229E-18	4.951E-17	6.904E-16	7.859E-24	0.000E+00
Th-228	ΣDOSE(j)		8.298E-23	2.364E-21	4.996E-20	2.230E-18	4.956E-17	6.921E-16	7.887E-24	0.000E+00
Cs-134	Cs-134	1.000E+00	7.522E-02	5.373E-02	2.741E-02	2.601E-03	3.108E-06	1.808E-16	0.000E+00	0.000E+00
I-129	I-129	1.000E+00	1.032E-02	7.036E-03	3.256E-03	2.195E-04	9.855E-08	5.431E-03	0.000E+00	0.000E+00
Ni-59	Ni-59	1.000E+00	1.008E-04	1.004E-04	9.964E-05	9.703E-05	8.967E-05	6.462E-05	1.261E-10	0.000E+00
Ni-63	Ni-63	1.000E+00	4.695E-05	4.644E-05	4.543E-05	4.205E-05	3.360E-05	1.456E-05	6.673E-12	0.000E+00
Pu-238	Pu-238	1.000E+00	1.508E-03	1.492E-03	1.461E-03	1.358E-03	1.099E-03	4.848E-04	1.324E-10	0.000E+00
U-234	Pu-238	1.000E+00	2.444E-10	7.279E-10	1.664E-09	4.638E-09	1.088E-08	1.566E-08	9.425E-15	0.000E+00
Th-230	Pu-238	1.000E+00	1.153E-15	7.852E-15	4.055E-14	3.437E-13	2.517E-12	1.546E-11	3.538E-17	0.000E+00

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Summary : Evaluation of Potential Dose from Discarded Radionuclides File : DiscDose.RAD

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
Ra-226	Pu-238	1.000E+00	1.007E-16	1.506E-15	1.739E-14	4.415E-13	9.514E-12	2.162E-10	1.269E-16	0.000E+00
Pb-210	Pu-238	1.000E+00	5.713E-20	1.504E-18	3.335E-17	2.199E-15	1.132E-13	4.732E-12	1.310E-16	0.000E+00
Pu-241	Pu-241	1.000E+00	5.140E-03	4.886E-03	4.415E-03	3.096E-03	1.121E-03	2.967E-05	2.617E-15	0.000E+00
Pu-241	Pu-241	2.450E-05	1.259E-07	1.197E-07	1.082E-07	7.584E-08	2.746E-08	7.268E-10	6.412E-20	0.000E+00
Pu-241	ΣDOSE(j)		5.140E-03	4.886E-03	4.415E-03	3.096E-03	1.121E-03	2.967E-05	2.617E-15	0.000E+00
Tc-99	Tc-99	1.000E+00	3.921E-03	4.559E-04	5.879E-06	1.431E-12	1.158E-19	0.000E+00	0.000E+00	0.000E+00
Zn-65	Zn-65	1.000E+00	6.701E-02	2.373E-02	2.975E-03	2.077E-06	1.993E-15	0.000E+00	0.000E+00	0.000E+00

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

Ag-110m	Ag-110m	1.000E+00	3.000E-02	1.089E-02	1.434E-03	1.189E-06	1.867E-15	0.000E+00	0.000E+00	0.000E+00
Am-241	Am-241	1.000E+00	6.650E-02	6.639E-02	6.617E-02	6.542E-02	6.330E-02	5.642E-02	4.062E-02	1.286E-02
Am-241	Pu-241	1.000E+00	0.000E+00	1.134E-02	3.239E-02	9.137E-02	1.786E-01	2.092E-01	1.520E-01	4.813E-02
Am-241	ΣS(j):		6.650E-02	7.773E-02	9.856E-02	1.568E-01	2.419E-01	2.656E-01	1.926E-01	6.099E-02
Np-237	Am-241	1.000E+00	0.000E+00	2.124E-08	6.195E-08	1.875E-07	4.329E-07	6.718E-07	5.268E-07	1.669E-07
Np-237	Pu-241	1.000E+00	0.000E+00	1.836E-09	1.570E-08	1.465E-07	8.208E-07	2.285E-06	1.970E-06	6.245E-07
Np-237	Pu-241	2.450E-05	0.000E+00	5.542E-11	1.543E-10	3.963E-10	5.706E-10	1.639E-10	9.023E-13	7.378E-21
Np-237	ΣS(j):		0.000E+00	2.313E-08	7.781E-08	3.344E-07	1.254E-06	2.957E-06	2.497E-06	7.914E-07
U-233	Am-241	1.000E+00	0.000E+00	4.660E-14	4.106E-13	4.242E-12	3.125E-11	1.875E-10	4.650E-10	3.113E-10
U-233	Pu-241	1.000E+00	0.000E+00	2.690E-15	6.981E-14	2.254E-12	4.190E-11	5.097E-10	1.625E-09	1.156E-09
U-233	Pu-241	2.450E-05	0.000E+00	1.226E-16	1.047E-15	9.721E-15	5.355E-14	1.371E-13	8.198E-14	6.417E-15
U-233	ΣS(j):		0.000E+00	4.941E-14	4.815E-13	6.505E-12	7.320E-11	6.974E-10	2.090E-09	1.467E-09
Th-229	Am-241	1.000E+00	0.000E+00	1.471E-18	3.908E-17	1.370E-15	3.179E-14	7.363E-13	7.311E-12	3.349E-11
Th-229	Pu-241	1.000E+00	0.000E+00	6.377E-20	5.003E-18	5.533E-16	3.323E-14	1.672E-12	2.334E-11	1.193E-10
Th-229	Pu-241	2.450E-05	0.000E+00	3.883E-21	1.008E-19	3.264E-18	6.120E-17	7.729E-16	2.868E-15	4.343E-15
Th-229	ΣS(j):		0.000E+00	1.538E-18	4.419E-17	1.927E-15	6.508E-14	2.410E-12	3.065E-11	1.528E-10
C-14	C-14	1.000E+00	4.700E-01	1.157E-10	7.013E-30	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cm-243	Cm-243	9.976E-01	5.996E-02	5.851E-02	5.573E-02	4.700E-02	2.889E-02	5.257E-03	4.041E-05	1.610E-12
Cm-243	Cm-243	2.400E-03	1.442E-04	1.408E-04	1.341E-04	1.131E-04	6.949E-05	1.265E-05	9.722E-08	3.872E-15
Cm-243	ΣS(j):		6.010E-02	5.865E-02	5.587E-02	4.712E-02	2.896E-02	5.269E-03	4.051E-05	1.613E-12

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Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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
Pu-239	Cm-243	9.976E-01	0.000E+00	1.706E-06	4.995E-06	1.531E-05	3.666E-05	6.400E-05	6.793E-05	6.054E-05
Pu-239	Cm-243	2.400E-03	0.000E+00	1.935E-13	1.713E-12	1.800E-11	1.392E-10	9.907E-10	3.990E-09	1.332E-08
Pu-239	Pu-239	1.000E+00	4.000E-02	3.999E-02	3.998E-02	3.993E-02	3.980E-02	3.934E-02	3.806E-02	3.390E-02
Pu-239	ΣS(j):		4.000E-02	4.000E-02	3.999E-02	3.995E-02	3.984E-02	3.941E-02	3.813E-02	3.396E-02
U-235	Cm-243	9.976E-01	0.000E+00	8.425E-16	7.442E-15	7.753E-14	5.848E-13	3.782E-12	1.134E-11	1.655E-11
U-235	Cm-243	2.400E-03	0.000E+00	6.360E-23	1.693E-21	5.974E-20	1.411E-18	3.454E-17	3.902E-16	2.676E-15
U-235	Pu-239	1.000E+00	0.000E+00	3.932E-11	1.175E-10	3.865E-10	1.117E-09	3.274E-09	6.986E-09	9.317E-09
U-235	ΣS(j):		0.000E+00	3.932E-11	1.175E-10	3.866E-10	1.117E-09	3.277E-09	6.998E-09	9.333E-09
Pa-231	Cm-243	9.976E-01	0.000E+00	5.954E-21	1.584E-19	5.578E-18	1.310E-16	3.137E-15	3.296E-14	1.691E-13
Pa-231	Cm-243	2.400E-03	0.000E+00	3.368E-28	2.696E-26	3.196E-24	2.313E-22	2.001E-20	7.363E-19	1.676E-17
Pa-231	Pu-239	1.000E+00	0.000E+00	4.161E-16	3.732E-15	4.098E-14	3.568E-13	3.533E-12	2.320E-11	9.863E-11
Pa-231	ΣS(j):		0.000E+00	4.161E-16	3.732E-15	4.099E-14	3.569E-13	3.536E-12	2.323E-11	9.879E-11
Ac-227	Cm-243	9.976E-01	0.000E+00	4.715E-23	3.726E-21	4.225E-19	2.704E-17	1.593E-15	2.671E-14	1.617E-13
Ac-227	Cm-243	2.400E-03	0.000E+00	2.135E-30	5.083E-28	1.948E-25	3.888E-23	8.588E-21	5.395E-19	1.541E-17
Ac-227	Pu-239	1.000E+00	0.000E+00	4.381E-18	1.161E-16	4.035E-15	9.157E-14	2.016E-12	1.932E-11	9.454E-11
Ac-227	ΣS(j):		0.000E+00	4.381E-18	1.161E-16	4.035E-15	9.160E-14	2.018E-12	1.935E-11	9.470E-11
Am-243	Cm-243	2.400E-03	0.000E+00	1.338E-08	3.919E-08	1.202E-07	2.878E-07	5.032E-07	5.373E-07	4.899E-07
Cm-244	Cm-244	1.000E+00	6.010E-02	5.782E-02	5.353E-02	4.085E-02	1.888E-02	1.265E-03	5.611E-07	1.030E-18
Pu-240	Cm-244	1.000E+00	0.000E+00	6.250E-06	1.804E-05	5.277E-05	1.126E-04	1.575E-04	1.506E-04	1.191E-04
Pu-240	Pu-240	1.000E+00	4.000E-02	3.999E-02	3.996E-02	3.987E-02	3.960E-02	3.868E-02	3.617E-02	2.860E-02
Pu-240	ΣS(j):		4.000E-02	3.999E-02	3.998E-02	3.992E-02	3.971E-02	3.884E-02	3.632E-02	2.872E-02
U-236	Cm-244	1.000E+00	0.000E+00	9.283E-14	8.093E-13	8.062E-12	5.402E-11	2.533E-10	4.590E-10	3.997E-10
U-236	Pu-240	1.000E+00	0.000E+00	1.179E-09	3.502E-09	1.130E-08	3.090E-08	7.610E-08	1.128E-07	9.602E-08
U-236	ΣS(j):		0.000E+00	1.179E-09	3.503E-09	1.130E-08	3.096E-08	7.635E-08	1.133E-07	9.642E-08
Th-232	Cm-244	1.000E+00	0.000E+00	1.533E-24	4.041E-23	1.379E-21	2.982E-20	5.739E-19	4.418E-18	1.966E-17
Th-232	Pu-240	1.000E+00	0.000E+00	2.912E-20	2.604E-19	2.830E-18	2.395E-17	2.175E-16	1.212E-15	4.888E-15
Th-232	ΣS(j):		0.000E+00	2.912E-20	2.604E-19	2.832E-18	2.398E-17	2.180E-16	1.217E-15	4.907E-15
Ra-228	Cm-244	1.000E+00	0.000E+00	4.515E-26	3.414E-24	3.354E-22	1.534E-20	4.583E-19	4.023E-18	1.850E-17
Ra-228	Pu-240	1.000E+00	0.000E+00	1.135E-21	2.868E-20	8.570E-19	1.405E-17	1.797E-16	1.109E-15	4.601E-15
Ra-228	ΣS(j):		0.000E+00	1.135E-21	2.868E-20	8.573E-19	1.406E-17	1.801E-16	1.113E-15	4.619E-15

RESRAD, Version 6.21 T< Limit = 0.5 year 01/16/2003 14:43 Page 50
Summary : Evaluation of Potential Dose from Discarded Radionuclides
File : DiscDose.RAD

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
Th-228	Cm-244	1.000E+00	0.000E+00	3.101E-27	6.357E-25	1.534E-22	1.158E-20	4.291E-19	3.964E-18	1.845E-17
Th-228	Pu-240	1.000E+00	0.000E+00	9.637E-23	6.474E-21	4.510E-19	1.134E-17	1.705E-16	1.094E-15	4.588E-15
Th-228	&S(j):		0.000E+00	9.637E-23	6.474E-21	4.511E-19	1.135E-17	1.710E-16	1.098E-15	4.607E-15
Cs-134	Cs-134	1.000E+00	2.220E-02	1.586E-02	8.093E-03	7.683E-04	9.202E-07	5.471E-17	0.000E+00	0.000E+00
I-129	I-129	1.000E+00	2.600E-01	1.774E-01	8.257E-02	5.681E-03	2.712E-06	6.449E-18	0.000E+00	0.000E+00
Ni-59	Ni-59	1.000E+00	2.350E+00	2.349E+00	2.347E+00	2.340E+00	2.321E+00	2.254E+00	2.075E+00	1.551E+00
Ni-63	Ni-63	1.000E+00	4.000E-01	3.969E-01	3.909E-01	3.704E-01	3.177E-01	1.856E-01	3.995E-02	1.849E-04
Pu-238	Pu-238	1.000E+00	4.500E-02	4.464E-02	4.392E-02	4.149E-02	3.526E-02	1.996E-02	3.927E-03	1.326E-05
U-234	Pu-238	1.000E+00	0.000E+00	1.265E-07	3.729E-07	1.170E-06	2.953E-06	5.378E-06	2.875E-06	2.352E-08
Th-230	Pu-238	1.000E+00	0.000E+00	5.709E-13	5.079E-12	5.421E-11	4.355E-10	3.296E-09	1.123E-08	1.521E-08
Ra-226	Pu-238	1.000E+00	0.000E+00	8.242E-17	2.198E-15	7.805E-14	1.868E-12	4.580E-11	4.122E-10	9.346E-10
Pb-210	Pu-238	1.000E+00	0.000E+00	6.367E-19	5.035E-17	5.722E-15	3.682E-13	2.167E-11	3.098E-10	8.125E-10
Pu-241	Pu-241	1.000E+00	7.250E+00	6.908E+00	6.271E+00	4.470E+00	1.699E+00	5.753E-02	3.622E-06	7.175E-21
Pu-241	Pu-241	2.450E-05	1.776E-04	1.692E-04	1.536E-04	1.095E-04	4.163E-05	1.409E-06	8.875E-11	1.758E-25
Pu-241	&S(j):		7.250E+00	6.908E+00	6.271E+00	4.470E+00	1.699E+00	5.753E-02	3.622E-06	7.175E-21
Tc-99	Tc-99	1.000E+00	3.100E-01	3.532E-02	4.585E-04	1.143E-10	1.554E-29	0.000E+00	0.000E+00	0.000E+00
Zn-65	Zn-65	1.000E+00	6.870E-02	2.433E-02	3.052E-03	2.133E-06	2.057E-15	0.000E+00	0.000E+00	0.000E+00

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

RESCALC.EXE execution time = 63.62 seconds

RESRAD, Version 6.21 T« Limit = 0.5 year 03/07/2003 10:52 Page 1
Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

RESRAD, Version 6.21 T« Limit = 0.5 year 03/07/2003 10:52 Page 2
Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Co-60	2.190E-04	2.190E-04	DCF2(1)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(2)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(3)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(5)
B-1	Eu-155	4.140E-05	4.140E-05	DCF2(6)
B-1	Fe-55	2.690E-06	2.690E-06	DCF2(7)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(8)
B-1	H-3	6.400E-08	6.400E-08	DCF2(9)
B-1	Mn-54	6.700E-06	6.700E-06	DCF2(10)
B-1	Sr-90+D	1.310E-03	1.310E-03	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Co-60	2.690E-05	2.690E-05	DCF3(1)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(2)
D-1	Eu-152	6.480E-06	6.480E-06	DCF3(3)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3(5)
D-1	Eu-155	1.530E-06	1.530E-06	DCF3(6)
D-1	Fe-55	6.070E-07	6.070E-07	DCF3(7)
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(8)
D-1	H-3	6.400E-08	6.400E-08	DCF3(9)
D-1	Mn-54	2.770E-06	2.770E-06	DCF3(10)
D-1	Sr-90+D	1.530E-04	1.530E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Co-60 , plant/soil concentration ratio, dimensionless	7.900E-02	8.000E-02	RTF(1,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	2.000E-02	RTF(1,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(1,3)
D-34				
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(2,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-02	3.000E-02	RTF(2,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	8.000E-03	RTF(2,3)
D-34				
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(3,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(3,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.990E-05	2.000E-05	RTF(3,3)
D-34				

RESRAD, Version 6.21 T< Limit = 0.5 year 03/07/2003 10:52 Page 3
Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(5,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.990E-05	2.000E-05	RTF(5,3)
D-34				
D-34	Eu-155 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(6,1)
D-34	Eu-155 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(6,2)
D-34	Eu-155 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.990E-05	2.000E-05	RTF(6,3)
D-34				
D-34	Fe-55 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Fe-55 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	2.000E-02	RTF(7,2)
D-34	Fe-55 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	0.000E+00	3.000E-04	RTF(7,3)
D-34				
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.000E-03	2.500E-03	RTF(8,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(8,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.010E-05	2.000E-05	RTF(8,3)
D-34				
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(9,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(9,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(9,3)
D-34				
D-34	Mn-54 , plant/soil concentration ratio, dimensionless	2.990E-01	3.000E-01	RTF(10,1)
D-34	Mn-54 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	5.000E-04	RTF(10,2)
D-34	Mn-54 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	3.000E-04	RTF(10,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	5.890E-01	3.000E-01	RTF(11,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-02	8.000E-03	RTF(11,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Co-60 , fish	2.970E+02	3.000E+02	BIOFAC(1,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(1,2)
D-5				
D-5	Cs-137+D , fish	1.990E+03	2.000E+03	BIOFAC(2,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(2,2)
D-5				
D-5	Eu-152 , fish	4.920E+01	5.000E+01	BIOFAC(3,1)
D-5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)

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Dose Conversion Factor (and Related) Parameter Summary (continued)
File: BRP Dose Modeling

Menu	Parameter	Current Value	Default	Parameter Name
D-5				
D-5	Eu-154 , fish	4.920E+01	5.000E+01	BIOFAC(5,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(5,2)
D-5				
D-5	Eu-155 , fish	4.920E+01	5.000E+01	BIOFAC(6,1)
D-5	Eu-155 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(6,2)
D-5				
D-5	Fe-55 , fish	1.990E+02	2.000E+02	BIOFAC(7,1)
D-5	Fe-55 , crustacea and mollusks	3.200E+03	3.200E+03	BIOFAC(7,2)
D-5				
D-5	Gd-152 , fish	2.440E+01	2.500E+01	BIOFAC(8,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(8,2)
D-5				
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(9,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(9,2)
D-5				
D-5	Mn-54 , fish	4.000E+02	4.000E+02	BIOFAC(10,1)
D-5	Mn-54 , crustacea and mollusks	9.000E+04	9.000E+04	BIOFAC(10,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(11,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(11,2)

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Site-Specific Parameter Summary

Menu	Parameter		User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)		8.094E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)		1.500E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)		1.020E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)		2.422E+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):	Co-60	1.000E+00	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g):	Cs-137	1.000E+00	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g):	Eu-152	1.000E+00	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g):	Eu-154	1.000E+00	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g):	Eu-155	1.000E+00	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g):	Fe-55	1.000E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g):	H-3	1.000E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g):	Mn-54	1.000E+00	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g):	Sr-90	1.000E+00	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L):	Co-60	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L):	Cs-137	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L):	Eu-152	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L):	Eu-154	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L):	Eu-155	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L):	Fe-55	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L):	H-3	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L):	Mn-54	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L):	Sr-90	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)		0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)		not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)		not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)		1.750E+00	1.500E+00	---	DENSCZ

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.510E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.630E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	5.360E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	5.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	7.220E+00	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	6.240E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	8.000E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	4.490E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	2.307E+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)	1.520E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.240E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	3.550E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.600E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.520E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	7.000E-04	2.000E-02	---	HGWT
R014	Saturated zone b parameter	2.880E+00	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)	MB	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	3.303E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	4	1	---	NS
R015	Unsat. zone 1, thickness (m)	1.240E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.950E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	2.740E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.600E-02	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.480E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	4.380E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	5.540E+02	1.000E+01	---	HCUZ(1)
R015	Unsat. zone 2, thickness (m)	4.110E+00	0.000E+00	---	H(2)
R015	Unsat. zone 2, soil density (g/cm**3)	1.920E+00	1.500E+00	---	DENSUZ(2)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Unsat. zone 2, total porosity	2.870E-01	4.000E-01	---	TPUZ(2)
R015	Unsat. zone 2, effective porosity	3.700E-02	2.000E-01	---	EPUZ(2)
R015	Unsat. zone 2, field capacity	2.500E-01	2.000E-01	---	FCUZ(2)
R015	Unsat. zone 2, soil-specific b parameter	4.900E+00	5.300E+00	---	BUZ(2)
R015	Unsat. zone 2, hydraulic conductivity (m/yr)	5.170E+00	1.000E+01	---	HCUZ(2)
R015	Unsat. zone 3, thickness (m)	6.100E-01	0.000E+00	---	H(3)
R015	Unsat. zone 3, soil density (g/cm**3)	1.830E+00	1.500E+00	---	DENSUZ(3)
R015	Unsat. zone 3, total porosity	3.170E-01	4.000E-01	---	TPUZ(3)
R015	Unsat. zone 3, effective porosity	2.900E-02	2.000E-01	---	EPUZ(3)
R015	Unsat. zone 3, field capacity	2.870E-01	2.000E-01	---	FCUZ(3)
R015	Unsat. zone 3, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(3)
R015	Unsat. zone 3, hydraulic conductivity (m/yr)	1.046E+03	1.000E+01	---	HCUZ(3)
R015	Unsat. zone 4, thickness (m)	7.320E+00	0.000E+00	---	H(4)
R015	Unsat. zone 4, soil density (g/cm**3)	1.850E+00	1.500E+00	---	DENSUZ(4)
R015	Unsat. zone 4, total porosity	3.130E-01	4.000E-01	---	TPUZ(4)
R015	Unsat. zone 4, effective porosity	5.400E-02	2.000E-01	---	EPUZ(4)
R015	Unsat. zone 4, field capacity	2.580E-01	2.000E-01	---	FCUZ(4)
R015	Unsat. zone 4, soil-specific b parameter	4.900E+00	5.300E+00	---	BUZ(4)
R015	Unsat. zone 4, hydraulic conductivity (m/yr)	1.560E+01	1.000E+01	---	HCUZ(4)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	1.284E+03	1.000E+03	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.310E+02	1.000E+03	---	DCNUCU(1,1)
R016	Unsaturated zone 2 (cm**3/g)	2.340E+02	1.000E+03	---	DCNUCU(1,2)
R016	Unsaturated zone 3 (cm**3/g)	2.310E+02	1.000E+03	---	DCNUCU(1,3)
R016	Unsaturated zone 4 (cm**3/g)	2.300E+02	1.000E+03	---	DCNUCU(1,4)
R016	Saturated zone (cm**3/g)	2.320E+02	1.000E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.148E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	2.130E+03	1.000E+03	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(2,1)
R016	Unsaturated zone 2 (cm**3/g)	4.440E+02	1.000E+03	---	DCNUCU(2,2)
R016	Unsaturated zone 3 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(2,3)
R016	Unsaturated zone 4 (cm**3/g)	4.380E+02	1.000E+03	---	DCNUCU(2,4)
R016	Saturated zone (cm**3/g)	4.400E+02	1.000E+03	---	DCNUCS(2)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.309E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	7.194E+03	-1.000E+00	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(3,1)
R016	Unsaturated zone 2 (cm**3/g)	8.240E+02	-1.000E+00	---	DCNUCU(3,2)
R016	Unsaturated zone 3 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(3,3)
R016	Unsaturated zone 4 (cm**3/g)	8.080E+02	-1.000E+00	---	DCNUCU(3,4)
R016	Saturated zone (cm**3/g)	8.140E+02	-1.000E+00	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.276E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm**3/g)	7.194E+03	-1.000E+00	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(5,1)
R016	Unsaturated zone 2 (cm**3/g)	8.240E+02	-1.000E+00	---	DCNUCU(5,2)
R016	Unsaturated zone 3 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(5,3)
R016	Unsaturated zone 4 (cm**3/g)	8.080E+02	-1.000E+00	---	DCNUCU(5,4)
R016	Saturated zone (cm**3/g)	8.140E+02	-1.000E+00	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.276E-05	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Eu-155				
R016	Contaminated zone (cm**3/g)	7.194E+03	-1.000E+00	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(6,1)
R016	Unsaturated zone 2 (cm**3/g)	8.240E+02	-1.000E+00	---	DCNUCU(6,2)
R016	Unsaturated zone 3 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(6,3)
R016	Unsaturated zone 4 (cm**3/g)	8.080E+02	-1.000E+00	---	DCNUCU(6,4)
R016	Saturated zone (cm**3/g)	8.140E+02	-1.000E+00	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.276E-05	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Fe-55				
R016	Contaminated zone (cm**3/g)	1.251E+03	1.000E+03	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	2.040E+02	1.000E+03	---	DCNUCU(7,1)
R016	Unsaturated zone 2 (cm**3/g)	2.070E+02	1.000E+03	---	DCNUCU(7,2)
R016	Unsaturated zone 3 (cm**3/g)	2.040E+02	1.000E+03	---	DCNUCU(7,3)
R016	Unsaturated zone 4 (cm**3/g)	2.040E+02	1.000E+03	---	DCNUCU(7,4)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Saturated zone (cm**3/g)	2.050E+02	1.000E+03	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.336E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm**3/g)	4.300E-02	0.000E+00	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	6.000E-02	0.000E+00	---	DCNUCU(9,1)
R016	Unsaturated zone 2 (cm**3/g)	6.000E-02	0.000E+00	---	DCNUCU(9,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E-02	0.000E+00	---	DCNUCU(9,3)
R016	Unsaturated zone 4 (cm**3/g)	4.300E-02	0.000E+00	---	DCNUCU(9,4)
R016	Saturated zone (cm**3/g)	6.000E-02	0.000E+00	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.749E-01	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Mn-54				
R016	Contaminated zone (cm**3/g)	7.330E+02	2.000E+02	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	1.550E+02	2.000E+02	---	DCNUCU(10,1)
R016	Unsaturated zone 2 (cm**3/g)	1.570E+02	2.000E+02	---	DCNUCU(10,2)
R016	Unsaturated zone 3 (cm**3/g)	1.550E+02	2.000E+02	---	DCNUCU(10,3)
R016	Unsaturated zone 4 (cm**3/g)	1.550E+02	2.000E+02	---	DCNUCU(10,4)
R016	Saturated zone (cm**3/g)	1.560E+02	2.000E+02	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.252E-04	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	1.310E+02	3.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	3.100E+01	3.000E+01	---	DCNUCU(11,1)
R016	Unsaturated zone 2 (cm**3/g)	3.140E+01	3.000E+01	---	DCNUCU(11,2)
R016	Unsaturated zone 3 (cm**3/g)	3.100E+01	3.000E+01	---	DCNUCU(11,3)
R016	Unsaturated zone 4 (cm**3/g)	3.100E+01	3.000E+01	---	DCNUCU(11,4)
R016	Saturated zone (cm**3/g)	3.110E+01	3.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.999E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter Gd-152				
R016	Contaminated zone (cm**3/g)	7.194E+03	-1.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(8,1)
R016	Unsaturated zone 2 (cm**3/g)	8.240E+02	-1.000E+00	---	DCNUCU(8,2)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Unsaturated zone 3 (cm**3/g)	8.090E+02	-1.000E+00	---	DCNUCU(8,3)
R016	Unsaturated zone 4 (cm**3/g)	8.080E+02	-1.000E+00	---	DCNUCU(8,4)
R016	Saturated zone (cm**3/g)	8.140E+02	-1.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.276E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R017	Inhalation rate (m**3/yr)	8.570E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.350E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.500E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	3.970E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.670E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	2.050E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	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)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.820E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	4.090E+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	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	4.480E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	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
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	2.320E-01	1.500E-01	---	DM
R019	Depth of roots (m)	1.220E+00	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	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)	1.750E+00	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)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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	5.810E-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	3.280E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	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	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
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)	active
3 -- plant ingestion	active
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

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Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	8094.00 square meters	Co-60	1.000E+00
Thickness:	1.50 meters	Cs-137	1.000E+00
Cover Depth:	0.00 meters	Eu-152	1.000E+00
		Eu-154	1.000E+00
		Eu-155	1.000E+00
		Fe-55	1.000E+00
		H-3	1.000E+00
		Mn-54	1.000E+00
		Sr-90	1.000E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.422E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.785E+01	2.520E+01	2.176E+01	1.471E+01	6.769E+00	1.043E+00	7.926E-03	2.562E-10
M(t):	1.150E+00	1.041E+00	8.986E-01	6.076E-01	2.795E-01	4.306E-02	3.273E-04	1.058E-11

Maximum TDOSE(t): 2.785E+01 mrem/yr at t = 0.000E+00 years

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	7.316E+00	0.2627	1.677E-06	0.0000	0.000E+00	0.0000	2.180E-01	0.0078	0.000E+00	0.0000	0.000E+00	0.0000	4.207E-04	0.0000
Cs-137	1.615E+00	0.0580	2.577E-07	0.0000	0.000E+00	0.0000	2.165E-01	0.0078	0.000E+00	0.0000	0.000E+00	0.0000	8.249E-04	0.0000
Eu-152	3.288E+00	0.1181	1.760E-06	0.0000	0.000E+00	0.0000	1.383E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.054E-04	0.0000
Eu-154	3.562E+00	0.1279	2.248E-06	0.0000	0.000E+00	0.0000	2.011E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.533E-04	0.0000
Eu-155	8.396E-02	0.0030	3.158E-07	0.0000	0.000E+00	0.0000	3.127E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.383E-05	0.0000
Fe-55	0.000E+00	0.0000	1.939E-08	0.0000	0.000E+00	0.0000	5.863E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.934E-06	0.0000
H-3	0.000E+00	0.0000	1.235E-04	0.0000	0.000E+00	0.0000	1.673E-02	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	5.929E-07	0.0000
Mn-54	1.701E+00	0.0611	3.753E-08	0.0000	0.000E+00	0.0000	6.215E-02	0.0022	0.000E+00	0.0000	0.000E+00	0.0000	3.168E-05	0.0000
Sr-90	1.170E-02	0.0004	1.058E-05	0.0000	0.000E+00	0.0000	9.748E+00	0.3501	0.000E+00	0.0000	0.000E+00	0.0000	2.522E-03	0.0001
Total	1.758E+01	0.6312	1.404E-04	0.0000	0.000E+00	0.0000	1.027E+01	0.3686	0.000E+00	0.0000	0.000E+00	0.0000	4.092E-03	0.0001

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

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.534E+00	0.2706
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.833E+00	0.0658
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.289E+00	0.1181
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.564E+00	0.1280
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.430E-02	0.0030
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.758E-05	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.685E-02	0.0006
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E+00	0.0633
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.762E+00	0.3506
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.785E+01	1.0000

*Sum of all water independent and dependent pathways.

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Co-60	6.414E+00	0.2545	1.470E-06	0.0000	0.000E+00	0.0000	1.912E-01	0.0076	0.000E+00	0.0000	0.000E+00	0.0000	3.688E-04	0.0000
Cs-137	1.578E+00	0.0626	2.518E-07	0.0000	0.000E+00	0.0000	2.115E-01	0.0084	0.000E+00	0.0000	0.000E+00	0.0000	8.060E-04	0.0000
Eu-152	3.121E+00	0.1238	1.671E-06	0.0000	0.000E+00	0.0000	1.313E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.000E-04	0.0000
Eu-154	3.292E+00	0.1306	2.077E-06	0.0000	0.000E+00	0.0000	1.859E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.417E-04	0.0000
Eu-155	7.301E-02	0.0029	2.746E-07	0.0000	0.000E+00	0.0000	2.719E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.072E-05	0.0000
Fe-55	0.000E+00	0.0000	1.500E-08	0.0000	0.000E+00	0.0000	4.535E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.911E-06	0.0000
H-3	0.000E+00	0.0000	3.295E-05	0.0000	0.000E+00	0.0000	4.492E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.582E-07	0.0000
Mn-54	7.566E-01	0.0300	1.669E-08	0.0000	0.000E+00	0.0000	2.764E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	1.409E-05	0.0000
Sr-90	1.141E-02	0.0005	1.032E-05	0.0000	0.000E+00	0.0000	9.512E+00	0.3775	0.000E+00	0.0000	0.000E+00	0.0000	2.461E-03	0.0001
Total	1.525E+01	0.6050	4.905E-05	0.0000	0.000E+00	0.0000	9.951E+00	0.3948	0.000E+00	0.0000	0.000E+00	0.0000	3.920E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.605E+00	0.2621
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E+00	0.0711
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.122E+00	0.1239
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.294E+00	0.1307
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.330E-02	0.0029
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.228E-05	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.525E-03	0.0002
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.843E-01	0.0311
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.526E+00	0.3780
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.520E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	4.930E+00	0.2265	1.130E-06	0.0000	0.000E+00	0.0000	1.469E-01	0.0068	0.000E+00	0.0000	0.000E+00	0.0000	2.835E-04	0.0000
Cs-137	1.507E+00	0.0692	2.404E-07	0.0000	0.000E+00	0.0000	2.020E-01	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	7.695E-04	0.0000
Eu-152	2.813E+00	0.1292	1.506E-06	0.0000	0.000E+00	0.0000	1.183E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	9.016E-05	0.0000
Eu-154	2.812E+00	0.1292	1.775E-06	0.0000	0.000E+00	0.0000	1.588E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.210E-04	0.0000
Eu-155	5.521E-02	0.0025	2.076E-07	0.0000	0.000E+00	0.0000	2.056E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.567E-05	0.0000
Fe-55	0.000E+00	0.0000	8.974E-09	0.0000	0.000E+00	0.0000	2.714E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.135E-06	0.0000
H-3	0.000E+00	0.0000	2.338E-06	0.0000	0.000E+00	0.0000	3.187E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.122E-08	0.0000
Mn-54	1.497E-01	0.0069	3.301E-09	0.0000	0.000E+00	0.0000	5.468E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.787E-06	0.0000
Sr-90	1.087E-02	0.0005	9.827E-06	0.0000	0.000E+00	0.0000	9.057E+00	0.4162	0.000E+00	0.0000	0.000E+00	0.0000	2.344E-03	0.0001
Total	1.228E+01	0.5642	1.704E-05	0.0000	0.000E+00	0.0000	9.415E+00	0.4326	0.000E+00	0.0000	0.000E+00	0.0000	3.630E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.077E+00	0.2333
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.710E+00	0.0786
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.814E+00	0.1293
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.814E+00	0.1293
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.543E-02	0.0025
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.128E-05	0.0000
H-3	5.594E-02	0.0026	1.391E-06	0.0000	0.000E+00	0.0000	9.710E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	6.597E-02	0.0030
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.551E-01	0.0071
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.070E+00	0.4168
Total	5.594E-02	0.0026	1.391E-06	0.0000	0.000E+00	0.0000	9.710E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	2.176E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 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.
Co-60	1.963E+00	0.1334	4.499E-07	0.0000	0.000E+00	0.0000	5.850E-02	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	1.129E-04	0.0000
Cs-137	1.282E+00	0.0871	2.045E-07	0.0000	0.000E+00	0.0000	1.718E-01	0.0117	0.000E+00	0.0000	0.000E+00	0.0000	6.544E-04	0.0000
Eu-152	1.954E+00	0.1328	1.046E-06	0.0000	0.000E+00	0.0000	8.221E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.264E-05	0.0000
Eu-154	1.620E+00	0.1101	1.022E-06	0.0000	0.000E+00	0.0000	9.149E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.971E-05	0.0000
Eu-155	2.075E-02	0.0014	7.806E-08	0.0000	0.000E+00	0.0000	7.730E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.891E-06	0.0000
Fe-55	0.000E+00	0.0000	1.487E-09	0.0000	0.000E+00	0.0000	4.496E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.852E-07	0.0000
H-3	0.000E+00	0.0000	2.149E-10	0.0000	0.000E+00	0.0000	2.931E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.032E-12	0.0000
Mn-54	5.151E-04	0.0000	1.136E-11	0.0000	0.000E+00	0.0000	1.882E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.592E-09	0.0000
Sr-90	9.155E-03	0.0006	8.278E-06	0.0000	0.000E+00	0.0000	7.630E+00	0.5185	0.000E+00	0.0000	0.000E+00	0.0000	1.974E-03	0.0001
Total	6.849E+00	0.4655	1.108E-05	0.0000	0.000E+00	0.0000	7.862E+00	0.5343	0.000E+00	0.0000	0.000E+00	0.0000	2.881E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.021E+00	0.1374
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.454E+00	0.0988
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.955E+00	0.1329
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.621E+00	0.1102
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.084E-02	0.0014
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.183E-06	0.0000
H-3	5.270E-06	0.0000	1.303E-10	0.0000	0.000E+00	0.0000	9.109E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.211E-06	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.339E-04	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.641E+00	0.5193
Total	5.270E-06	0.0000	1.303E-10	0.0000	0.000E+00	0.0000	9.109E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.471E+01	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	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.
Co-60	1.413E-01	0.0209	3.238E-08	0.0000	0.000E+00	0.0000	4.210E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	8.122E-06	0.0000
Cs-137	8.066E-01	0.1192	1.287E-07	0.0000	0.000E+00	0.0000	1.081E-01	0.0160	0.000E+00	0.0000	0.000E+00	0.0000	4.119E-04	0.0001
Eu-152	6.906E-01	0.1020	3.697E-07	0.0000	0.000E+00	0.0000	2.905E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.214E-05	0.0000
Eu-154	3.352E-01	0.0495	2.115E-07	0.0000	0.000E+00	0.0000	1.893E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.442E-05	0.0000
Eu-155	1.268E-03	0.0002	4.769E-09	0.0000	0.000E+00	0.0000	4.723E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.599E-07	0.0000
Fe-55	0.000E+00	0.0000	8.746E-12	0.0000	0.000E+00	0.0000	2.645E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.030E-09	0.0000
H-3	0.000E+00	0.0000	4.703E-22	0.0000	0.000E+00	0.0000	6.419E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.257E-24	0.0000
Mn-54	4.722E-11	0.0000	1.041E-18	0.0000	0.000E+00	0.0000	1.725E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.793E-16	0.0000
Sr-90	5.608E-03	0.0008	5.071E-06	0.0000	0.000E+00	0.0000	4.674E+00	0.6905	0.000E+00	0.0000	0.000E+00	0.0000	1.209E-03	0.0002
Total	1.981E+00	0.2926	5.818E-06	0.0000	0.000E+00	0.0000	4.787E+00	0.7072	0.000E+00	0.0000	0.000E+00	0.0000	1.666E-03	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+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.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.455E-01	0.0215
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.151E-01	0.1352
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.909E-01	0.1021
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.354E-01	0.0495
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.273E-03	0.0002
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.049E-08	0.0000
H-3	1.243E-17	0.0000	3.075E-22	0.0000	0.000E+00	0.0000	2.149E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.465E-17	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.894E-11	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.681E+00	0.6915
Total	1.243E-17	0.0000	3.075E-22	0.0000	0.000E+00	0.0000	2.149E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.769E+00	1.0000

*Sum of all water independent and dependent pathways.

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Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

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

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	1.413E-05	0.0000	3.239E-12	0.0000	0.000E+00	0.0000	4.211E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.124E-10	0.0000
Cs-137	1.596E-01	0.1530	2.546E-08	0.0000	0.000E+00	0.0000	2.139E-02	0.0205	0.000E+00	0.0000	0.000E+00	0.0000	8.149E-05	0.0001
Eu-152	1.811E-02	0.0174	9.698E-09	0.0000	0.000E+00	0.0000	7.620E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.807E-07	0.0000
Eu-154	1.350E-03	0.0013	8.519E-10	0.0000	0.000E+00	0.0000	7.623E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.809E-08	0.0000
Eu-155	7.151E-08	0.0000	2.689E-13	0.0000	0.000E+00	0.0000	2.664E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.030E-11	0.0000
Fe-55	0.000E+00	0.0000	1.365E-19	0.0000	0.000E+00	0.0000	4.127E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.289E-17	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	1.009E-03	0.0010	9.124E-07	0.0000	0.000E+00	0.0000	8.410E-01	0.8065	0.000E+00	0.0000	0.000E+00	0.0000	2.176E-04	0.0002
Total	1.801E-01	0.1727	9.484E-07	0.0000	0.000E+00	0.0000	8.623E-01	0.8270	0.000E+00	0.0000	0.000E+00	0.0000	2.997E-04	0.0003

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

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.455E-05	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.810E-01	0.1736
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-02	0.0174
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.351E-03	0.0013
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.180E-08	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.758E-16	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.422E-01	0.8077
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	1.043E+00	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	5.270E-17	0.0000	1.208E-23	0.0000	0.000E+00	0.0000	1.544E-18	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.030E-21	0.0000
Cs-137	1.557E-03	0.1965	2.484E-10	0.0000	0.000E+00	0.0000	2.052E-04	0.0259	0.000E+00	0.0000	0.000E+00	0.0000	7.952E-07	0.0001
Eu-152	5.500E-07	0.0001	2.945E-13	0.0000	0.000E+00	0.0000	2.275E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-11	0.0000
Eu-154	1.939E-10	0.0000	1.224E-16	0.0000	0.000E+00	0.0000	1.077E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.345E-15	0.0000
Eu-155	5.187E-20	0.0000	1.951E-25	0.0000	0.000E+00	0.0000	1.900E-22	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.472E-23	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	7.509E-06	0.0009	6.790E-09	0.0000	0.000E+00	0.0000	6.153E-03	0.7763	0.000E+00	0.0000	0.000E+00	0.0000	1.619E-06	0.0002
Total	1.565E-03	0.1975	7.039E-09	0.0000	0.000E+00	0.0000	6.359E-03	0.8022	0.000E+00	0.0000	0.000E+00	0.0000	2.415E-06	0.0003

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

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.424E-17	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.763E-03	0.2224
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.502E-07	0.0001
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.940E-10	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.208E-20	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.163E-03	0.7775
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	7.926E-03	1.0000

*Sum of all water independent and dependent pathways.

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

Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	1.429E-10	0.5579	2.281E-17	0.0000	0.000E+00	0.0000	7.845E-12	0.0306	0.000E+00	0.0000	0.000E+00	0.0000	7.300E-14	0.0003
Eu-152	8.476E-23	0.0000	6.757E-17	0.0000	0.000E+00	0.0000	4.913E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.142E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	2.670E-13	0.0010	2.414E-16	0.0000	0.000E+00	0.0000	9.112E-11	0.3557	0.000E+00	0.0000	0.000E+00	0.0000	5.758E-14	0.0002
Total	1.432E-10	0.5590	3.318E-16	0.0000	0.000E+00	0.0000	9.897E-11	0.3863	0.000E+00	0.0000	0.000E+00	0.0000	1.307E-13	0.0005

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

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-														
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.509E-10	0.5888
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.503E-16	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Fe-55	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Mn-54	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Sr-90	1.285E-11	0.0501	2.044E-14	0.0001	0.000E+00	0.0000	1.026E-12	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	1.053E-10	0.4112
Total	1.285E-11	0.0501	2.044E-14	0.0001	0.000E+00	0.0000	1.026E-12	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	2.562E-10	1.0000

*Sum of all water independent and dependent pathways.

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

Parent (i)	Product (j)	Branch Fraction*	t=	DSR(j,t) (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Co-60	Co-60	1.000E+00		7.534E+00	6.605E+00	5.077E+00	2.021E+00	1.455E-01	1.455E-05	5.424E-17	0.000E+00
Cs-137	Cs-137	1.000E+00		1.833E+00	1.791E+00	1.710E+00	1.454E+00	9.151E-01	1.810E-01	1.763E-03	1.509E-10
Eu-152	Eu-152	7.208E-01		2.371E+00	2.251E+00	2.028E+00	1.409E+00	4.980E-01	1.306E-02	3.966E-07	6.111E-23
Eu-152	Eu-152	2.792E-01		9.183E-01	8.718E-01	7.856E-01	5.459E-01	1.929E-01	5.060E-03	1.536E-07	2.367E-23
Eu-152	Gd-152	2.792E-01		3.517E-17	1.031E-16	2.288E-16	5.788E-16	1.094E-15	1.367E-15	1.351E-15	6.503E-16
Eu-152	ΣDSR(j)			9.183E-01	8.718E-01	7.856E-01	5.459E-01	1.929E-01	5.060E-03	1.536E-07	6.503E-16
Eu-154	Eu-154	1.000E+00		3.564E+00	3.294E+00	2.814E+00	1.621E+00	3.354E-01	1.351E-03	1.940E-10	2.178E-34
Eu-155	Eu-155	1.000E+00		8.430E-02	7.330E-02	5.543E-02	2.084E-02	1.273E-03	7.180E-08	5.208E-20	0.000E+00
Fe-55	Fe-55	1.000E+00		6.758E-05	5.228E-05	3.128E-05	5.183E-06	3.049E-08	4.758E-16	2.323E-38	0.000E+00
H-3	H-3	1.000E+00		1.685E-02	4.525E-03	6.597E-02	6.211E-06	1.465E-17	0.000E+00	0.000E+00	0.000E+00
Mn-54	Mn-54	1.000E+00		1.763E+00	7.843E-01	1.551E-01	5.339E-04	4.894E-11	1.141E-35	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00		9.762E+00	9.526E+00	9.070E+00	7.641E+00	4.681E+00	8.422E-01	6.163E-03	1.053E-10

*Branch Fraction is the cumulative factor for the j'th principal radionuclide daughter: CUMBRF(j) = BRF(1)*BRF(2)* ... BRF(j).
The DSR includes contributions from associated (half-life ó 0.5 yr) daughters.

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Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.422E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Co-60	3.214E+00	3.666E+00	4.770E+00	1.198E+01	1.665E+02	1.664E+06	*1.131E+15	*1.131E+15
Cs-137	1.321E+01	1.352E+01	1.417E+01	1.666E+01	2.646E+01	1.338E+02	1.374E+04	1.605E+11
Eu-152	7.363E+00	7.756E+00	8.607E+00	1.239E+01	3.505E+01	1.336E+03	4.402E+07	*1.765E+14
Eu-154	6.795E+00	7.352E+00	8.607E+00	1.494E+01	7.221E+01	1.793E+04	1.248E+11	*2.639E+14
Eu-155	2.873E+02	3.304E+02	4.369E+02	1.162E+03	1.902E+04	3.373E+08	*4.651E+14	*4.651E+14
Fe-55	3.584E+05	4.633E+05	7.743E+05	4.673E+06	7.944E+08	*2.409E+15	*2.409E+15	*2.409E+15
H-3	1.437E+03	5.352E+03	3.671E+02	3.899E+06	*9.594E+15	*9.594E+15	*9.594E+15	*9.594E+15
Mn-54	1.373E+01	3.088E+01	1.561E+02	4.536E+04	4.948E+11	*7.744E+15	*7.744E+15	*7.744E+15
Sr-90	2.481E+00	2.542E+00	2.670E+00	3.170E+00	5.174E+00	2.876E+01	3.930E+03	2.299E+11

*At specific activity limit

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

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Co-60	1.000E+00	0.000E+00	7.534E+00	3.214E+00	7.534E+00	3.214E+00
Cs-137	1.000E+00	0.000E+00	1.833E+00	1.321E+01	1.833E+00	1.321E+01
Eu-152	1.000E+00	0.000E+00	3.289E+00	7.363E+00	3.289E+00	7.363E+00
Eu-154	1.000E+00	0.000E+00	3.564E+00	6.795E+00	3.564E+00	6.795E+00
Eu-155	1.000E+00	0.000E+00	8.430E-02	2.873E+02	8.430E-02	2.873E+02
Fe-55	1.000E+00	0.000E+00	6.758E-05	3.584E+05	6.758E-05	3.584E+05
H-3	1.000E+00	2.883 ñ 0.006	7.401E-02	3.272E+02	1.685E-02	1.437E+03
Mn-54	1.000E+00	0.000E+00	1.763E+00	1.373E+01	1.763E+00	1.373E+01
Sr-90	1.000E+00	0.000E+00	9.762E+00	2.481E+00	9.762E+00	2.481E+00

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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
Co-60	Co-60	1.000E+00	7.534E+00	6.605E+00	5.077E+00	2.021E+00	1.455E-01	1.455E-05	5.424E-17	0.000E+00
Cs-137	Cs-137	1.000E+00	1.833E+00	1.791E+00	1.710E+00	1.454E+00	9.151E-01	1.810E-01	1.763E-03	1.509E-10
Eu-152	Eu-152	7.208E-01	2.371E+00	2.251E+00	2.028E+00	1.409E+00	4.980E-01	1.306E-02	3.966E-07	6.111E-23
Eu-152	Eu-152	2.792E-01	9.183E-01	8.718E-01	7.856E-01	5.459E-01	1.929E-01	5.060E-03	1.536E-07	2.367E-23
Eu-152	&DOSE(j)		3.289E+00	3.122E+00	2.814E+00	1.955E+00	6.909E-01	1.812E-02	5.502E-07	8.478E-23
Gd-152	Eu-152	2.792E-01	3.517E-17	1.031E-16	2.288E-16	5.788E-16	1.094E-15	1.367E-15	1.351E-15	6.503E-16
Eu-154	Eu-154	1.000E+00	3.564E+00	3.294E+00	2.814E+00	1.621E+00	3.354E-01	1.351E-03	1.940E-10	0.000E+00
Eu-155	Eu-155	1.000E+00	8.430E-02	7.330E-02	5.543E-02	2.084E-02	1.273E-03	7.180E-08	5.208E-20	0.000E+00
Fe-55	Fe-55	1.000E+00	6.758E-05	5.228E-05	3.128E-05	5.183E-06	3.049E-08	4.758E-16	0.000E+00	0.000E+00
H-3	H-3	1.000E+00	1.685E-02	4.525E-03	6.597E-02	6.211E-06	1.465E-17	0.000E+00	0.000E+00	0.000E+00
Mn-54	Mn-54	1.000E+00	1.763E+00	7.843E-01	1.551E-01	5.339E-04	4.894E-11	0.000E+00	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00	9.762E+00	9.526E+00	9.070E+00	7.641E+00	4.681E+00	8.422E-01	6.163E-03	1.053E-10

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

RESRAD, Version 6.21 T« Limit = 0.5 year 03/07/2003 10:52 Page 27
Summary : Derivation of Surface Soil DCGL Values Using a 1.5m CZ Thickness
File : DCGL10.RAD

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
Co-60	Co-60	1.000E+00	1.000E+00	8.767E-01	6.739E-01	2.683E-01	1.931E-02	1.931E-06	7.203E-18	0.000E+00
Cs-137	Cs-137	1.000E+00	1.000E+00	9.771E-01	9.329E-01	7.934E-01	4.994E-01	9.879E-02	9.640E-04	8.850E-11
Eu-152	Eu-152	7.208E-01	7.208E-01	6.843E-01	6.167E-01	4.285E-01	1.514E-01	3.972E-03	1.206E-07	1.859E-23
Eu-152	Eu-152	2.792E-01	2.792E-01	2.650E-01	2.389E-01	1.660E-01	5.865E-02	1.538E-03	4.671E-08	7.202E-24
Eu-152	aS(j):		1.000E+00	9.493E-01	8.555E-01	5.945E-01	2.101E-01	5.510E-03	1.673E-07	2.580E-23
Gd-152	Eu-152	2.792E-01	0.000E+00	1.746E-15	4.977E-15	1.397E-14	2.721E-14	3.423E-14	3.433E-14	3.402E-14
Eu-154	Eu-154	1.000E+00	1.000E+00	9.242E-01	7.895E-01	4.548E-01	9.410E-02	3.790E-04	5.444E-11	6.117E-35
Eu-155	Eu-155	1.000E+00	1.000E+00	8.696E-01	6.575E-01	2.472E-01	1.510E-02	8.517E-07	6.178E-19	0.000E+00
Fe-55	Fe-55	1.000E+00	1.000E+00	7.735E-01	4.628E-01	7.669E-02	4.511E-04	7.040E-12	3.489E-34	0.000E+00
H-3	H-3	1.000E+00	1.000E+00	2.669E-01	1.895E-02	1.747E-06	3.856E-18	0.000E+00	0.000E+00	0.000E+00
Mn-54	Mn-54	1.000E+00	1.000E+00	4.447E-01	8.797E-02	3.028E-04	2.775E-11	6.472E-36	0.000E+00	0.000E+00
Sr-90	Sr-90	1.000E+00	1.000E+00	9.758E-01	9.291E-01	7.827E-01	4.795E-01	8.627E-02	6.420E-04	2.283E-11

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

RESCALC.EXE execution time = 1.56 seconds

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]			
			1	2	3	4
Distribution coefficient for H	1	Truncated lognormal-n	-2.81	0.5	0.001	0.999
Distribution coefficient for Mn	1	Truncated lognormal-n	5.06	2.29	0.001	0.999
Distribution coefficient for Fe	1	Truncated lognormal-n	5.34	2.67	0.001	0.999
Distribution coefficient for Co	1	Truncated lognormal-n	5.46	2.53	0.001	0.999
Distribution coefficient for Sr	1	Truncated lognormal-n	3.45	2.12	0.001	0.999
Distribution coefficient for Cs	1	Truncated lognormal-n	6.10	2.33	0.001	0.999
Distribution coefficient for Eu	1	Truncated lognormal-n	6.72	3.22	0.001	0.999
Distribution coefficient for Gd	1	Truncated lognormal-n	6.72	3.22	0.001	0.999
Density of contaminated zone	1	Truncated normal	1.52	0.230	0.001	0.999
Density of saturated zone	1	Truncated normal	1.52	0.230	0.001	0.999
Saturated zone total porosity	1	Truncated normal	0.425	0.0867	0.001	0.999
Saturated zone effective porosity	1	Truncated normal	0.355	0.0906	0.001	0.999
Saturated zone hydraulic conductivity	1	Bounded lognormal-n	2.3	2.11	0.004	9250
Unsaturated zone 1 thickness	1	Bounded lognormal-n	2.296	1.276	0.18	320
Unsaturated zone 2 thickness	1	Bounded lognormal-n	2.296	1.276	0.18	320
Unsaturated zone 3 thickness	1	Bounded lognormal-n	2.296	1.276	0.18	320
Unsaturated zone 4 thickness	1	Bounded lognormal-n	2.296	1.276	0.18	320
Unsaturated zone 5 thickness	1	Bounded lognormal-n	2.296	1.276	0.18	320
Depth of roots	1	Uniform	0.3	4.0	-	-
Plant transfer factor for H	1	Truncated lognormal-n	1.57	1.1	0.001	0.999
Plant transfer factor for Mn	1	Truncated lognormal-n	-1.20	0.9	0.001	0.999
Plant transfer factor for Fe	1	Truncated lognormal-n	-6.91	0.9	0.001	0.999
Plant transfer factor for Co	1	Truncated lognormal-n	-2.53	0.9	0.001	0.999
Plant transfer factor for Sr	1	Truncated lognormal-n	-1.20	1.0	0.001	0.999
Plant transfer factor for Cs	1	Truncated lognormal-n	-3.22	1.0	0.001	0.999
Plant transfer factor for Eu	1	Truncated lognormal-n	-6.21	1.1	0.001	0.999
Plant transfer factor for Gd	1	Truncated lognormal-n	-6.21	1.1	0.001	0.999
Concentration of H-3	2	NR	-	-	-	-
Concentration of Mn-54	2	NR	-	-	-	-
Concentration of Fe-55	2	NR	-	-	-	-
Concentration of Co-60	2	NR	-	-	-	-
Concentration of Sr-90	2	NR	-	-	-	-
Concentration of Cs-137	2	NR	-	-	-	-
Concentration of Eu-152	2	NR	-	-	-	-
Concentration of Eu-154	2	NR	-	-	-	-
Concentration of Eu-155	2	NR	-	-	-	-
Area of contaminated zone	2	NR	-	-	-	-
Thickness of contaminated zone	2	NR	-	-	-	-
Length parallel to aquifer flow	2	NR	-	-	-	-
Contaminated zone total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Contaminated zone erosion rate	2	Continuous logarithmic	Default[3]			
Contaminated zone hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Contaminated zone b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Evapotranspiration coefficient	2	Uniform	0.5	0.75	-	-
Wind speed	2	Bounded lognormal-n	1.445	0.2419	1.4	13
Precipitation rare	2	None recommended	-	-	-	-
Runoff coefficient	2	Uniform	0.1	0.8	-	-
Saturated zone hydraulic gradient	2	Bounded lognormal-n	-5.11	1.77	7E-05	0.5
Saturated zone soil-specific b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Well-pump intake depth (below water table)	2	Triangular	6	30	10	-
Well pumping rare	2	None recommended	-	-	-	-
Unsaturated zone 1 density	2	Truncated normal	1.52	0.230	0.001	0.999
Unsaturated zone 2 density	2	Truncated normal	1.52	0.230	0.001	0.999
Unsaturated zone 3 density	2	Truncated normal	1.52	0.230	0.001	0.999
Unsaturated zone 4 density	2	Truncated normal	1.52	0.230	0.001	0.999
Unsaturated zone 5 density	2	Truncated normal	1.52	0.230	0.001	0.999

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]			
			1	2	3	4
Unsaturated zone 1 total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Unsaturated zone 2 total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Unsaturated zone 3 total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Unsaturated zone 4 total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Unsaturated zone 5 total porosity	2	Truncated normal	0.425	0.0867	0.001	0.999
Unsaturated zone 1 effective porosity	2	Truncated normal	0.355	0.0906	0.001	0.999
Unsaturated zone 2 effective porosity	2	Truncated normal	0.355	0.0906	0.001	0.999
Unsaturated zone 3 effective porosity	2	Truncated normal	0.355	0.0906	0.001	0.999
Unsaturated zone 4 effective porosity	2	Truncated normal	0.355	0.0906	0.001	0.999
Unsaturated zone 5 effective porosity	2	Truncated normal	0.355	0.0906	0.001	0.999
Unsaturated zone 1 soil-b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Unsaturated zone 2 soil-b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Unsaturated zone 3 soil-b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Unsaturated zone 4 soil-b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Unsaturated zone 5 soil-b parameter	2	Bounded lognormal-n	1.06	0.66	0.5	30
Unsaturated zone 1 hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Unsaturated zone 2 hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Unsaturated zone 3 hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Unsaturated zone 4 hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Unsaturated zone 5 hydraulic conductivity	2	Bounded lognormal-n	2.3	2.11	0.004	9250
Fruit, vegetable, and grain consumption rate	2	Triangular	135	318	178	-
Mass loading for inhalation	2	Continuous linear	Default[3]			
Indoor dust filtration factor	2	Uniform	0.15	0.95	-	-
External gamma shielding factor	2	Bounded lognormal-n	-1.3	0.59	0.044	1
Soil ingestion rate	2	Triangular	0	36.5	18.3	-
Drinking water ingestion rate	2	Truncated lognormal-n	6.015	0.489	0.001	0.999
Aquatic food contaminated fraction	2	Triangular	0	1	0.39	-
Depth of soil mixing layer	2	Triangular	0.0	0.6	0.15	-
Wet weight crop yield for non-leafy vegetables	2	Truncated lognormal-n	0.56	0.48	0.001	0.999
Weathering removal constant	2	Triangular	5.1	84	18	-
Wet foliar interception fraction for leafy vegetables	2	Triangular	0.06	0.95	0.67	-
Meat transfer factor for H	2	Truncated lognormal-n	-4.42	1.0	0.001	0.999
Meat transfer factor for Mn	2	Truncated lognormal-n	-6.91	0.7	0.001	0.999
Meat transfer factor for Fe	2	Truncated lognormal-n	-3.51	0.4	0.001	0.999
Meat transfer factor for Co	2	Truncated lognormal-n	-3.51	1.0	0.001	0.999
Meat transfer factor for Sr	2	Truncated lognormal-n	-4.61	0.4	0.001	0.999
Meat transfer factor for Cs	2	Truncated lognormal-n	-3.00	0.4	0.001	0.999
Meat transfer factor for Eu	2	Truncated lognormal-n	-6.21	1.0	0.001	0.999
Meat transfer factor for Gd	2	Truncated lognormal-n	-6.21	1.0	0.001	0.999
Milk transfer factor for H	2	Truncated lognormal-n	-4.6	0.9	0.001	0.999
Milk transfer factor for Mn	2	Truncated lognormal-n	-8.11	0.7	0.001	0.999
Milk transfer factor for Fe	2	Truncated lognormal-n	-8.11	0.7	0.001	0.999
Milk transfer factor for Co	2	Truncated lognormal-n	-6.21	0.7	0.001	0.999
Milk transfer factor for Sr	2	Truncated lognormal-n	-6.21	0.5	0.001	0.999
Milk transfer factor for Cs	2	Truncated lognormal-n	-4.61	0.5	0.001	0.999
Milk transfer factor for Eu	2	Truncated lognormal-n	-9.72	0.9	0.001	0.999
Milk transfer factor for Gd	2	Truncated lognormal-n	-9.72	0.9	0.001	0.999

Parameter	Priority[1]	Distribution	Distribution's Statistical Parameters[2]			
			1	2	3	4
H bioaccumulation factor for fish	2	Lognormal-n	0	0.1	-	-
Mn bioaccumulation factor for fish	2	Lognormal-n	6	1.1	-	-
Fe bioaccumulation factor for fish	2	Lognormal-n	5.3	1.1	-	-
Co bioaccumulation factor for fish	2	Lognormal-n	5.7	1.1	-	-
Sr bioaccumulation factor for fish	2	Lognormal-n	4.1	1.1	-	-
Cs bioaccumulation factor for fish	2	Lognormal-n	7.6	0.7	-	-
Eu bioaccumulation factor for fish	2	Lognormal-n	3.9	1.1	-	-
Gd bioaccumulation factor for fish	2	Lognormal-n	3.2	1.1	-	-
Humidity in air	3	Truncated lognormal-n	1.98	0.334	0.001	0.999
Indoor time fraction	3	Continuous linear	Default[3]			
Inhalation rate	3	Triangular	4,380	13,100	8,400	-

Notes:

[1]1 = high priority parameter, 2 = medium priority parameter, 3 = low priority parameter

[2]Distribution's Statistical Parameter
Lognormal-n: 1 = mean, 2 = standard deviation
Bounded lognormal-n: 1 = underlying mean value, 2 = underlying standard deviation, 3 = lower limit, 4 = upper limit
Truncated lognormal-n: 1 = underlying mean value, 2 = underlying standard deviation, 3 = lower quantile, 4 = upper quantile
Truncated normal: 1 = mean, 2 = standard deviation, 3 = lower quantile, 4 = upper quantile
Triangular: 1 = minimum, 2 = maximum, 3 = most likely
Uniform: 1 = minimum, 2 = maximum

[3]Default RESRAD v6.21 distribution parameters were used

NR – Not ranked, NUREG/CR-6697 did not provide statistical distributions for these parameters nor do default distributions exist in RESRAD v6.21

Rank	Uncorrelated Parameters			Correlated Parameters		
	Parameter Class[1]	Parameter	PRCC[2] Coefficient	Parameter Class[1]	Parameter	PRCC[2] Coefficient
Site-Specific Suite of Nine Radionuclides in One Calculation						
1	B	Indoor time fraction	0.94	P	Density of Contaminated Zone	0.94
2	P	External gamma shielding factor	0.71	P	K_d of Co-60 in Contaminated Zone	0.52
3	P	Plant transfer factor for Sr	0.61	P	K_d of Eu-152 in Contaminated Zone	0.36
4	P	Depth of roots	-0.55	P	K_d of Sr-90 in Contaminated Zone	0.21
5	P	Density of Contaminated Zone	0.54	P	K_d of Mn-54 in Contaminated Zone	0.14
6	P, B	Indoor dust filtration factor	-0.27	P	K_d of Cs-137 in Unsaturated Zone 3	-0.13
7	P	K_d of Sr-90 in Unsaturated Zone 4	0.27	P	K_d of Eu-152 in Unsaturated Zone 2	0.13
8	P	K_d of Co-60 in Unsaturated Zone 5	0.24	P	K_d of H-3 in Unsaturated Zone 2	0.11
9	P	K_d of Mn-54 in Unsaturated Zone 3	-0.21	P	K_d of Cs-137 in Unsaturated Zone 2	0.11
10	P	Plant transfer factor for Cs	0.21	P	K_d of Fe-55 in Contaminated Zone	0.10
Tritium Only Calculation						
1	P	Depth of roots	-0.97	P	Depth of roots	-0.97
2	P	Runoff coefficient	0.86	P	Runoff coefficient	0.80
3	M, B	Fruit, vegetable and grain consumption	0.73	M, B	Fruit, vegetable and grain consumption	0.74
4	P	Density of Contaminated Zone	0.72	P	Density of Contaminated Zone	0.66
5	P	Evapotranspiration coefficient	0.37	P	Evapotranspiration coefficient	0.40
Mn-54 Only Calculation						
1	B	Indoor time fraction	0.93	B	Indoor time fraction	0.93
2	P	External gamma shielding factor	0.69	P	External gamma shielding factor	0.68
3	P	Density of Contaminated Zone	0.52	P	Density of Contaminated Zone	0.44
4	P	K_d of Mn-54 in Contaminated Zone	0.42	P	K_d of Mn-54 in Contaminated Zone	0.36
5	P	Saturated zone hydraulic conductivity	-0.21	P	Saturated zone hydraulic conductivity	-0.23
Fe-55 Only Calculation						
1	P	Plant transfer factor for Fe	0.86	P	Depth of roots	-0.79
2	P	Depth of roots	-0.76	B	Indoor time fraction	0.64
3	B	Indoor time fraction	0.62	P	Plant transfer factor for Fe	0.63
4	P	Depth of soil mixing layer	-0.52	M, B	Soil ingestion	0.52
5	M, B	Soil ingestion	0.50	P	Depth of soil mixing layer	-0.51

Rank	Uncorrelated Parameters			Correlated Parameters		
	Parameter Class[1]	Parameter	PRCC[2] Coefficient	Parameter Class[1]	Parameter	PRCC[2] Coefficient
Co-60 Only Calculation						
1	B	Indoor time fraction	0.92	B	Indoor time fraction	0.92
2	P	External gamma shielding factor	0.65	P	External gamma shielding factor	0.65
3	P	Density of Contaminated Zone	0.53	P	Density of Contaminated Zone	0.44
4	P	K_d of Co-60 in Contaminated Zone	0.42	P	K_d of Co-60 in Contaminated Zone	0.35
5	P	Saturated zone hydraulic conductivity	-0.21	P	Saturated zone hydraulic conductivity	-0.23
Sr-90 Only Calculation						
1	P	Plant transfer factor for Sr	0.96	P	Depth of roots	-0.90
2	P	Depth of roots	-0.91	P	Plant transfer factor for Sr	0.86
3	M, B	Fruit, vegetable and grain consumption	0.52	M, B	Fruit, vegetable and grain consumption	0.41
4	P	K_d of Sr-90 in Contaminated Zone	0.35	P	Density of Unsaturated Zone 5	0.17
5	P	Well pump intake depth	-0.15	P	K_d of Sr-90 in Contaminated Zone	-0.17
Cs-137 Only Calculation						
1	B	Indoor time fraction	0.94	B	Indoor time fraction	0.93
2	P	External gamma shielding factor	0.71	P	External gamma shielding factor	0.71
3	P	Density of Contaminated Zone	0.46	P	Density of Contaminated Zone	0.37
4	P	Plant transfer factor for Cs	0.43	P	Plant transfer factor for Cs	0.30
5	P	K_d of Cs-137 in Contaminated Zone	0.30	P	Saturated zone hydraulic conductivity	-0.29

[1]Parameter Classification: P = Physical; B = Behavioral; M = Metabolic
[2]PRCC = Partial Rank Correlation Coefficient

Contaminated Area (m^2)	Calculated Area Factors at Time of Peak Dose								
	H-3	Mn-54	Fe-55	Co-60	Sr-90	Cs-137	Eu-152	Eu-154	Eu-155
8094	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4047	1.00	1.01	1.00	1.01	1.00	1.02	1.02	1.01	1.02
2024	1.00	1.03	1.00	1.03	1.00	1.03	1.03	1.03	1.03
1012	1.35	1.04	1.00	1.04	1.00	1.04	1.05	1.04	1.04
506	2.91	1.09	1.98	1.08	1.98	1.13	1.07	1.07	1.06
253	6.05	1.14	3.95	1.13	3.94	1.20	1.11	1.11	1.09
126	12.4	1.20	7.93	1.20	7.87	1.29	1.17	1.16	1.14
63	24.9	1.30	15.8	1.30	15.6	1.41	1.27	1.26	1.23
32	49.2	1.49	31.2	1.49	30.5	1.62	1.44	1.45	1.39
16	98.9	1.78	62.0	1.78	59.9	1.93	1.72	1.73	1.63
8	198	2.38	123	2.38	117	2.58	2.30	2.31	2.14
4	397	3.61	243	3.62	230	3.91	3.49	3.52	3.19
2	794	5.68	473	5.75	452	6.14	5.48	5.55	4.90
1	1590	9.57	905	9.73	887	10.3	9.24	9.39	7.88

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TABLES

7.0 UPDATE OF SITE-SPECIFIC DECOMMISSIONING COSTS

7.1 INTRODUCTION

In accordance with 10 CFR 50.82(a)(9)(ii)(F), Regulatory Guide 1.179, *Standard Format and Content of License Termination Plans for Nuclear Power Plants*, and Regulatory Guide 1.159, *Assuring the Availability of Funds for Decommissioning Nuclear Reactors*, the site-specific cost estimate and funding plans are provided [References 7-13 and 7-12]. Regulatory Guide 1.179 provides guidance with respect to the information to be presented.

The License Termination Plan (LTP) must:

Provide an estimate of the remaining decommissioning costs, and compare the estimated costs with the present funds set aside for decommissioning. The financial assurance instrument required per 10 CFR 50.75 must be funded to the amount of the cost estimate. If there is a deficit in present funding, the LTP must indicate the means for ensuring adequate funds to complete the decommissioning.

The decommissioning cost estimate should include an evaluation of the following cost elements:

- Cost assumptions used, including a contingency factor,
- Major decommissioning activities and tasks,
- Unit cost factors,
- Estimated costs of decontamination and removal of equipment and structures,
- Estimated costs of waste disposal, including applicable disposal site surcharges,
- Estimated final survey costs, and
- Estimated total costs.

The cost estimate should focus on the remaining work, detailed by each activity associated with the decommissioning, including the costs of labor, materials, equipment, energy, and services.

Consumers Energy owns a 100% undivided interest in the Big Rock Point (BRP) Nuclear Plant and provides financial assurance for decommissioning through the use of an external sinking fund, funded by rates that are established by cost of service ratemaking regulation. Following 35 years of electric power generation, BRP was voluntarily shut down by Consumers Energy on August 29, 1997 and immediately entered into decommissioning. In accordance with 10CFR50.82(a)(8)(iii), a detailed, site-specific cost estimate was prepared by TLG Services for Consumers Energy and docketed with the NRC in its submittal of the BRP-Post Shutdown Decommissioning Activities Report (PSDAR) [References 7-9 and 7-2]. Pursuant to State of Michigan requirements to prepare and file decommissioning cost estimate updates with the Michigan Public Service Commission (MPSC) at three year intervals, an estimate update was prepared by TLG Services in 2000 and filed in March 2001 as a follow-up to a site-specific decommissioning cost estimate filed with the MPSC in March

1998 [References 7-9 and 7-10]. Consumers Energy will be contracting with TLG Services to prepare an estimate update in 2003 for filing with the MPSC in March 2004. The 2000 estimate, updated with actual costs incurred through 2002 and the latest forecast costs, will serve as the cost basis for this submittal of the LTP.

In response to the March 1998 MPSC filing, Consumers Energy received a revised decommissioning rate surcharge order to increase annual collections through December 2000 which resulted in full funding of the decommissioning costs. Based on the same MPSC order, Consumers Energy discontinued decommissioning funding effective December 31, 2000 and is relying on the funds in the external sinking fund and fund earnings to cover the remaining amount of decommissioning expenditures for purposes of providing financial assurance. In compliance with 10 CFR 50.75(f)(1), Consumers Energy continues to demonstrate financial assurance on an annual basis.

7.2 DECOMMISSIONING COST ESTIMATE

7.2.1 Cost Estimate Description and Methodology

As previously stated, Consumers Energy docketed a site-specific cost estimate prepared by TLG Services in accordance with 10 CFR 50.82(a)(8)(iii). Subsequently, Consumers Energy, in compliance with State of Michigan requirements for providing three-year estimate updates, filed an estimate update prepared by TLG Services with the MPSC in March 2001. This estimate update was prepared in year 2000 constant dollars totaling $400.6 million which detailed all costs to decommission BRP including radiological decommissioning, site restoration, spent fuel management (independent spent fuel storage installation-ISFSI) and a contingency factor. Consumers Energy will be contracting with TLG Services to prepare a new estimate update in 2003 for MPSC filing in March 2004 and, as such, is utilizing the current 2000 estimate updated with actual cost and forecast data through 2002 as the basis for the cost estimate in this submittal of the LTP.

The methodology used to develop the cost estimate follows the basic approach originally presented in the Atomic Industrial Forum (now Nuclear Energy Institute) program for developing standardized decommissioning cost estimates published as AIF/NESP-036, *Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates*, [Reference 7-1]. This document presents a unit cost factor method for estimating direct activity costs, activity by activity, simplifying the estimating process. Unit factors for the removal of equipment, concrete, steel, etc., were constructed from site-specific labor costs provided by Consumers Energy and actual worker productivity data from the BRP decommissioning project. The direct activity costs were then estimated using the plant inventory developed for each work area.

The unit cost factor method provides a demonstrable basis for establishing reliable cost estimates. The detail available in the unit cost factors for activity time, labor costs (by craft), and equipment and consumable costs provides assurance that cost elements have not been omitted. The unit cost factor, coupled with the plant-specific inventory of piping, components, and structures, provide a high degree of confidence in the reliability of the cost estimate.

Work difficulty factors (WDFs) were assigned to each work area, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- Access Factor 0% to 40%
- Respiratory Protection Factor 0% to 50%
- Radiation Protection/ALARA Factor 0% to 100%
- Protective Clothing Factor 0% to 30%
- Work Break Factor 8.33%

These factors and their associated range of values were developed in conjunction with the Atomic Industrial Forum's Guidelines Study.

The period-dependent costs for the decommissioning program management, administration, field engineering, equipment rental and contracted services were developed using the critical path schedule.

Consistent with industry practice, contingencies were applied to the decontamination and dismantlement costs developed as specific provision for unforeseeable elements of cost within the defined project scope. Contingencies are particularly important where previous experience has shown unforeseeable events, which will increase costs, are likely to occur. The cost elements in the estimate are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line item basis. The contingency, as used in the estimate, does not account for price escalation and inflation in the cost of decommissioning over the remaining project duration.

7.2.2 Summary of the Site Specific Decommissioning Cost Estimate

The estimate, prepared in year 2000 constant dollars, details all costs to decommission BRP including radiological decommissioning, site restoration, spent fuel management, and a contingency factor. The estimate assumes all buildings will be demolished, including the removal of all below-grade foundations, and the site will be restored to a Greenfield condition by late 2005 with the exception of the ISFSI. The ISFSI will remain operational until the spent fuel is transferred to an approved repository by the Department of Energy (DOE); assumed to occur starting November 2011 and be completed by May 2012. Following completion of spent fuel transfer, the ISFSI will be demolished, which is assumed to be completed by November 2012.

Total cost to decommission BRP per the estimate prepared by TLG Services in year 2000 constant dollars is $400.6 million. Table 7-1 summarizes the decommissioning costs into three major categories; plant radiological decommissioning totaling $323.0 million, site restoration or the non-radiological "Greenfield" costs totaling $26.7 million, and spent fuel management which addresses the cost of dry fuel storage including ISFSI construction, storage system procurement, and ISFSI operations and dismantlement totaling $50.9 million. The $400.6 million estimate includes $45.0 million in contingency dollars.

Entering the third year since the 2000 estimate was prepared, actual project cost performance has been on target and is expected to trend unchanged. No portion of the $45.0 million contingency has been expended to date. Potential future cost exposures on typically high risk cost items have been mitigated by contractual commitments obtained by Consumers Energy. The cost for reactor vessel burial, scheduled for late 2003, has been contractually fixed with the disposal facility at Barnwell, South Carolina. The cost of low-level radioactive waste processing and disposal is fixed by Consumers Energy's contract with Duratek, Inc., the processor of the waste generated from the decommissioning of BRP. The contract specifically defines per pound rates for various waste streams and applicable annual escalation rates. Major component and structure removal cost exposures have been mitigated by a milestone based fixed price contract with BNFL, Inc., with the exception of those exposures associated with schedule delays attributable directly to Consumers Energy. Approval pursuant to 10 CFR 20.2002 will be utilized to economically dispose of approximately 80 million pounds of clean concrete and demolition debris at a local industrial landfill [Reference 7-7]. Approval of this program, critical to cost effective clean debris disposal, greatly minimizes cost risk in the upcoming structures demolition phase of the project.

With the above future cost exposure mitigation measures in place and approximately 90% of the mechanical and electrical systems and components already dismantled and disposed of, Consumers Energy has adopted a revised estimate forecast for budgetary and financial planning and reporting purposes for the balance of this three year estimate update period. The revised estimate forecast will remain in place until the official 2003 estimate update is prepared by TLG Services for filing with the MPSC in March 2004.

Table 7-1. TLG Services 2000 Decommissioning Estimate Summary of Decommissioning Costs[1] Year 2000 Constant Dollars Major Cost Categories

Plant Radiological Decommissioning	2000 Dollars
Project Management/Staffing[4]	$133,359
Major Component/Structures Removal	$20,957
Hazard Abatement & Projects[4]	$20,482
Reactor Building Systems Dismantlement	$10,700
Turbine & Service Building Systems Dismantlement	$1,900
Outbuildings/Yard Systems Dismantlement	$657
Tools & Equipment	$10,672
Waste Processing/Disposal	$42,326
Other Costs[2, 4]	$38,589
Contingency	$43,408
Subtotal	$323,050

Site Restoration (Greenfield Costs)	
Project Management/Staffing[4]	$108
Major Component/Structures Removal	$13,067
Hazard Abatement & Projects[4]	$39
Turbine & Service Building Systems Dismantlement	$61
Outbuildings/Yard Systems Dismantlement	$1,213
Tools & Equipment	$757
Waste Processing/Disposal	$9,594
Other/Miscellaneous[2, 4]	$235
Contingency	$1,592
Subtotal	$26,666

Spent Fuel Management (ISFSI)	
Construction & Equipment	$33,940
Staffing & Security	$8,340
ISFSI Dismantlement/Restoration[4]	$2,530
Other Costs[3,4]	$6,053
Subtotal	$50,863
Total Decommissioning Cost	$400,579

[1] Prompt Decommissioning Alternative (DECON), costs in thousands of dollars.
[2] Other costs include energy, maintenance, overheads, etc.
[3] Other costs include insurance, taxes, fees, overheads, etc.
[4] Include cost of Final Status Survey.

The revised estimate forecast, the cost basis for this submittal of the LTP totaling $382.4 million in year 2000 constant dollars, is summarized in Table 7-2. The overall reduction of $18.2 million from the previous estimate is the net result of a reduction in contingency dollars from $45.0 million to $13.0 million and an increase in projected spent fuel management costs from $50.9 million to $64.7 million.

For financial planning and cost performance monitoring purposes, this revised estimate forecast, escalated for inflation at an average annual rate of 3.7 %, yields a year of expenditure cost estimate of $408.4 million. Table 7-3 summarizes the year of expenditure decommissioning costs into three major categories; plant radiological decommissioning totaling $305.5 million, site restoration or non-radiological "Greenfield" costs totaling $27.9 million, and spent fuel management costs totaling $75.0 million. The $408.4 million estimate includes $15.4 million in contingency dollars.

7.2.3 Plant Radiological Decommissioning

As summarized in Table 7-3, plant radiological decommissioning costs total $305.5 million. Accounting for work completed through 2002 totaling $218.0 million, forecast expenditures for the remaining work are anticipated to be $87.5 million (in year of expenditure dollars), including a contingency factor of 18.2% equal to $13.5 million. The contingency factor has been applied to the remaining activities to ensure sufficient funds are available to cover unforeseen conditions that may arise in the course of their completion.

Consistent with the NRC definition of decommissioning under 10 CFR 50.2, the radiological decommissioning costs under this category consider only those costs associated with normal decommissioning activities necessary for termination of the Part 50 license and release of the site for unrestricted use. It does not include costs associated with the disposal of non-radiological materials or structures beyond those necessary to terminate the Part 50 license or the costs associated with construction or operation of an ISFSI.

Upon permanent plant shutdown and commencement of decommissioning, Consumers Energy contracted with Duratek, Inc., to be the waste processing/disposal contractor. All low-level radioactive waste generated from the decontamination and dismantlement activities is turned over to Duratek, Inc. for appropriate disposition. The contract specifies fixed rates for various waste streams and defines escalation rates for the duration of the project. Application of the rates against the inventory of waste materials defined in the TLG Services estimate results in a high confidence level in the waste disposition cost elements within the estimate.

Table 7-2. Revised 2000 Decommissioning Estimate Forecast Summary of Decommissioning Costs [1] Year 2000 Constant Dollars Major Cost Categories

Plant Radiological Decommissioning	2000 Dollars
Project Management/Staffing[4]	$133,359
Major Component/Structures Removal	$20,957
Hazard Abatement & Projects[4]	$20,482
Reactor Building Systems Dismantlement	$10,700
Turbine & Service Building Systems Dismantlement	$1,900
Outbuildings/Yard Systems Dismantlement	$657
Tools & Equipment	$10,672
Waste Processing/Disposal	$42,326
Other Costs[2,4]	$38,589
Contingency	$11,337
Subtotal	$290,979

Site Restoration (Greenfield Costs)	
Project Management/Staffing[4]	$108
Major Component/Structures Removal	$13,067
Hazard Abatement & Projects[4]	$39
Turbine & Service Building Systems Dismantlement	$61
Outbuildings/Yard Systems Dismantlement	$1,213
Tools & Equipment	$757
Waste Processing/Disposal	$9,594
Other/Miscellaneous[2,4]	$235
Contingency	$1,592
Subtotal	$26,666

Spent Fuel Management (ISFSI)	
Construction & Equipment	$45,187
Staffing & Security	$11,044
ISFSI Dismantlement/Restoration[4]	$2,530
Other Costs[3,4]	$5,978
Subtotal	$64,739
Total Decommissioning Cost	$382,384

[1] Prompt Decommissioning Alternative (DECON), costs in thousands of dollars.
[2] Other costs include energy, maintenance, overheads, etc.
[3] Other costs include insurance, taxes, fees, overheads, etc.
[4] Include cost of Final Status Survey.

Table 7-3. Revised 2000 Decommissioning Estimate Forecast
Summary of Decommissioning Costs[1]
Year of Expenditure Dollars
Major Cost Categories

Plant Radiological Decommissioning	YOE Dollars
Project Management/Staffing[4]	$137,537
Major Component/Structures Removal	$24,537
Hazard Abatement & Projects[4]	$21,141
Reactor Building Systems Dismantlement	$10,813
Turbine & Service Building Systems Dismantlement	$1,972
Outbuildings/Yard Systems Dismantlement	$686
Tools & Equipment	$10,887
Waste Processing/Disposal	$43,855
Other Costs[2, 4]	$40,565
Contingency	$13,505
Subtotal	$305,498

Site Restoration (Greenfield Costs)	
Project Management/Staffing[4]	$131
Major Component/Structures Removal	$13,067
Hazard Abatement & Projects[4]	$44
Turbine & Service Building Systems Dismantlement	$69
Outbuildings/Yard Systems Dismantlement	$1,440
Tools & Equipment	$828
Waste Processing/Disposal	$10,185
Other/Miscellaneous[2, 4]	$272
Contingency	$1,876
Subtotal	$27,912

Spent Fuel Management (ISFSI)	
Construction & Equipment	$47,661
Staffing & Security	$14,999
ISFSI Dismantlement/Restoration[4]	$4,051
Other Costs[3, 4]	$8,304
Subtotal	$75,015
Total Decommissioning Cost	$408,425

[1] Prompt Decommissioning Alternative (DECON), costs in thousands of dollars
[2] Other costs include energy, maintenance, overheads, etc.
[3] Other costs include insurance, taxes, fees, overheads, etc.
[4] Include cost of Final Status Survey.

Specifically excluded from the Duratek, Inc., contract is the disposal of the reactor vessel. Consumers Energy has contractually fixed the disposal cost of the reactor vessel with the burial facility at Barnwell, South Carolina. Physical vessel removal and transportation costs have been contractually defined with BNFL, Inc., the major component and structures removal contractor selected for BRP.

The site-specific waste costs provide the basis for waste disposal costs within the estimate in lieu of guidance provided in NUREG-1307, *Report on Waste Burial Charges*, [Reference 7-11].

7.2.4 Site Restoration (Greenfield Costs)

Recognizing site restoration or "Greenfield" costs, or the removal and disposal of non-radioactive waste resulting from dismantlement activities, are outside the scope of the NRC definition of decommissioning, the information in this section of Table 7-3 is supplied for informational purposes. The total cost of site restoration work is estimated at $27.9 million, including a contingency factor of 7.2% equal to $1.9 million. No actual expenditures have been incurred for this work.

7.2.5 Spent Fuel Management

Similar to non-radiological site restoration costs, Consumers Energy recognizes that the costs to construct and operate an ISFSI and other spent fuel related costs fall outside the NRC definition of decommissioning. A presentation of these costs is included for informational purposes. Also, the staff recognized, as discussed in 10 CFR 50.75(a), that funding for the decommissioning of power reactors may be subject to the jurisdiction of other Federal and State Government agencies.

Table 7-3 summarizes the spent fuel management costs for BRP. These costs, currently being borne by Consumers Energy, have increased substantially due to security enhancements necessitated by the events of September 11, 2001, and higher than previously envisioned dry fuel storage equipment costs. The current forecast stands at $75.0 million. These costs include ISFSI engineering, licensing, construction, dry fuel storage system licensing and procurement, and ISFSI operations until possession of the spent fuel is transferred to the DOE assumed in this estimate to begin in 2011. The cost to decommission the ISFSI is included in the spent fuel management costs.

7.2.6 Summary of the Big Rock Point Decommissioning Cost Estimate

The revised estimate forecast (Table 7-2) prepared as an update to the *Decommissioning Cost Study for the Big Rock Point Nuclear Plant* prepared by TLG Services in 2000 is the basis for the LTP cost estimate. The estimated total cost for decommissioning BRP in year 2000 constant dollars is $382.4 million. For budgetary and financial planning purposes, this estimate, escalated for inflation at an average annual rate of 3.7%, results in a year of expenditure estimate of $408.4 million

(Table 7-3). Decommissioning costs, as defined by the NRC, total $305.5 million for radiological decontamination and disposal. Site restoration (non-radiological) and spent fuel management activities total $27.9 million and $75.0 million, respectively.

Consumers Energy has concluded that, based upon information currently available, the revised estimate forecast is adequate to complete the remaining decommissioning activities for BRP and will continue to monitor actual cost performance through the development period of the next estimate update cycle for MPSC filing in March 2004.

7.3 DECOMMISSIONING FUNDING PLAN

Consumers Energy, in compliance with 10 CFR 50.75(f)(1), provides financial assurance for the decommissioning of BRP through the use of an external sinking fund, funded by rates that are established by cost of service rate making regulation under the jurisdiction of the MPSC.

Consumers Energy entered into decommissioning immediately following plant shutdown on August 29, 1997. Consumers Energy filed a site specific decommissioning cost estimate with the MPSC as part of Case No. U-11662 on March 31, 1998 [Reference 7-3]. The MPSC issued an Order in Case No. U-11662 on March 22, 1999 authorizing a revised decommissioning surcharge to be collected through December 31, 2000, calculated to provide full funding of the decommissioning costs [Reference 7-8]. Based on the same order, Consumers Energy discontinued decommissioning funding effective December 31, 2000 and is relying on the funds in the external sinking fund and fund earnings to cover the remaining amount of decommissioning expenditures. A small portion of remaining decommissioning expenditures (approximately $3.9 million at year-end 2002) will be funded through a Federal Energy Regulatory Commission (FERC)-jurisdictional reserve balance.

Pursuant to State of Michigan requirements to prepare and file decommissioning cost estimate updates with the MPSC at three-year intervals, an estimate update was filed on March 30, 2001 [Reference 7-4]. This estimate update included a substantial increase in spent fuel management costs due to higher than previously anticipated dry fuel storage equipment and ISFSI operational costs. In their Staff Report following review of the submittal, transmitted to Consumers Energy on September 19, 2001, the MPSC Licensing and Enforcement Division accepted Consumers Energy's projection that the assumed investments would generate enough trust fund revenue to complete decommissioning activities, both NRC radiological and site restoration or Greenfield, in 2005 with no additional decommissioning rate surcharge revenues being required [Reference 7-6]. Specifically excluded from the decommissioning funding analyses were spent fuel storage costs. Consumers Energy stated in its March 31, 2001, estimate update that it plans to pursue recovery of these costs from the Department of Energy (DOE) as

they are related to DOE's failure to take possession of spent nuclear fuel as obligated to by contract. Consumers Energy indicated these costs could be included in future analyses if deemed appropriate. These costs are currently being borne by Consumers Energy.

As demonstrated in Consumers Energy's recent submittal of the annual Certification of Financial Assurance for Decommissioning of the BRP Plant pursuant to 10 CFR 50.75(f)(1) dated March 27, 2003, the amount of decommissioning funds estimated to be required, based on the Revised 2000 Decommissioning Estimate Forecast shown in Table 7-2, is $382.4 million in 2000 dollars or, escalated for inflation, $395.3 million in 2002 dollars [Reference 7-5]. Included in the $395.3 million are $299.4 million of NRC radiological decommissioning costs, $27.3 million of site restoration or Greenfield costs, and $68.6 million of spent fuel management costs. Consumers Energy is providing decommissioning assurance in the amount of $299.4 million for the NRC radiological decommissioning costs.

Of the $299.4 million of NRC radiological costs, $208.8 million has been withdrawn from the MPSC-jurisdictional external sinking fund as of December 31, 2002, and an additional $5.7 million has been funded from the FERC-jurisdictional reserve, leaving a remaining cost (in year 2002 dollars) of $84.9 million. Financial assurance for the $84.9 million (in year 2002 dollars) of NRC radiological decommissioning costs has been provided for through funds in the external sinking fund and assumed fund earnings. At the end of 2002, the balance in the external sinking fund was $110.3 million, based on State Street Bank and Trust, December 31, 2002 Annual Reports. The year-end balance reflects withdrawals of $208.8 million to cover NRC radiological decommissioning expenditures incurred through December 31, 2002.

7.4 REFERENCES

7-1 AIF/NESP-036, Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates, May 1986

7-2 Big Rock Point Post Shutdown Decommissioning Activities Report (PSDAR), Revision 2, March 26, 1998

7-3 Letter from Consumers Energy to Michigan Public Service Commission, *Case No. U-11662*, March 31, 1998

7-4 Letter from Consumers Energy to Michigan Public Service Commission, *Case No. U-10800 – Decommissioning Fund Report – Big Rock Point Nuclear Decommissioning Fund*, March 30, 2001

7-5 Letter from Consumers Energy, Big Rock Point Plant to U.S. Nuclear Regulatory Commission, *Dockets 50-155 and 72-043 – License DPR-6, Big Rock Point Plant – Certification of Financial Assurance for Decommissioning Pursuant to 10 CFR 50.75(f)(1)*, March 27, 2003

7-6 Letter from the Director, Licensing and Enforcement Division, Michigan Public Service Commission to Consumers Energy, *Consumers Energy Decommissioning Fund Report – MPSC Case U-10800*, September 19, 2001

7-7 Letter from U.S. Nuclear Regulatory Commission to Consumers Energy, Big Rock Point Plant, *Proposed Disposal Procedures in Accordance With 10 CFR 20.2002*, February 5, 2002

7-8 Michigan Public Service Commission Order issued in Case No. U-11662, March 22, 1999

7-9 TLG Services, Inc., Decommissioning Cost Study for the Big Rock Point Nuclear Plant, March 26, 1998

7-10 TLG Services, Inc., Decommissioning Cost Study for the Big Rock Point Nuclear Plant, March 22, 2001

7-11 U.S. Nuclear Regulatory Commission NUREG-1307, *Report on Waste Burial Charges*, Revision 10, October 2002

7-12 U.S. Nuclear Regulatory Commission Regulatory Guide 1.159, *Assuring the Availability of Funds for Decommissioning Nuclear Reactors*

7-13 U.S. Nuclear Regulatory Commission Regulatory Guide 1.179, *Standard Format and Content of License Termination Plans for Nuclear Power Reactors*, January 1999

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8.0 SUPPLEMENT TO THE ENVIRONMENTAL REPORT

8.1 INTRODUCTION AND PURPOSE

8.1.1 Purpose

The purpose of this section of the License Termination Plan (LTP) is to update the Environmental Report for Big Rock Point (BRP) with new information and significant environmental change associated with the site's proposed decommissioning and license termination activities. This section of the LTP is pursuant to 10 CFR 51.53(d) and 10 CFR 50.82 (a) (9)(ii)(G).

The information contained in this chapter generally follows the Nuclear Regulatory Commission (NRC) guidance of Regulatory Guide 1.179, *Standard Format and Content of License Termination Plans for Nuclear Power Reactors*, dated January 1999 and NUREG-1700, *Standard Review Plan for Evaluation Nuclear Power Reactor License Termination Plans*, dated April 2000. The contents of this section have also been reviewed against the appropriate sections of NUREG-1727, *NMSS Decommissioning Standard Review Plan*, dated September 2000. Much of the information in this document has also been provided to the NRC in other forms, e.g., Updated Final Hazards Summary Report (UFHSR). Guidance contained in Supplement 1 to NUREG-0586, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* (GEIS) was also utilized during preparation of this chapter [Reference 8-34].

8.1.2 Background

At the time the BRP Nuclear Plant was licensed for construction in 1960, the Atomic Energy Commission (AEC; NRC predecessor) regulations did not require submittal of an environmental report. Since this time-frame was prior to promulgation of the National Environmental Policy Act of 1969, the AEC was not required to issue an Environmental Impact Statement (EIS) for BRP. However, much of the information typically contained in an environmental report was available for the AEC's review within BRP's original Final Hazards Summary Report (FHSR) at the time of licensing [Reference 8-10].

In 1993, BRP initiated a decommissioning study to prepare a Decommissioning Plan in accordance with 10 CFR 50.82(a) for submittal to the NRC. During this decommissioning study, it was recognized BRP had never submitted an environmental report as part of the site's original licensing basis documents. In February 1995 BRP submitted to the NRC a Decommissioning Plan and also a companion Environmental Report for decommissioning the BRP site [Reference 8-22]. This Environmental Report for decommissioning concluded the SAFSTOR option selected by decommissioning study was bounded by NUREG-0586, *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* (FGEIS) [References 8-6 and 8-33]. The SAFSTOR option was chosen at this time due to the unavailability of a low-level radioactive waste disposal site to licensees in the State of Michigan.

In July 1995 the NRC proposed to amend its regulations related to decommissioning nuclear power reactors. In February 1996 BRP requested the NRC delay completion of its review of the BRP Decommissioning Plan to allow Consumers Power Company[1] to assess the effect of the proposed regulations on the decommissioning of BRP [Reference 8-23]. The revised decommissioning regulations were finalized in August 1996 and included a provision that a previously submitted Decommissioning Plan be considered to be equivalent to a Post Shutdown Decommissioning Activities Report (PSDAR) required under 10 CFR 50.82(a)(4). In September 1996 Consumers Power Co. reached an agreement with the NRC that the BRP Decommissioning Plan was to be considered as the site's PSDAR and that this Decommissioning Plan be appended to the BRP UFHSR [Reference 8-24].

Following permanent cessation of plant operations in August 1997, BRP submitted a revision to its PSDAR stating that immediate dismantlement (DECON option) would begin since a low-level radioactive waste burial site was now available [References 8-25 and 8-12]. This revision to the PSDAR was structured in accordance with the new decommissioning rule and superceded the previously submitted Decommissioning Plan (Rev 0 of the PSDAR). Due to the revision to decommissioning regulations and subsequent revision to the PSDAR to utilize the DECON option, the BRP Decommissioning Plan and corresponding Environmental Report for Decommissioning were never formally reviewed by the NRC and a Safety Evaluation Report (SER) was never generated for these documents. Big Rock Point did not rescind its original Environmental Report for decommissioning because it was determined by site personnel that this document was still required by 10 CFR 50.82(a)(4)(i).

During review of revisions to the 10 CFR 50.59 and 50.82 processes, BRP personnel determined that an Environmental Report was required to perform both 10 CFR 50.59 and 50.82 evaluations. Subsequently, the site's Environmental Report for decommissioning was revised and incorporated by reference into the BRP UFHSR [Reference 8-18]. This revised Environmental Report for decommissioning concluded the DECON option and immediate dismantlement currently supported by the site's PSDAR is within the bounds of NUREG-0586.

8.1.3 Site Description After Unrestricted Release

A summary description of the site following license termination and unrestricted release is provided in Section 8.2. Generally, all above-grade and below-grade structures, equipment and foundations will be demolished and the resulting demolition debris will be disposed of offsite at either a low-level radioactive waste facility or a local, State of Michigan licensed, industrial waste landfill. The building foundation excavations will be backfilled with local soil fill material following any required remediation and final status survey activities.

[1] Prior to 1998 Consumers Energy Company's legal name was Consumers Power Company.

8.1.4 PSDAR Update for Remaining Dismantlement and Decontamination Activities

Big Rock Point LTP Chapter 3, *Identification of Remaining Site Dismantlement Activities,* identifies the dismantlement and decontamination activities, which are scheduled to be completed prior to license termination and unrestricted release. These activities are compared to the descriptions provided on the PSDAR and any changes identified. The impacts of changes to these activities are described in Section 8.3.

8.1.5 Summary and Update of Big Rock Point Environmental Report

The BRP ER, originally developed for decommissioning (see Section 8.1.2), was used as the basis to prepare this supplement to the ER. A review of the BRP's ER was performed to identify any relevant new information or significant environmental changes to the report. Guidance contained in Supplement 1 to NUREG-0586 was reviewed to determine the nature of any new information to be included in this section. A summary of information in the BRP ER is contained in Section 8.4.

8.1.6 Environmental Effects of Decommissioning

A description of both the radiological and non-radiological environmental effects of decommissioning is provided in Section 8.5. Radiological impacts reviewed include evaluations of occupational and public doses, decommissioning accidents, low-level waste (LLW) generation, transportation and disposal, and adherence to radiological criteria for license termination. The non-radiological effects include potential impacts governed by federal (other than the NRC), state and local regulations. NUREG-0586 GEIS, Supplement 1 was utilized as guidance in evaluating the non-radiological effects of decommissioning. New information is provided concerning the decommissioning impacts on socio-economic, cultural, historical, archeological, and environmental justice considerations.

8.1.7 Overview of Regulations Governing Decommissioning and Final Site Release

Section 8.6 provides a summary of federal, state and local regulations governing decommissioning of BRP and final site release of the property.

8.1.8 Summary and Conclusions

The development of information contained in the various sections of this LTP has resulted in defining additional detail regarding the evolution of planned decommissioning activities. New or relevant information and significant environmental changes were reviewed against the existing BRP PSDAR, the BRP ER and against NUREG-0586 (GEIS) criteria to determine if the conclusions reached in these documents are still valid for decommissioning and license termination activities planned at BRP. This additional information forms the basis for the conclusions provided in Section 8.7.

8.2 SITE DESCRIPTION AFTER UNRESTRICTED RELEASE

This section presents a summary of the final Greenfield condition of the site at the conclusion of demolition and license termination activities. License Termination Plan Section 1.4 provides a more detailed description of the final Greenfield condition as it relates to specific decommissioning activities. The impacts of these activities are discussed in Section 8.5.

At the time of license termination the site will meet the radiological criteria for unrestricted release as defined in 10 CFR 20.1302 in addition to any applicable State of Michigan criteria for release of the site. All site buildings that supported operation of the BRP Nuclear Plant will be demolished and disposed of in accordance with applicable regulations. Subsurface structures, foundations, piping, equipment, and utilities that supported facilities in the Industrial Area will be removed with the exception of the septic drainfield (ceramic tile) located west of the plant site. The Screenhouse structure and foundation will be demolished, and the shoreline returned to its original contour by filling a portion of the Discharge Canal; the breakwall jetty into Lake Michigan will remain in place. The lake water intake pipe will terminate at the former Screenhouse and be plugged with concrete; the intake structure out in Lake Michigan will remain in its current location. The only site buildings in existence will support Dry Fuel Storage and will be located near the Independent Spent Fuel Storage Installation (ISFSI) pad. There may be some remaining utilities (electric, phone, sanitary) supporting the ISFSI; these utilities will be routed from the south along the ISFSI road. Asphalt within the Protected Area and parking areas will be removed. Asphalt will remain on the roads accessing the site from US Route 31N. The Access Road approaching the site will terminate at a gravel parking area, and a road to the ISFSI will terminate just north of the ISFSI location. Figure 8-1 is a map of the BRP site.

Upon completion of the Final Status Survey (FSS) of the site (excluding ISFSI, see Section 1.3.2), affected areas will be graded for proper drainage. Topsoil, seed and other plantings will be utilized as appropriate to achieve the final Greenfield condition. While it is not known at this time what the future use of the site will be, it is expected that future use of the site will be similar to other lakefront properties in the region.

8.3 PSDAR UPDATE FOR REMAINING DISMANTLEMENT AND DECONTAMINATION ACTIVITIES

License Termination Plan Chapter 3 identifies and details the remaining dismantlement and decontamination activities that are scheduled to be completed in support of license termination and unrestricted release. These activities are compared to the descriptions provided in the PSDAR and any changes identified.

8.3.1 Post-Shutdown Decommissioning Activities Report Description

The BRP PSDAR was submitted to the NRC under the provisions of 10 CFR 50.82(a)(7). The PSDAR describes planned decommissioning activities, a schedule for their accomplishment, estimate of expected decommissioning costs, and provides the reasons for concluding the environmental impacts associated with site-specific decommissioning activities will be in compliance with 10 CFR 50.82(a)(6)(ii) [Reference 8-13]. Consumers Energy Co. intends to dismantle BRP in accordance with the DECON option found acceptable to the NRC in its FGEIS. Completion of this option is contingent upon continued access to one or more LLW disposal sites.

8.3.2 Impacts of Changes to the PSDAR

Although additional detail regarding major decommissioning activities is available through decommissioning planning efforts, no significant impacts beyond those identified in the PSDAR have been identified. Subsequent sections in this chapter of the LTP provide additional information regarding environmental effects of decommissioning.

8.4 BIG ROCK POINT SITE ENVIRONMENTAL DESCRIPTION

The information contained in this section is a summary based on the BRP ER developed for decommissioning [Reference 8-7]. The purpose of this section is to provide an overview of the site and regional environmental information. In general, the information contained in this section is derived directly from the ER; where new or different information is provided, the appropriate reference is also included.

8.4.1 Geography and Demography

8.4.1.1 Site Location Description

The BRP site is located on the northeast shore of Lake Michigan in Charlevoix County in the northern part of Michigan's Lower Peninsula. The site is approximately 60 miles northeast of Traverse City, Michigan, and 225 miles north-northwest of Detroit. The closest population centers are the cities of Charlevoix, 3.5 miles southwest, and Petoskey, 11 miles east of the plant site. The site is owned by Consumers Energy and occupies approximately 580 acres (2.35 km^2)[2]. Figure 8-1 depicts the property boundaries and Owner-Controlled Area and Figure 8-2 shows an aerial view of the BRP site and surrounding land. The Owner-Controlled Area is identical to plant property boundaries, except where US Route 31 traverses plant property. In those locations US Route 31 bounds the Owner-Controlled Area.

[2] BRP site is 580.4 acres including highway right-of-way and 563.6 acres without this right-of-way.

The area immediately surrounding the plant Industrial Area is wooded and gently sloping; a significant portion of the site property has been classified as wetlands. Approximately three miles to the south are Lake Charlevoix and Round Lake, inland extensions of Lake Michigan. Lake Charlevoix occupies approximately 27 square miles while Round Lake is a small natural harbor connecting Lakes Michigan and Charlevoix. A small stream, Susan Creek, exists to the east of US Route 31 and drains into Lake Michigan, east of the Owner-Controlled Area boundary.

Scattered rural and resort residences and a few commercial facilities are found within three miles of the site. Significant commercial and residential areas exist in the cities of Charlevoix and Petoskey. Industrial activity in the vicinity of BRP consists primarily of small manufacturing facilities. A small plastics manufacturer, employing approximately 150 people, is located to the east, adjacent to plant property. An operating cement plant with a quarry is located about six miles to the southwest. A large housing and recreational complex is located about nine miles to the east of the BRP site.

8.4.1.2 Population

The areas near BRP are generally rural to suburban. The northern part of Michigan is a well-documented tourist destination, resulting in significant seasonal population fluctuations. Peak seasonal visitation occurs in the summer months (June through August) with corresponding population increases in Charlevoix and Emmet counties of up to 75 percent.

The permanent residential population within the five-mile radius is approximately 3,800 and includes a portion of the city of Charlevoix; Charlevoix County residential population is 26,090. The permanent residential population within 50 miles is approximately 195,000. The closest city with a residential population in excess of 25,000 is Sault Ste. Marie, Ontario, Canada, located approximately 100 miles from the plant. Traverse City, Michigan, approximately 50 miles to the south, does not have a population of greater than 25,000 within its incorporated boundaries, but the greater metropolitan area does exceed 25,000. There are no significant minority populations in the areas surrounding the BRP site [Reference 8-31].

Based on Census data over the last four decades, average population increases for area municipalities is 11 percent over 40 years or approximately 0.3 percent per year. The average annual population increase for the three surrounding counties (Charlevoix, Antrim and Emmet) is approximately 2.6 percent. The increase in rural residential populations is consistent with an overall trend recognized across the country of movement from urban to suburban or rural areas. Projected population growth rate for the regional area is expected to remain relatively constant.

8.4.1.3 Land and Water Use Within a Five-Mile Radius

The general land use surrounding BRP is shown in Figure 8-3. Vegetation in this area consists largely of wooded areas and open fields. There are relatively few farms in the area immediately surrounding the plant site. Commercial land use consists primarily of small businesses in or near the city of Charlevoix. There are several small industrial sites within the five-mile radius. Several medium-density residential developments are located to the east of the plant. The remainder of residential and vacation homes are scattered throughout the area. There are also a variety of public recreation areas and several large bodies of water located within five miles of the plant.

- Farms

  Land use for farming is limited in the vicinity of BRP primarily due to nutrient-poor soils. According to 1997 agricultural census, approximately 12 percent of Charlevoix County is used for farming versus 16 percent in 1987 [Reference 8-8]. In general there has been a decrease in the number of both large and small farms in Charlevoix County over the last several decades. Currently, no lakefront farms are located along Lake Michigan within 35 miles of BRP due to poor soil quality and high economic value of Lake Michigan shoreline property.

- Commercial / Industrial Areas

  The majority of commercial land use occurs in the city of Charlevoix, located approximately 3.5 miles southwest of the plant. A small industrial park of less than ten small businesses and a 58-room hotel are located approximately 2.5 miles southwest of the BRP site boundary. Refer to Figure 8-3 for approximate locations of commercial/industrial facilities.

- Residential Areas

  Several residential areas are located in the vicinity of BRP including subdivisions to the east, west and south and also within the city limits of Charlevoix. The closest residence to BRP is located approximately ½ mile to the west.

- Schools / Hospitals

  There are four schools within five miles of the plant. The size of these schools ranges from approximately 100-700 students. Charlevoix Area Hospital and Northern Michigan Hospital, both small regional facilities, are located five miles to the southwest and twelve miles to the east, respectively.

- Recreational Areas

  Waterfront recreational areas include the Mt. McSauba Recreation Area, Lake Michigan Beach, Depot Beach, and Ferry Avenue Beach located on Lake Charlevoix, in addition to several public and private marinas also located on Lake Charlevoix. In the vicinity of the plant, both Lake Charlevoix and Lake Michigan are used extensively for recreational fishing. There are two golf courses within five miles of the plant; both of these courses are located along US Route 31, between BRP and the city of Charlevoix. Approximately 1.5 acres just west of the plant is owned by the Little Traverse Conservancy. South of US Route 31 approximately 100 acres are owned by the Charlevoix Rod and Gun Club. A non-motorized recreational trail was completed in 2002 along the BRP property parallel to US Route 31.

- Transportation Routes

  US Route 31 connects the cities of Charlevoix and Petoskey and provides access to the plant. A small airport serving the area is located south of Charlevoix along US Route 31.

- Major Bodies of Water

  The primary body of water in the vicinity of the plant is Lake Michigan. Lake Michigan has a surface area of approximately 22,300 square miles and a maximum recorded depth of 923 feet. To the south, at a distance of about three miles, is Lake Charlevoix, an inland extension of Lake Michigan. To the east of the plant is Susan Creek, which flows from Susan Lake north into Lake Michigan. Lake Charlevoix has a surface area of about 17,000 acres, while Susan Lake has a surface area of about 130 acres.

8.4.2 Climate

The following assessment of the climatology of the plant is based on data from on-site instrumentation and from the three National Weather Service (NWS) cooperative stations in the vicinity of BRP (Charlevoix, 5.2 miles west-southwest; Petoskey, 10.3 miles east; and East Jordan, 14.8 miles south of BRP).

Due to the proximity of the site to Lake Michigan, the influence of the lake on the climatology at the plant is significant throughout most of the year. In general, the lake has a moderating effect on the weather. Prevailing westerly winds bring cooler spring and early summer temperatures while fall and early winter temperatures are milder than those experienced further inland. Since the day-to-day weather is controlled mostly by the high and low pressure fronts, the area near BRP usually does not experience prolonged periods of hot, humid weather in summer, or extreme cold in the winter.

8.4.2.1 Temperature

A moderating effect on ambient temperatures caused by Lake Michigan water temperatures is commonly experienced at the site. On the average, the warmest normal maximum and normal minimum temperatures both occur in July (76.6 °F and 57.0 °F). The coldest normal maximum temperatures usually occur in January (26.7 °F). However, the coldest normal minimum temperatures (12.8 °F) occur in February. By February, northern Lake Michigan is usually frozen over. Thus, its moderating effects on cold temperature and cloud coverage are minimized. For all months, the diurnal range for the shoreline stations is consistently less than that of the inland site. During the spring months, the high temperatures are typically two to five degrees Fahrenheit cooler near the cold lake. Conversely, low temperatures during the autumn months are two to four degrees Fahrenheit warmer at the shoreline.

8.4.2.2 Precipitation

Precipitation at the BRP site is very evenly distributed, averaging between two and three inches eight months of the year. Annually, the BRP site receives an average of 31.7 inches of precipitation. During a typical year, 149 days receive measurable precipitation. Heavier daily amounts of precipitation, those at and above 0.10", occur mainly during the spring, late summer and fall. These amounts are partially the result of the thunderstorm season, which lasts from March to November.

8.4.2.3 Evaporation

Local evaporation measurements are recorded at Lake City, Michigan, approximately 70 miles south of BRP. July, the warmest month, has the highest evaporation rate. Total evaporation for the May through October seasonal averages about 28.0 inches. However, the normal precipitation during this period is only 18.5 inches. Thus, moisture replenishment during the fall and winter months is important in maintaining overall area hydrology.

8.4.2.4 Snowfall

Annually, the BRP site averages over 106 inches of snow; however, this has varied greatly over the years, ranging from as little as 43.3 inches in 1954 to as much as 231.0 inches in 1985. January receives the most, with an average of 33.4 inches. The daily snowfalls at the BRP site are generally the result of light, but frequent, lake-effect squalls. Major snowstorms do occasionally occur at BRP. The maximum daily snowfall recorded in the vicinity of the plant was 20.5 inches in November 1950. BRP's winter combination of below freezing temperatures and frequent snowfalls is ideal for snow accumulation. February has the deepest average snow cover, approximately 17 inches.

8.4.2.5 Wind

Wind data are currently collected by ground-level instrumentation located near the plant Monitoring Station. Historical wind data were collected by instrumentation located on the plant stack, 71.3 meters (233.9 feet) above-grade. The highest annual average wind speeds are associated with the north-northwest and north sectors, at 7.6 m/s (17.0 mph) and 7.4 m/s (16.6 mph), respectively. The lowest speeds, 5.6 m/s (12.5 mph), are associated with northeast winds. Calm winds, defined as less than 0.4 m/s, are observed only 0.26% of the time.

8.4.2.6 Severe Weather

The highest monthly frequencies for thunderstorms at BRP occur in June and July, with an incidence of seven days each. The normal annual thunderstorm total is 36 days. Most of the storms that arrive at the plant originate over Lake Michigan where moisture is plentiful. Thus, a significant portion of the daily precipitation amounts are caused by convective activity. Flooding, resulting from either probable maximum precipitation or lake flooding event, would not exceed an elevation of 594.0 feet mean sea level (msl), approximate elevation of the Industrial Area [Reference 8-18].

Tornadic activity in the vicinity of BRP is rare. The northern part of Michigan is at the extreme fringe of the Midwest tornado belt. During the period from 1930-1985, inclusive, only two tornado sightings have been recorded in Charlevoix County.

8.4.3 Geology and Seismology

The following sections provide a general discussion of site geology and seismology.

8.4.3.1 Regional Geology

The BRP site lies within the Great Lakes Section of the Central Lowlands Physiographic Province. The dominant features of this section were caused by glaciation and include lakes, prominent end moraines, outwash plains, closed basins forming swamps or lakes, eskers and drumlins, and vast areas of rolling ground moraine between the end moraines. Because of the direction of advance and retreat of the last glaciation, lower peninsula Michigan has a strong surficial northwest-southeast grain. This is also the principal structural trend in Paleozoic rock. Bedrock consists of limestone and shale of the Traverse Group of Middle Devonian age (395 million years before present (mybp) to 375 mybp). Three formations of the Traverse Group are exposed in the region: the Petoskey, Charlevoix, and Gravel Point formations. The bedrock immediately beneath the plant is the Gravel Point formation as the Petoskey and Charlevoix formations have been eroded away. Much of the southern shoreline of Little Traverse Bay from Charlevoix to Petoskey is formed by outcrops of the Gravel Point formation. Interbedded with the limestone strata are beds of shale and shaley limestone.

BRP is located in the Central Stable Region Tectonic Province. This province is characterized by major domes, basins, and arches which formed during the Paleozoic Era (570 mybp to 240 mybp). The site lies above the northern flank of the Michigan Basin, which is one of the large tectonic structures in the Central Stable Region. Bedrock in the region dips at a low angle to the southeast toward the center of the Michigan Basin. Superimposed on this regional dip in the site region are gentle undulations caused by the presence of minor synclines and anticlines. These folds strike generally northwest-southeast and plunge to the southeast. The axes of major folds within Paleozoic rocks of the Michigan Basin also have northwest-southeast trends.

Regional jointing in the northern Michigan Basin have four major vertical joint sets: N52 E, N46 W, N89 W, and N1 E. These trends are present in the site region with the northwest set being the most prominent. The joints are usually tight and widely spaced, but locally they have been widened by solutioning. Sinkholes exposed in local quarries appear to be aligned along major joint trends.

The Michigan Basin has been relatively stable for several hundred million years and is therefore relatively undeformed. Faults have been identified in Paleozoic rocks in the basin. However, no major faults are known in the site area. The faults in the basin are believed to be pre-Pennsylvanian (more than 330 mybp). They do not offset Pleistocene (10,000 years to 2 mybp) glacial deposits. Minor faults related to ancient solution collapse features have been observed in local quarries. Faults have been postulated, based on seismic reflection profiling in Lake Michigan. These faults have been evaluated and interpreted to be not capable of displacement.

8.4.3.2 Site Geology

Elevations at the plant property on the south shore of Little Traverse Bay range from about 580 feet msl at the lakeshore to 700 feet msl about, one mile inland. Elevation at the plant Industrial Area is approximately 590 feet msl. From the lakeshore to about one mile inland the terrain is a lowland that was once submerged beneath ancestral Lake Michigan.

Site topography is characterized by low beach ridges separated by swampy areas. Approximately one to five miles inland from the lake, elevations range from 700 to 900 feet above lake levels. This area is a till plain with drumlins that rise 40 to 60 feet above it. A drainage divide causes surface water and shallow groundwater to flow north to Little Traverse Bay and south to Lake Charlevoix. It is also the probable recharge area for minor artesian zones in the soil beneath the plant site. A topographic map of the area surrounding BRP is provided in Figure 8-4.

The geology of the site was investigated in several phases. Two exploratory borings were drilled into the top of bedrock in May 1959, and seven more borings were drilled into rock in February 1960. In 1979, three borings were drilled to determine the dynamic characteristics of the soil and rock beneath the site. In 1999, 26 borings were drilled to better define geologic and hydrogeologic conditions at the site. In 2001 and 2002, 15 groundwater wells and borings were drilled to further identify site hydrogeologic conditions in the vicinity of the Industrial Area [Reference 8-28]. Section 2.4.3 contains additional information regarding groundwater and geology investigation wells as they relate to site characterization.

8.4.3.3 Seismology

The probability of earthquakes of significant intensity near BRP appears to be very low. Recorded earthquake history for Michigan and the surrounding region has classified all earthquakes in the region as minor or intermediate. The nearest recorded earthquake, occurring in 1909, was centered near Menominee, Michigan approximately 110 miles from the plant. Since 1909, no earthquakes centered within a 150-mile radius of BRP have been documented. Figure 8-5 is a United States Geologic Survey (USGS) seismic history for Michigan [Reference 8-19].

8.4.4 Hydrology

The information presented in this section describes general characteristics of the surface and groundwater within the area immediately surrounding BRP.

8.4.4.1 Surface Waters

The water level of Lake Michigan has varied between approximately 576 and 583 feet msl since 1905. Lake Michigan water level experiences long-term, seasonal, and short-term variations. Long-term variations are caused by periods of higher or lower than usual precipitation or evaporation lasting several years and extending over a large part of the Great Lakes watershed. The highest recorded (1905-present) mean monthly water level on northern Lake Michigan near BRP was 582.0 feet msl (1986). The minimum monthly level of Lake Michigan was elevation 576.6 feet msl (1964) [Reference 8-30].

Big Rock Point is located in an area where surface runoff generally flows into Lake Michigan. The plant Industrial Area is currently equipped with a regulated storm drainage system, consisting of catch basins and corrugated metal pipes emptying into Lake Michigan. Drainage from building areas generally flows away from the plant area toward Lake Michigan. Some runoff from high ground is diverted around the plant to the lake by a ditch and culverts on the south and east sides of the Industrial Area. Drainage areas are well vegetated and relatively flat. All underground drainage piping will be removed and surface water flow will be channeled to a grassy area east and west of the former Industrial Area.

In general, the northern portion of Lake Michigan is characterized as an oligotrophic lake with excellent water quality. Periodic analyses have been performed on Lake Michigan waters in the vicinity of the plant. Water quality data reflect analyses performed on Lake Michigan waters near the plant Discharge Canal, in Little Traverse Bay, and outside the Pine River Channel leading from Round Lake to Lake Michigan (also known as the Charlevoix Harbor area). Water quality information obtained from these locations is fairly consistent and is a reasonable representation of Lake Michigan water quality in this region.

8.4.4.2 Groundwater

Groundwater at the site moves north into Lake Michigan from the groundwater divide between Lakes Charlevoix and Michigan.

Three groundwater bearing zones have been identified at the site. These include the lower portion of the near-surface and gravel layer (three-five feet below the surface), the intermediate depth sand layer (approximately 20-25 feet below the surface) and the underlying fractured limestone bedrock. The most probable entry point for groundwater found in the uppermost zone is located south of the main power station area in the undeveloped portion of the BRP site. Much of this area is low, wetland type terrain, which collects infiltration from property to the south of the site. The groundwater entry points for the other two units are most likely located even farther south. The groundwater movement direction in all three of these units is northerly into Lake Michigan. The near-surface location of the two upper groundwater bearing units would prevent their use as sources of drinking water due to lack of capacity and State Regulations on drinking water well depth. The limited thickness of these same two units would likely prevent their use as sources of irrigation water. The fractured bedrock zone is considered to be the main drinking water aquifer at the site, and it is also a potential source for other non-potable water uses.

Several groundwater monitoring wells have been installed near the BRP Industrial Area. Nine monitoring wells were installed in 1994 and are sampled semi-annually for radioactivity. Additional groundwater sampling points were installed for the 2002 hydrogeologic assessment. Section 2.4.3 provides a detailed explanation of the BRP site groundwater monitoring locations. Dewatering and groundwater control measures are expected to be necessary during subsurface foundation and equipment removal and subsequent final status surveys of excavated areas. Dewatering activities may require temporary barriers to groundwater flow prior to and during demolition and final status surveys. These barriers are not expected to influence groundwater flow characteristics beyond the demolition and final status survey interval.

The well water system at BRP is located approximately 800 feet east of the plant at a depth of 135 feet. The site well will be decommissioned in accordance with Michigan Department of Environmental Quality (MDEQ) regulations. Other water supplies near BRP generally consist of private residential and commercial wells or well

systems serving small residential communities. The city of Charlevoix obtains water directly from Lake Michigan. The city water intake is located approximately four miles from the plant, west of the Pine River Channel connecting Lake Michigan and Round Lake.

8.4.5 Natural Resources

In addition to the aquatic resources described in Section 8.4.1.3, several public lands and conservation areas are located near BRP, offering a variety of recreational opportunities including fishing, hunting, boating, swimming, hiking and picnicking. Waterfront recreational areas include the Mt. McSauba Recreation Area, Lake Michigan Beach, Depot Beach and Ferry Avenue Beach located on Lake Charlevoix. In the vicinity of the plant, both Lake Charlevoix and Lake Michigan are used extensively for recreational fishing. Approximately 1.5 acres just west of the plant is owned by the Little Traverse Conservancy. This land includes 500 feet of Lake Michigan shoreline, reserved as a natural habitat and receives minimal public use. Figure 8-3 shows the locations of public lands listed above as well as the locations of recreational facilities within five miles of BRP. There are no known mineral resources as defined by USGS on the BRP site [Reference 8-32].

Commercial fishing in Lake Michigan near BRP is regulated under the terms of the 1985 negotiated settlement involving Native American tribes, the State of Michigan and the U.S. Department of Interior. Currently, three northern Michigan tribes, operating under the regulation of the Chippewa/Ottawa Treaty Fishery Management Authority (COTFMA), fish in the treaty-ceded waters of Lake Michigan. The three tribes involved are the Sault Ste. Marie Tribe of Chippewa Indians, Bay Mills Indian Community and the Grand Traverse Band of Ottawa/Chippewa Indians. The area of Lake Michigan near BRP is considered a "transition zone," and no tribal commercial fishing is allowed for the periods from June 1 to September 30 and November 1 to December 31. Under the provisions of this treaty the region of Lake Michigan near BRP is designated as a primary lake trout rehabilitation zone.

8.4.6 Cultural, Historical and Archeological Resources

The Michigan Historic Preservation Office has no record of any historical or archaeological sites on the BRP property. There are recorded archaeological sites along and near the shoreline in the surrounding region, including a site to the east of the plant, two sites in the Nine-Mile Point vicinity, and one site to the west near North Point. There are several historic sites in Charlevoix County, the closest to the plant is the Pine River Indian Mission located approximately six miles inland from the shoreline [Reference 8-26].

A Phase I archaeological survey of plant property was conducted in 2000 assessing the historic significance of previously undisturbed site land [Reference 8-29]. This study identified seven prehistoric archaeological sites within the BRP property boundary. The significance of these sites is still under evaluation by the Michigan Historic Preservation Office pending completion of a Phase II archeological study; it is expected that this evaluation will be completed prior to release of the site for unrestricted use.

Along the Lake Michigan shoreline approximately ½ mile west of the plant Industrial Area exists a large rock (approximately 4m by 4m in size) visible both from the water and shoreline. The "Big Rock" has historical and cultural significance to the local Native American tribe, Little Traverse Bay Band of Odawa[3] Indians, as it has been documented as a navigational marker used by native people as they canoed across Little Traverse Bay each year. Based on this information, Consumers Energy plans to perform a Traditional Cultural Properties study to assess the significance of the "Big Rock" as a cultural resource of the assessment of the Little Traverse Bay Band of Odawa Indians. It is expected that this study will be completed prior to release of the site for unrestricted use.

8.4.7 Ecological Resources

The following sections provide an overview of the aquatic flora and fauna, terrestrial flora and fauna, and Threatened and Endangered Species information for the biological communities in the vicinity of BRP.

8.4.7.1 Aquatic Ecology

- Aquatic Flora

  While no current data is available on aquatic flora near the BRP site, results of several Lake Michigan near-shore water studies indicate that the year-to-year distribution of phytoplankton throughout Lake Michigan is relatively constant with expected seasonal variations.

- Aquatic Fauna

  Characterization of aquatic biological communities provided in this subsection focuses on Lake Michigan and Lake Charlevoix. The littoral mainland area of Lake Michigan has potential spring and summer spawning grounds for several species of fish. However, the immediate vicinity of BRP has not been identified by the U.S. Fish and Wildlife Service as a critical spawning ground. The site does not represent a unique or specialized niche for colonization or ecological activities, and the habitat is typical of the northern part of Lake Michigan's lower peninsula shoreline.

[3] Odawa is the Native-American equivalent of the English word Ottawa.

Popular sport fish found in Lake Charlevoix and the Charlevoix County area of Lake Michigan include: lake trout, coho salmon, chinook salmon, rainbow trout, pink salmon, brown trout, walleye, channel catfish, burbot, yellow perch, lake whitefish, smallmouth bass, largemouth bass, northern pike and sunfish. Forage fish stocks in Lake Michigan include such species as alewife, smelt, bloater chubs and sculpins.

8.4.7.2 Terrestrial Ecology

Terrestrial biological communities onsite are located on level to gently sloping lake plain soils that are cobbly and gravelly. Most of the site property is composed of woodlands, with limited open-land acreage that is converting to forest. Both sand and stone beaches occur onsite. Soils on the property are in the Detour-Kiva association. These soils are very poorly suited to both farming and silvicultural practices. The following sections describe soil, terrestrial plant and wildlife in the vicinity of BRP.

- Soils

The soil survey of Charlevoix County, Michigan, includes all site soils in the Detour-Kiva association. Soil types and their approximate onsite acreage are provided in Table 8-1; Figure 8-6 provides information on approximate locations of these onsite soil types. In general, the site is poorly suited to agriculture use due to nutrient-poor soils and the high economic value of Lake Michigan shoreline. This high capital cost makes farming not economically feasible, although small residential gardens are possible.

Table 8-1. Big Rock Point Soil Types

Soil Type	Description	Onsite Acreage* (%)	Comments
AgB	Alpena gravelly-sandy loam, 0-6% slopes	188 acres (33%)	This is a soil of beach ridges and terraces. Onsite, this soil is found predominantly in a band about a quarter-mile wide along the beach ridges and terrace adjacent to Lake Michigan. Permeability is rapid, natural fertility is low, organic content is moderately low. The Industrial Area is comprised of this type.
DeB	Detour cobbly loam, 0-6% slopes	228 acres (40%)	This soil is a poorly drained soil with slow permeability and surface runoff. Detour soils are poorly suited to farming because of wetness. Onsite, Detour soils are generally forested.
EdB	Eastport sand, 0-6% slope	4 acres (<1%)	This is a soil of beach ridges and low dunes on the plant site. This soil is found about a quarter-mile inland in a narrow band associated with the steeply sloped Emmet-Onaway soils.
EoF	Emmet-Onaway sandy loam, 25-50% slopes	17 acres (3%)	This soil type is characterized by steep slopes, are sparsely wooded and prone to wind erosion.
Hs	Hessel cobbly loam	105 acres (18%)	Hessel soils are thin, poorly drained soils formed on lake plains and lake terraces. Water availability is high, organic matter and natural fertility is high. Depth is seldom more than two feet.
Lb	Lake beach	27 acres (5%)	These narrow strips of lake beach frontage are comprised primarily of sand, although the sand is covered by substantial cobble and boulders. These beaches are subject to storm action and may vary significantly in size depending on Lake Michigan level.
Rc	Roscommon sand 0-9% slopes	1 acre (<1%)	This is a poorly-drained soil with high organic matter but low natural fertility. This wetland soil occurs along Susan Creek on the far eastern perimeter of the plant property

* Acreage and percentage of onsite soils are based on the original plant property of 570 acres.

- Flora

Table 8-2 lists land cover types and their acreage within the BRP property boundary including tree species (where available) and stocking density. Figure 8-7 depicts general forest cover on the BRP property based on 1978 color aerial photos obtained from the Michigan Department of Natural Resources (MDNR), Land and Water Management Division. Since 1978, dramatic successional changes have occurred at the BRP site. Open areas have succeeded to young stands of cedar and birch. Growth that was formerly dominated by sawtimber-sized aspen and birch is now dominated by pole-sized white cedar and balsam fir due to death of the senescent aspen and birch and release of the coniferous understory. In general, the BRP site forest vegetation is now typically characterized as lowland conifer, pole-sized and well-stocked (cover Type 423).

Table 8-2. Big Rock Point General Land Cover Types

Cover Type*	Description	Onsite Acreage** (%)	Comments
146	Utilities	16 acres (3%)	Areas converted to industrial use. Note: This type has increased as a result of decommissioning.
31	Open land	35 acres (6%)	This is primarily old grazing or hay land that is reverting to shrubs and trees. Today, much of this type would be classified as 32, shrub land, or a young forest type.
32	Shrub land	7 acres (1%)	This type represents hay or grazing lands that are reverting to a forested condition.
411	Northern Hardwoods	28 acres (5%)	Northern hardwoods consist of sugar maple, beech and white ash. The majority of the acreage is of saw-timber size. The shrub and floral understories in these stands are well developed and diverse.
413	Aspen/White Birch	97 acres (18%)	These stands are located on the better-drained soils. At pole-size, the shrub and floral understories in these stands are moderately well developed. Conifer understories are well developed on wetter areas.
414	Lowland Hardwoods (Aspen)	233 acres (41%)	Floral elements and a conifer understory area were well developed in these stands. Today, these areas have succeeded to lowland conifers of pole size and would generally be typed as 423, lowland conifers
422	Upland Conifers	97 acres (17%)	The current observations indicate these are lowland conifers, Type 423.
423	Lowland Conifers	50 acres (9%)	Pole-sized white cedar is dominant; balsam fir, and immature white cedar are common in the understory. Natural succession has converted most of the aspen/birch and lowland hardwood stands to lowland conifers. Type 422, upland conifers, should have originally been designated as Type 423, lowland conifers
72	Beaches	7 acres (1 %)	Beach acreage varies with lake levels, wind direction, and storm accretion and removals. Beach grass, wormwood, willows, white cedar, dogwood, elm and other hardy, early successional species move inland or lakeward with the availability of beach. Great Lakes beaches may contain unique floral elements, such as several threatened species, which are discussed in Section 8.4.7.3.

*Nomenclature follows the Michigan Land Cover Use Classification System. The numerical system describes forest type for forested areas.

**Acreage and percentage of onsite vegetation are based on the original plant property of 570 acres.

- Fauna

Birds and mammals in the vicinity of BRP are generally representative of species found along shoreline and inland habitats in northern, lower Michigan. Species diversity, particularly of "nongame" species, may be higher onsite in the more mature habitats than they are regionally. However, species favoring younger successional stages, including uneven-aged aspen stands, such as whitetail deer, snowshoe hare or ruffed grouse may not be as abundant near the plant as they are regionally.

Employee observations indicate deer, grouse, and wild turkey are present onsite, and rarer animals such as black bear or bobcat may be present from time to time. Coyotes appear to be common, as are two of their common prey, snowshoe hare and cottontail rabbit. Both beaver and muskrat are common along Susan Creek. Several bald eagle sightings have also occurred on and near the BRP site since plant shutdown. Recreational hunting of deer, turkey, and bird occurs on private land near the BRP site.

8.4.7.3 Threatened and Endangered Species

The BRP site is located in relatively undisturbed natural habitats on the shore of Lake Michigan. Great Lake beaches, both sandy beaches and rock beaches, have the potential for harboring Federally-listed threatened species such as Dwarf lake iris (*Iris lacustris*), Houghton's goldenrod (*Solidago houghtonii*), and Pitcher's thistle (*Cirsium pitcheri*). These species are well-represented in shoreline habitats in Charlevoix County and adjacent counties, as evidenced by Michigan Natural Features Inventory (MNFI) records. Several surveys by Consumers Energy have documented the presence of Pitcher's Thistle and a State-listed threatened species, the Lake Huron tansy (*Tanacetum huronense*) on beach areas west of the plant Industrial Area. Dwarf Lake Iris and Houghton's Goldenrod were not found on the BRP site despite thorough searches, the most recent in August 2002 [Reference 8-20].

Inland, conifer swamp and upland habitats could possibly harbor plant or animal species that are State-listed as threatened or of special concern. However, no such species have been specifically identified at this time.

8.5 ENVIRONMENTAL EFFECTS OF DECOMMISSIONING

The following sections address the environmental impact for the process of decommissioning and site restoration of the BRP Nuclear Plant.

8.5.1 Radiological Impacts of Decommissioning

Radiological impacts of decommissioning discussed below include:

- Onsite occupational radiation doses,

- Offsite radiation exposures and monitoring, from liquid and gaseous effluent releases,
- Effects of decommissioning accidents,
- Radiation exposures resulting from LLW disposal and transportation,
- Spent fuel storage, and
- Radiological criteria for unrestricted use of the site.

8.5.1.1 Occupational Radiation Exposures

Occupational radiation exposure at BRP is controlled in accordance with 10 CFR 20. The requirements of 10 CFR 20 are implemented through a comprehensive Radiation Protection (RP) Program. The BRP RP Program is applied to all activities involving radiological hazards. The program is based on the premise that all exposures should be reduced to levels, which are as low as reasonably achievable (ALARA), to both the individual worker and to the workforce as a whole.

- Occupational Radiation Exposure Comparison to GEIS

  The total decommissioning dose for BRP RP activities is estimated to be 700 person-rem. This estimate is derived from the original five-year SAFSTOR dose estimate and was adjusted by the factor of radioactive decay that would have occurred if the five-year SAFSTOR option had been utilized and other radiological considerations. The immediate dismantlement (DECON option) dose estimate is significantly lower than the value of 1874 person-rem for a boiling water reactor facility identified in the GEIS. A chemical decontamination of the primary Nuclear Steam Supply System was completed in 1998, resulting in removal of approximately 435 curies of radioactivity. The performance of the chemical decontamination negates the disadvantage of the DECON option as discussed in the GEIS.

  To date, actual occupational doses have been consistent with dose estimates for completed decommissioning activities. Dose projections for each calendar year are completed annually based on specific planned work activities. The most significant contributors to occupational doses for remaining dismantlement activities include handling and shipping of major components (reactor vessel, steam drum, spent fuel pool); dismantlement of the radwaste system; and the handling and shipping of low-level radioactive waste.

- Radiation Protection Program

  The requirements of 10 CFR 19 and 20 are implemented by administrative and working level plant procedures. The elements of the BRP RP Program are described below.

- ALARA Program

  The ALARA Program utilizes reviews in initial engineering phases as well as job planning and dose estimates or goals for major tasks, work groups and individual workers. Reviews are performed at various administrative levels, with the highest doses requiring the highest level of management review. Both contract and company employees are covered by these procedures.

  Specific techniques of dose reduction which are considered in job planning include shielding, decontamination, special training (including mockup training or special tests of tools and procedures as appropriate), remote tools, remote video monitoring, use of alarming dosimeters, use of minimum effective crew size and other items, including suggestions from workers, which might reduce dose while permitting safe execution of the task.

- Radiation Respiratory Protection Program

  The BRP Radiation Respiratory Protection Program meets all requirements of 10 CFR 20, Subpart H, (20.1701 through 20.1704). The Radiation Respiratory Protection Program is a continuation of the ALARA program into the area of airborne radioactivity intake. The policy is to maintain total effective dose equivalent (TEDE) ALARA, regardless of the mix of internal and external exposure. Whenever practicable, engineering features are used to control airborne radioactivity. These features include installed ventilation, special mobile filter units, work enclosures, and other methods of maintaining the breathing zone at minimal levels of radioactivity. Individual respiratory protective devices may be utilized if such use minimizes TEDE or is required by other workplace hazards, e.g., asbestos, lead, etc.

- Radioactive Materials and Contamination Control

  Control of radioactive materials for BRP decommissioning involves the control of activated or contaminated materials originating from plant operation, as well as control of sealed sources licensed to the plant for use in instrument calibrations. Activated and contaminated materials are controlled predominantly by procedures and work practices specific to decommissioning tasks involving work in radiation and contamination areas, and for handling radioactive waste. These controls are applied as a portion of the overall program of minimizing radiation exposure to both workers and members of the public. Specific program items include:

  - Personnel contamination control,
  - Controls to minimize spread of contamination,
  - Labeling of radioactive materials,
  - Release of materials for unrestricted use,
  - Handling of radioactive materials for storage and shipment,
  - Liquid and gaseous release, and
  - Sealed source accountability.

8.5.1.2 Offsite Radiation Exposure and Monitoring

The Radiological Environmental Monitoring Program (REMP) has been modified to monitor specifically for the effects of decommissioning activities as described in the Offsite Dose Calculation Manual (ODCM). This program currently consists of monitoring doses associated with liquid and gaseous effluents, gamma radioactivity at the site boundary and near the ISFSI, and radioactivity in specific media (shoreline sediment, fish, well water, etc.). Reports of radioactive effluents released from BRP and radiological environmental monitoring results are submitted annually to the NRC in accordance with BRP Defueled Technical Specifications, 10 CFR 50.36(a), and 10 CFR 50, Appendix I, Section III.B.1 [Reference 8-11]. It is anticipated the requirements for environmental radiological monitoring will be revised as the potential for radiological effects/effluents is eliminated and documents controlling these activities are modified accordingly.

Actual doses during decommissioning are small fractions of those effluent doses received during the operating phase of the plant. Gaseous emissions decreased immediately upon plant shutdown while liquid radioactivity has decreased more slowly due to the presence of Cs-137 and Co-60 with their longer half-lives. Annual doses to the public during BRP's operating period and the initial phase of decommissioning have not exceeded 0.5 millirem for liquid effluents and 0.1 millirem from gaseous effluents.

Releases of radioactive liquid and gaseous (including particulate) effluents during the decommissioning period are minimized by use of existing radioactive effluent treatment systems until such time as those systems are deactivated in the decommissioning process. Temporary systems may be utilized, as necessary to meet the objectives of maintaining doses to the public ALARA as identified by 10 CFR 50, Appendix I. Effluent monitoring or sampling systems are maintained either by use of existing monitoring systems or by temporary equipment or actions during releases. Monitoring or sampling instruments of equal or higher sensitivity than those currently installed will be utilized as appropriate for decommissioning activities involving liquid or gaseous effluents.

Both liquid and gaseous effluent doses are calculated using industry-standard models, applying site-specific parameters of meteorology, and dilution factors to the nearest public water supply, nearby recreational activity and critical receptor. In addition, monthly, quarterly and annual dose calculations are performed prior to each liquid batch release (or continuous gaseous release) to assure that the guidelines are not exceeded prior to completion of the release [Reference 8-35].

8.5.1.3 Environmental Effects of Accidents and Decommissioning Events

Analysis of potential decommissioning accidents involved an assessment of planned BRP decommissioning activities to identify accidents with significant radiological release capabilities. These decommissioning accidents are categorized in two areas, events involving spent fuel and external events. Events involving spent fuel include fuel handling accidents, loss of spent fuel pool cooling, spent fuel pool freezing and dry fuel storage-related accidents. External events are initiating events

that have the potential to result in radiological consequences; these include loss of offsite power, aircraft hazards, fire and natural phenomena (flooding, tornadoes, etc.). The BRP UFHSR contains a detailed discussion of decommissioning accident scenarios and conclusions [Reference 8-18]. The Fuel Solution Storage System Final Safety Analysis Report addresses accidents and natural phenomena specifically applicable to the dry fuel storage system located at the ISFSI [Reference 8-2].

A review of these scenarios to determine which accident would produce the maximum off-site radiological consequences has been performed in accordance with the guidelines of the Environmental Protection Agency (EPA) Manual of Protective Action Guides (PAGs) and Protective Actions for Nuclear Accidents, EPA- 400 [References 8-5 and 8-21]. It has been determined doses for onsite essential personnel will remain below their occupational dose limits, assuming standard protective equipment is utilized. Radiological consequences for any of these accidents will not result in any offsite dose to the public, which exceed the EPA PAGs. The evaluation of potential site accidents and corresponding worst-case radiological consequences provides the basis for the Site Emergency Plan.

An evaluation of potential non-fuel related decommissioning accidents at BRP has also been performed. Decommissioning activities following final plant shutdown were evaluated, including system and equipment deactivation, decontamination, and dismantlement; radioactive material handling and storage; and transportation of radioactive materials. Types of postulated accidents reviewed were explosions and fires, loss of contamination control, waste transportation accidents, external events, and natural phenomena. In addition to the standard decommissioning activities, postulated accidents associated with potential long-term storage of radioactive waste during decommissioning also were evaluated.

The GEIS assumes that the reference baseline BWR utilizes high efficiency particulate air (HEPA) filters for plant ventilation effluents. To remain within the bounds of the FGEIS and recognizing that during dismantlement airborne particulate releases could be significantly reduced by plant HEPA filtration, a HEPA filtration system was installed in the ventilation system and is used for dismantlement activities involving major source terms of particulate activity.

It is concluded all postulated decommissioning accidents for BRP are bounded by the results described in the GEIS. Thus, as concluded by the GEIS, decommissioning will have a minimal impact on public safety and health.

8.5.1.4 Evaluation of Decommissioning Low-Level Radioactive Waste (LLRW) Volume & Transportation Considerations

Big Rock Point's decommissioning requires disposal of a large volume of radioactive and nonradioactive materials to restore the site and allow release of the site for unrestricted use and license termination. Materials that cannot be decontaminated to the level below the radioactive release criteria are processed as radioactive waste. Big Rock Point ensures appropriate processing, packaging, and control of solid, liquid, and gaseous radioactive wastes through procedures implementing requirements of the Process Control Program, the ODCM, and the Demolition Debris Disposal Program [References 8-11 and 8-14]. Chapter 3 describes the Demolition Debris Disposal Program developed to dispose of nonradioactive building demolition debris at a State of Michigan licensed, regional landfill (see Section 3.4.1.1).

The much smaller size of BRP as compared to the reference BWR in the GEIS results in volumes and total quantities of radioactivity required for shipment, which are on the order of 15-20% of the quantities assumed in Appendix N of the GEIS. Big Rock Point had a rating of 240 megawatt thermal (Mwt), significantly less than the 3320 Mwt reference BWR; thus, the total quantities of radioactivity present on site, the total volumes of waste produced and volume of waste shipped offsite are significantly less than those assumed in the FGEIS.

To date, the majority of radioactive waste shipped for disposal has included system components, material from spent fuel pool cleanout (components, resins, filters, etc.), asbestos and miscellaneous dry active waste (see Section 3.5.4). Consumers Energy contracted with Duratek, Inc., to provide waste processing/disposal services for the BRP Decommissioning Project. To support contractual arrangements and administration, waste quantities, as determined by TLG Services, Inc., are estimated and expressed in units of weight (pounds) as opposed to volume. Table 8.3 summarizes the estimated waste types by waste class as delineated in Title 10 of the Code of Federal Regulations, Part 61.55. Big Rock Point has secured disposal/ processing contracts for all large components and significant waste streams anticipated from BRP decommissioning.

Table 8-3. Total Estimated Waste to be Shipped from BRP

Waste Type	Waste Class *	Weight (Pounds)
CONTROLLED BURIAL		
Metal	C	18,500
Metal	>C	3,000
Resins	B	10,000
LLRW	A	465,000
Metal	A	313,000
Total		809,500
PROCESSED WASTE		
Metal	A	6,715,000
Concrete	A	4,063,000
Soil	A	2,255,000
Lead	A	240,000
Asbestos	A	250,000
Dry Active Waste	A	450,000
Total		13,973,000
CLEAN PROCESSED MATERIALS		
Concrete	N/A	80,100,000
Metal		2,126,000
Mixed Hazardous LLRW		5,000
Total		82,231,000

* Waste classified as delineated in Title 10 of the Code of Federal Regulations, Part 61.55.

In general, doses due to transportation of radioactive waste are bounded by the GEIS. The quantity of radioactivity for BRP waste is offset somewhat by a longer shipping distance for the higher activity wastes (800 km assumed in the GEIS versus 1900 km to Barnwell, via the waste processor, for BRP). The majority of the lowest activity wastes designated for disposal are shipped to Envirocare in Utah (via the BRP waste processor), the very low dose rates compensate for the longer travel time. Overall, both occupational and public doses remain bounded by the GEIS calculations.

8.5.1.5 Spent Fuel Storage

An onsite ISFSI will accommodate all current spent fuel in seven storage casks. An additional cask is designated for storage of greater-than-Class-C radioactive wastes. The environmental impacts associated with dry fuel storage at BRP include land use to accommodate the ISFSI (approximately 20 acres, most of which was previously undisturbed land) and small occupational doses for workers assigned to monitor the installation. Offsite/public doses associated with the ISFSI are considered not to be significant. Figure 8-1 shows the location of the ISFSI within the BRP site boundary.

8.5.1.6 Radiological Criteria for License Termination

Following decommissioning, residual radioactivity will be limited to allow release of the property for unrestricted use such that an individual of a critical population group living on the site would not be expected to receive a dose greater than 25 mrem/year from all applicable combined environmental exposure pathways. License Termination Plan Chapters 2, *Site Characterization,* Chapter 5, *Final Status Survey Plan,* and Chapter 6, *Compliance with the Radiological Criteria for License Termination,* provide the required information regarding achieving unrestricted site release.

8.5.2 Non-Radiological Environmental Impacts

The following subsections provide an assessment of the nonradiological impacts of decommissioning and site release. Generic Environmental Impact Statement Supplement 1 was utilized as the basis for identifying potential environmental impacts and determining the significance of these impacts.

8.5.2.1 Onsite / Offsite Land Use

Several previously undeveloped site areas have been utilized for various decommissioning activities. These include clearing land for additional parking areas and temporary office buildings, construction of the ISFSI, and soil storage/laydown areas. Of the 580-acre site[4], approximately 20 acres were utilized for plant original operational activities. Approximately 40 additional acres of site property have been developed for decommissioning purposes since plant shutdown in 1997. It is not expected any additional undeveloped site property will be altered for future decommissioning activities. Also, since the site is planned to be restored to a Greenfield condition, the long-term effects of onsite land-use are not significant. It is unlikely any offsite land will be utilized for decommissioning purposes, with the exception of the designated landfill for disposal of nonradioactive building demolition debris (see Section 3.4.1.1).

8.5.2.2 Water Use

Big Rock Point uses water directly from Lake Michigan as the source of water for equipment and space cooling purposes and also for the radioactive effluent releases system. Water is withdrawn from the lake via a 5 foot diameter intake pipe, located 1500 feet offshore at a depth of approximately 40 feet. The majority of the water is discharged back to Lake Michigan with little or no change to chemical or physical parameters. The environmental effects of water discharges associated with plant operation were minimal. The potential environmental effects associated with the decommissioning process are also considered to be minimal because plant water usage has been greatly reduced.

[4] Recently, land surveys conducted to support site characterization have determined the BRP site property is 580.4 acres including road right-of-way.

Another source of water usage is groundwater from the site well water system. The principal use of groundwater is for the domestic water system. Groundwater usage is expected to decrease as staffing levels decline throughout the decommissioning process.

8.5.2.3 Water Quality

No significant, long-term impacts on Lake Michigan are expected from decommissioning activities. The thermal plume created by discharge of condenser circulating water has been eliminated when plant operation ceased. Short -term elevated turbidity levels may occur along the Lake Michigan shoreline near BRP during dismantlement and removal of the Screenhouse structure and associated piping. Briefly elevated turbidity levels are not anticipated to have any adverse impact on Lake Michigan waters near the plant.

An unspecified amount of stormwater runoff is discharged to Lake Michigan under State of Michigan authorization. The stormwater outfalls include a network of storm drains connected to facility buildings and paved areas. Some plant floor drains are also connected to the storm water system; these drains are well-marked inside buildings to prevent inadvertent use. The BRP Storm Water Pollution Prevention Plan defines specific requirements for ensuring no inappropriate discharges occur to the stormwater system [Reference 8-17].

No adverse impacts on groundwater are anticipated from specific decommissioning activities. In addition, the groundwater system under the plant area is effectively separated from any potential contact with local private wells and the down- gradient direction of groundwater flow is to the north into Lake Michigan.

8.5.2.4 Air Quality

Fugitive dust will be generated from the various demolitions and dismantling operations. Fugitive dust may originate from concrete during removal of buildings or structures, removal of piping and related components, and from soil excavation to remove components such as underground utilities or potentially contaminated soils.

Reasonable control measures will be utilized to minimize the quantities of fugitive dust. The existing ventilation system, supplemented by localized HEPA filtration units, will monitor and filter particulate emissions from dismantling activities inside the Containment and Turbine Buildings. Excavation of soils and concrete demolition will include the use of wet suppression or chemical stabilization, as required, to minimize the generation of fugitive dust.

The controlled dismantlement and packaging of site components and structures will preclude fugitive dust from becoming an ambient air quality concern during the decommissioning process. The closest national ambient air quality Category 1 area is the Seney National Wildlife Refuge located approximately 70 miles northwest of the BRP site. The location of the Seney National Wildlife Preserve is generally considered upwind of the prevailing wind direction. There are no Category 1 areas within 100 miles downwind of the BRP site.

8.5.2.5 Aquatic Ecology

Aquatic impacts associated with plant operation were considered to be minimal, and the potential impacts associated with the decommissioning process are also minor because plant water usage and discharge quantities are greatly reduced. Therefore, no additional adverse impacts to the aquatic flora or fauna are anticipated from decommissioning activities. Additionally, all applicable National Pollutant Discharge Elimination System (NPDES) limits, as approved by the EPA/MDEQ, will be maintained throughout the decommissioning process.

8.5.2.6 Terrestrial Ecology

Since decommissioning activities will generally take place within the developed acreage on the plant property, additional impacts to site flora and fauna are anticipated only for the ISFSI site and new parking or laydown areas.

8.5.2.7 Threatened and Endangered Species

Several threatened plant species have been identified on BRP site property (see Section 8.4.7.3). Locations of these plant species are clearly marked using ropes and signs. No adverse impact to any identified species is anticipated, since they are not present in locations expected to be impacted by decommissioning activities. Prior to initiation of any decommissioning activities that could potentially affect endangered shoreline species, including final status surveys of beach areas, additional surveys will be conducted using up-to-date listings to identify the existence of threatened or endangered species near areas that may be impacted.

8.5.2.8 Occupational Safety

Consumers Energy Co. is committed to the safe decommissioning of BRP. The Industrial Safety Program provides the basis for controlling safety during decommissioning activities. The primary objective of the Industrial Safety Program is to protect workers and visitors from industrial hazards that have the potential of developing during decommissioning activities and to achieve an injury and incident-free workplace. The BRP Industrial Safety Program establishes and maintains a safe work place for workers, contractors, and visitors through procedures and guidelines to be used to reduce industrial hazards and risks. The site Health and Safety Plan, in conjunction with the BRP Accident Prevention Manual, define specific programs and requirements to ensure worker protection [References 8-3 and 8-8].

While it is recognized decommissioning activities are significantly different from the plant operational period, qualified staff, facilities, and equipment are available to perform decommissioning in a safe and effective manner. Compliance with all applicable federal Occupational Safety & Health Act (OSHA) and state (Michigan Occupational Safety & Health Act, MIOSHA) regulations and to the guidance provided through industry standards and good work practices is a top priority of all site management and employees.

8.5.2.9 Cost

Chapter 7, *Update of Site-Specific Decommissioning Costs,* of this LTP provides a summary and update of decommissioning costs.

8.5.2.10 *Socioeconomics*

Socioeconomic considerations related to decommissioning result from losses of wages and tax revenues after plant shutdown. The impact of these considerations as they apply to BRP and the surrounding communities is considered to be significant based on guidance contained in Supplement 1 to the GEIS. The effect on socioeconomics is considered to be large if a 5% or greater decrease in the area work force occurs and/or a greater than 20% loss of local tax revenues occurs. Since BRP began decommissioning immediately following plant operation, the initial loss of worker wages to the local community was offset by contracted workforce brought in to conduct decommissioning activities. A decrease in the site workforce is expected once spent fuel is placed on the ISFSI in mid-2003. In order to minimize this impact, BRP management has been very proactive within the local community (job fairs, educational assistance, etc.) to assist the workforce to find local employment if desired.

The loss of tax revenues to Charlevoix County and Hayes Township is also significant. This was recognized prior to plant shutdown, and BRP staff has worked with local government officials to minimize the effect of tax revenue loss by a phased-approach to tax payments over the decommissioning period. The effect of tax revenue loss has also been offset by healthy tourism economy and nearby land development for resort, residential and recreational use.

While BRP decommissioning socioeconomic considerations are evident, they have been minimized to the extent possible through early recognition and proactive agreements/actions with local businesses and governments.

8.5.2.11 Environmental Justice

Environmental justice is characterized by high and adverse health, economic or environmental effects by local low-income and minority populations. Due to a tourism-based local economy, area demographic data indicate very low incidence of low-income or minority populations in the communities affected by BRP decommissioning. Further, local Native American populations are not considered to be significantly affected by the decommissioning of BRP. Based upon area demographics and the fact that the site will be restored to a Greenfield condition acceptable for unrestricted use, environmental justice considerations are not considered significant for BRP site restoration.

It should be noted environmental justice issues were also considered relative to the local community where a landfill is located (Crawford County), which will be used to dispose of building demolition debris in accordance with 10 CFR 20.2002. Health and economic effects associated with disposal of demolition waste have been determined to be negligible by BRP, MDEQ and the NRC through approval under 10 CFR 20.2002 (see Section 3.6.3). The Crawford County landfill was deemed appropriate to receive the debris by regulatory agencies for the following reasons:

- The local (Charlevoix County) landfill was closed;
- A reciprocal waste disposal agreement is in place between Crawford and Charlevoix counties;
- The Crawford County site is the closest Type II industrial landfill to the plant;
- Shipping debris to the closest appropriate landfill minimizes risk associated with transportation.

BRP personnel have presented, discussed and addressed issues concerning the disposal plan to township, county, and state officials at more than 20 meetings.

8.5.2.12 Cultural, Historical & Archeological Resources

Prior to plant shutdown, the Michigan Historic Preservation Office requested that BRP perform an archeological study of the site property in accordance with the National Historic Preservation Act. In 2000, a Phase I Archeological Study was completed identifying several prehistoric archeological sites within the BRP property boundary. The significance of these sites is still under evaluation by the Michigan Historic Preservation Office pending completion of a Phase II Archeological Study. These sites are predominately near beach areas and are not expected to be disturbed by any decommissioning activities. Big Rock Point intends to complete a Phase II Archeological Study of the identified sites. Also a Traditional Cultural Property Study of the "Big Rock" to local Native American people will be completed prior to releasing the site for unrestricted use.

8.5.2.13 Aesthetic Issues

Aesthetic issues apply primarily to scenic preservation of public lands. The BRP site is not public land; however, its proximity to public lands (parks and conservation areas along the Lake Michigan shoreline) warrants an assessment of aesthetics. While decommissioning activities may have some short-term effects on Lake Michigan shoreline aesthetics, restoration of the site to a Greenfield condition will result in improved shoreline natural aesthetic views.

8.5.2.14 Noise

Big Rock Point is located in an area that is surrounded on three sides by dense coniferous and deciduous forests. The nearest residence is approximately one-half mile from the property boundary and the nearest recreational area is adjacent to the property boundary. Decommissioning activities will add minimally to ambient sound levels beyond the site boundary. Activities such as the operation of construction equipment may be audible along US Route 31 and over Lake Michigan. However,

the operation of construction equipment will be intermittent and temporary, occurring primarily during the daylight hours. With the exception of the onsite evacuation alarms, it is anticipated any noise beyond the site boundary will be well below 50 dBA, the level above which noise levels may initiate community complaints.

8.5.2.15 Irretrievable Resources

Irretrievable resources refer to materials utilized to construct, operate and decommission a commercial nuclear reactor; these include, but are not limited to, uranium for the nuclear fuel cycle, building construction materials, fuel oil, disposal site (landfill) space usage, etc. The utilization of space in radioactive and industrial landfills for system components and demolition debris is less than the space gained by unrestricted release of the site property. Therefore, decommissioning, dismantlement and restoration of the site to a Greenfield condition are determined not to have any additional adverse effect on resources beyond the materials required to construct and operate the facility.

8.6 OVERVIEW OF REGULATIONS GOVERNING DECOMMISSIONING ACTIVITIES AND SITE RELEASE

Decommissioning and restoration of BRP requires adherence to many federal, state, and local regulations. Applicable federal, state, and local requirements are identified and reviewed below. The information provided below is intended as a broad overview of applicable regulations; this discussion is not intended to be all-inclusive since specific decommissioning activities may invoke regulations not discussed within this section.

8.6.1 Federal Requirements

Decommissioning activities that are subject to federal regulations, permits, licenses, notification, approvals or acknowledgments include:

- Storage of spent fuel,
- Handling, packaging and shipment of radioactive waste,
- Worker radiation protection,
- License termination and final site release,
- Worker health and safety,
- Liquid effluent releases to Lake Michigan,
- Hazardous waste generation/disposition,
- Handling and removal of asbestos,
- Handling and removal of lead paint,
- Soil Erosion Sedimentation and Control Permit,
- Management and closure of mixed LLW storage facility, and
- Radio communications.

8.6.1.1 Nuclear Regulator Commission

The majority of radiological activities fall under Title 10 of the Code of Federal Regulation (CFR) and are administered by the NRC. Applicable Title 10 regulations include:

- Part 50 - decommissioning activities,
- Part 20 - radiation protection,
- Part 51 - environmental protection,
- Part 61 - disposal of radioactive waste, and
- Part 71 - packaging and transportation of radioactive waste (regulations in 49 CFR 171 to 174 also apply).

8.6.1.2 Occupational Safety and Health Administration

Worker health and safety protection during decommissioning is subject to Occupational Safety and Health Administration (OSHA) regulations. The regulations applicable to construction are 29 CFR 1910 and 1926. These regulations include requirements for respiratory protection (nonradiological), hearing protection, illumination, scaffold safety, crane and rigging safety, chemical usage and release response, and cleanup operations.

8.6.1.3 Environmental Protection Agency

The EPA regulations outlined in Title 40 of the Code of Federal Regulations apply as follows:

- Part 61 - Asbestos Handling and Removal,
- Parts 122 to 125 - National Pollutant Discharge Elimination System (NPDES),
- Part 141 - Safe Drinking Water Standards,
- Part 190 - Radiation Protection Standards for Nuclear Power Operations,
- Parts 260 to 272 - Resource Conservation and Recovery Act (RCRA),
- Part 280 - Underground Storage Tanks,
- Part 761 - Polychlorinated Biphenyls (PCBs), and
- Part 129-132 - Clean Water Act.

Asbestos and lead paint handling and removal is subject to OSHA regulations 29 CFR 1910 and 1926, and EPA Regulations 40 CFR 61, Subpart M. Hazardous waste generation, storage, transportation, disposal and closure of the mixed LLW waste facility are subject to the regulations outlined in 40 CFR 260 through 272 of the Resource Conservation and Recovery Act (RCRA). Handling and storage of PCB waste are subject to the requirements of 40 CFR 761 or the Toxic Substances Control Act (TSCA).

Federal Communications Commission (FCC) licenses are required for radio communication equipment used at BRP. Federal Communications Commission regulations apply to any radio communication equipment used in the reactor dismantlement and radwaste processing area.

8.6.2 State and Local Requirements

Permits and approvals from or notifications to several state and local agencies are required for safety and environmental protection purposes. Some of these are for specific decommissioning activities and others are for existing BRP site facilities and ongoing activities that will also be required to support decommissioning. Many of the state and local requirements apply to activities that are also subject to federal regulations discussed previously. Decommissioning activities and related site operations that fall under state and local jurisdiction include:

- Air emissions,
- Hazardous waste generation,
- Asbestos removal and disposal,
- Lead paint removal and disposal,
- Solid waste shipment,
- Solid waste disposal,
- Water use and effluent quality,
- Liquid industrial waste shipment,
- Fuel oil storage,
- Building permits,
- Plant domestic water wells,
- Soil erosion and sedimentation,
- Wetlands protection,
- Underground storage tanks,
- Building demolition,
- Construction and industrial stormwater management,
- Abandoned wells,
- Site unrestricted release,
- Radioactive waste disposal, and
- Building codes.

Michigan's environmental acts were consolidated into the Natural Resources and Environmental Protection Act (NREPA), 1994, PA 451 as amended [Reference 8-27]. Act 451 is organized into "Parts." The following section provides a general description of the Michigan Act 451 parts applicable to decommissioning BRP.

Air emissions and asbestos removal for the site are regulated under the Michigan Air Pollution Control Rules (Part 55) in addition to the Federal Clean Air Act. Operating permits will be revised or terminated as necessary to accommodate decommissioning activities. Notification of asbestos removal will be prepared and submitted to MDEQ staff.

Effluent discharges from the plant to Lake Michigan are regulated by an NPDES permit delegated by the EPA to the MDEQ, Water Division for administration. Part 31 of Act 451 provides regulations for surface water discharges that apply to onsite operations. Soil erosion and sedimentation control and wetlands protection are governed by Act 451, Parts 91 and 303, respectively.

Michigan waste management regulations are found in Parts 111, 115, 117 and 121 of Act 451. These regulations apply to generation, disposition and disposal of hazardous waste, solid waste management, nonhazardous liquid industrial wastes, and used oil recycling. All nonhazardous, nonradioactive wastes, including demolition debris, will be disposed of as either a Type II or Type III waste. Additionally, lead paint handling and disposal falls under MIOSHA regulations.

Three underground storage tanks exist at the BRP site for heating fuel oil, diesel generator fuel supply, and diesel fire pump fuel supply. In addition to regulation under Part 211 of Act 451, these tanks are also regulated by the State Fire Marshall.

Drinking water supplies are regulated under the Safe Drinking Water Act (PA 399, 1976) by the Drinking Water and Radiological Protection Division of the MDEQ.

At the local level, building permits will be required for temporary field office or other facilities necessary to support decommissioning activities.

8.7 SUMMARY AND CONCLUSIONS

The assessment establishes the environmental effects for decommissioning of BRP Nuclear Plant are minimal, and there are no adverse effects outside the bounds of NUREG-0586 (GEIS) or the associated Supplement 1.

Additionally the conclusions contained in the BRP PSDAR, utilized as the original basis for the decommissioning environmental assessment of radiological and non-radiological affects of decommissioning are still valid. These conclusions are summarized as follows:

- Annual occupational radiation exposures per individual will be maintained ALARA and below historical levels for the operating phase of the plant.
- All effluents, both radiological and non-radiological, will remain within regulatory limits as specified in applicable control documents and approvals throughout the decommissioning process.
- Exposure to onsite workers and the offsite public as a result of waste transportation are expected to be maintained well below the levels projected by NUREG-0586 (GEIS).
- Following decommissioning, residual radioactivity will be limited to allow release of the property for unrestricted use such that an individual of a critical population group living on the site would not be expected to receive a dose greater than 25 mrem/year from all combined environmental exposure pathways.

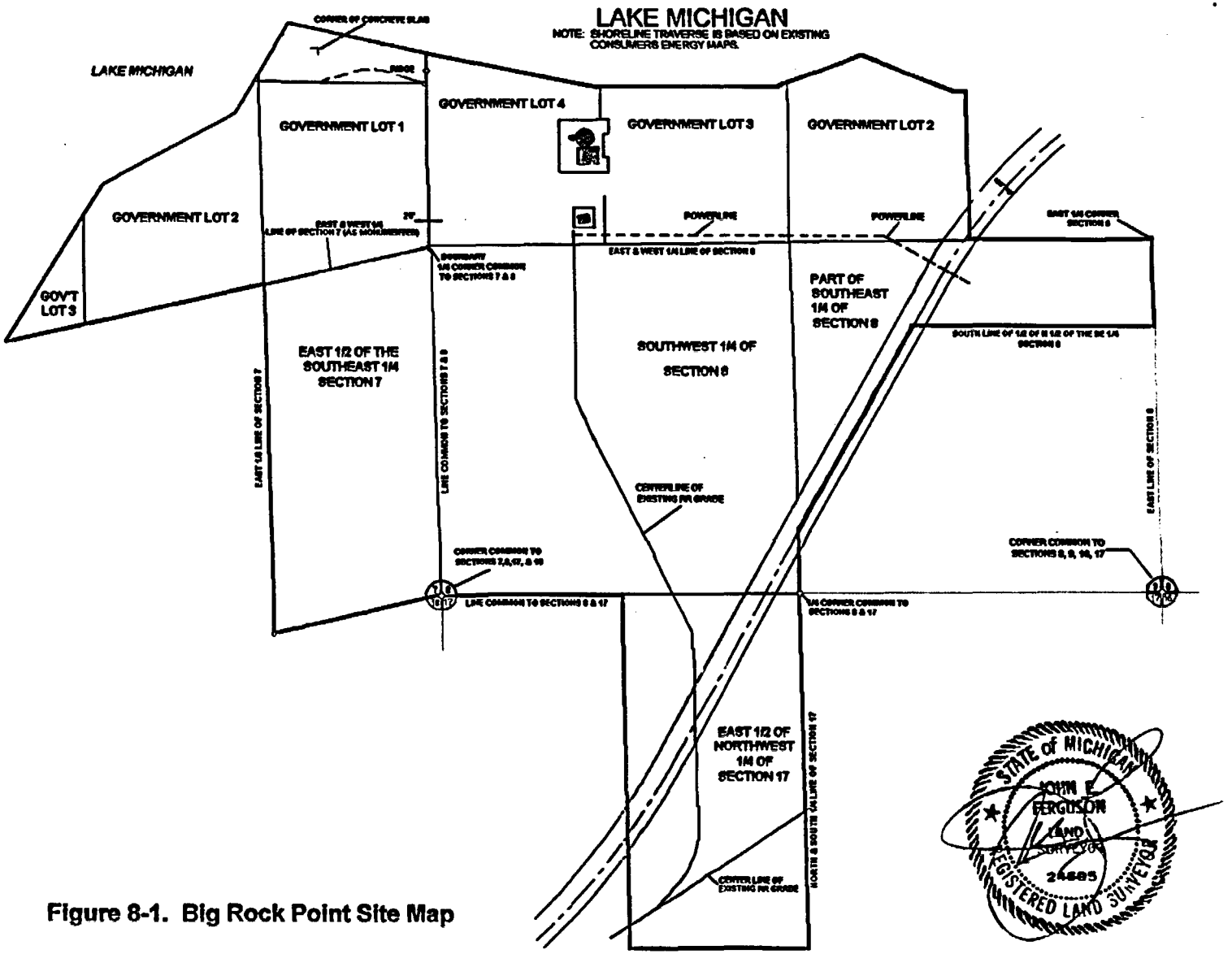

Figure 8-1. Big Rock Point Site Map

Big Rock Point Owner Controlled Area

Figure 8-2. Aerial Photograph of Big Rock Point and Surrounding Land Areas

C-01

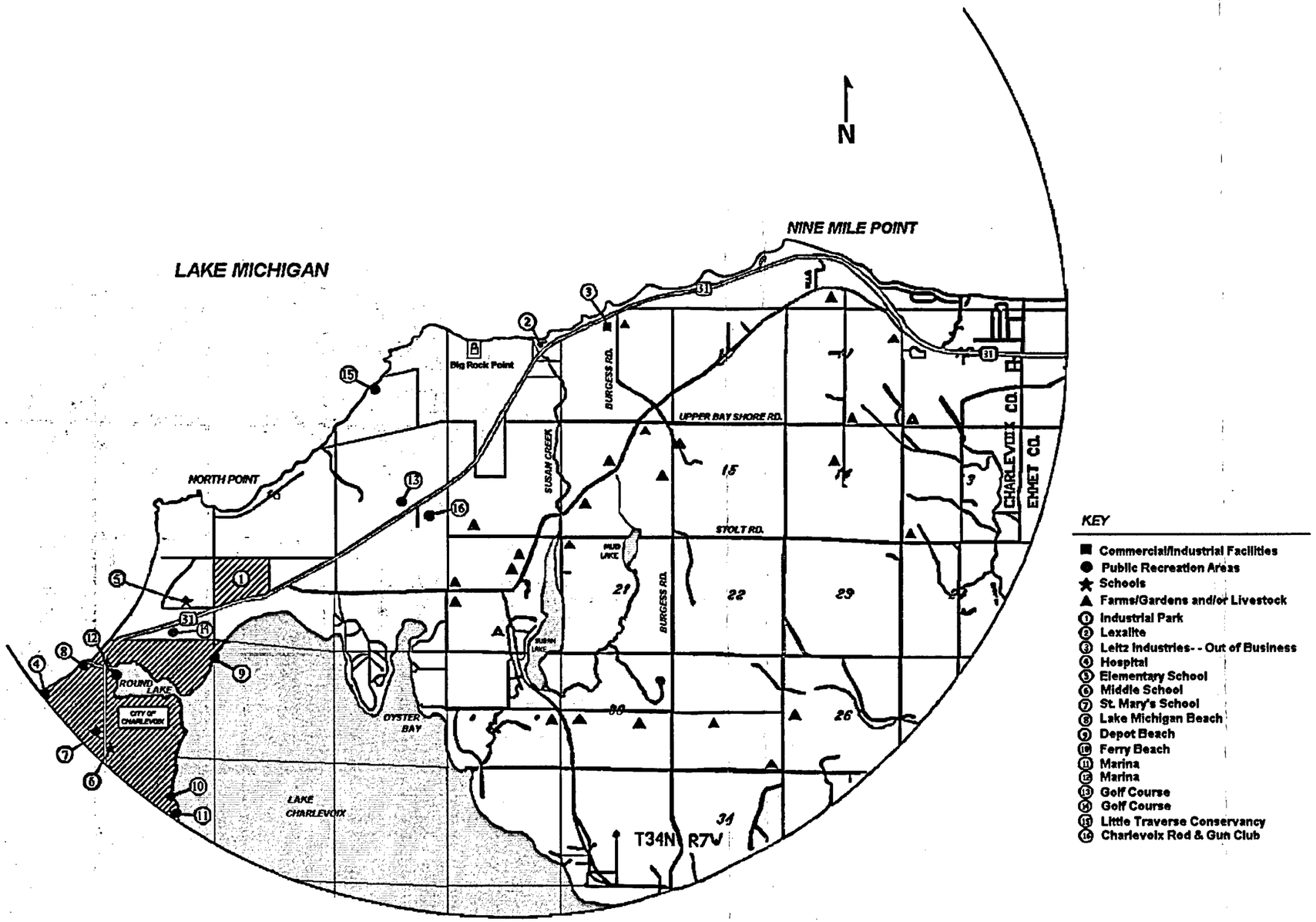

Figure 8-3. Land Use Within Five Miles of Big Rock Point

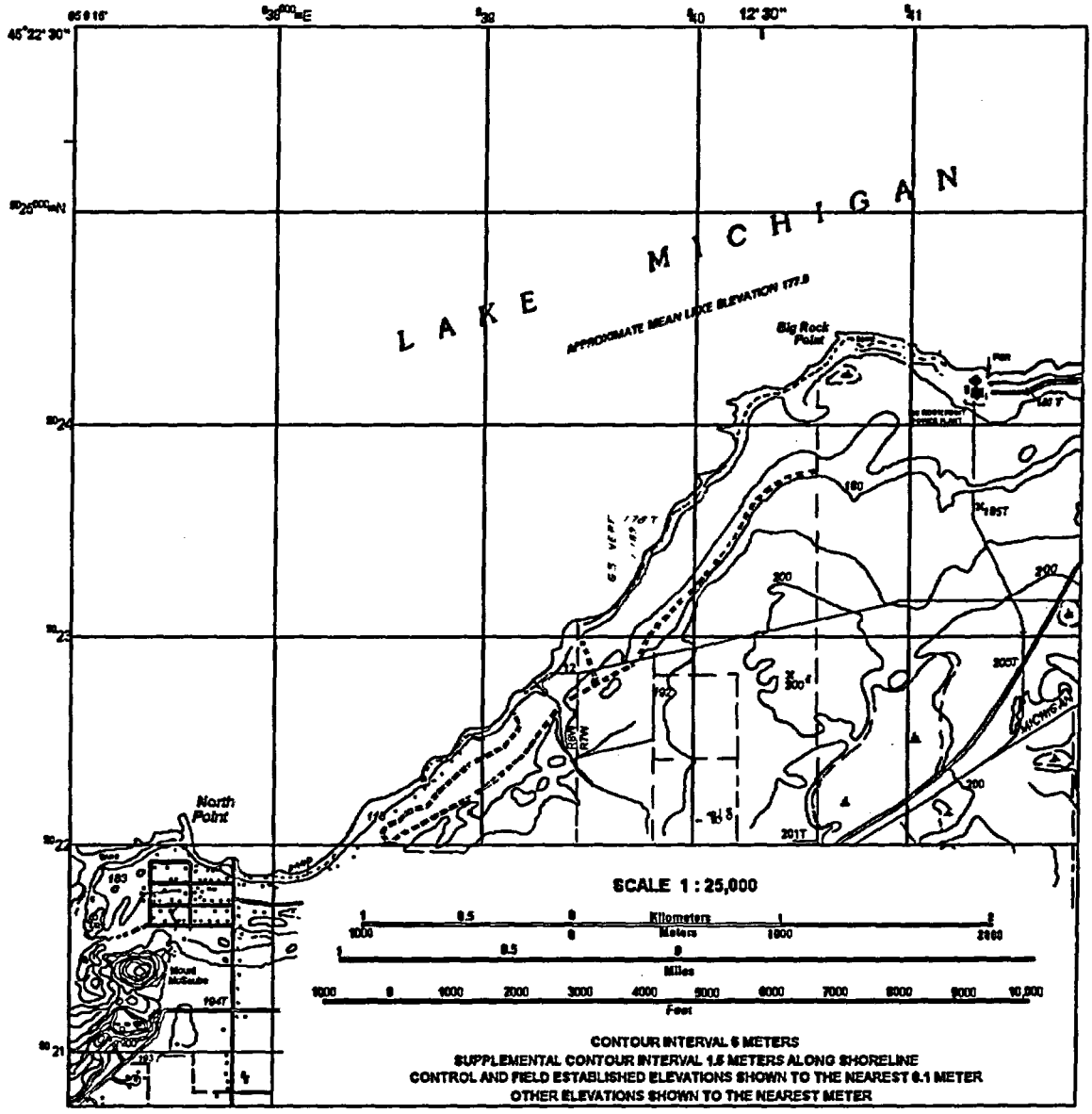

Figure 8-4. Topographic Map of Area Surrounding Big Rock Point

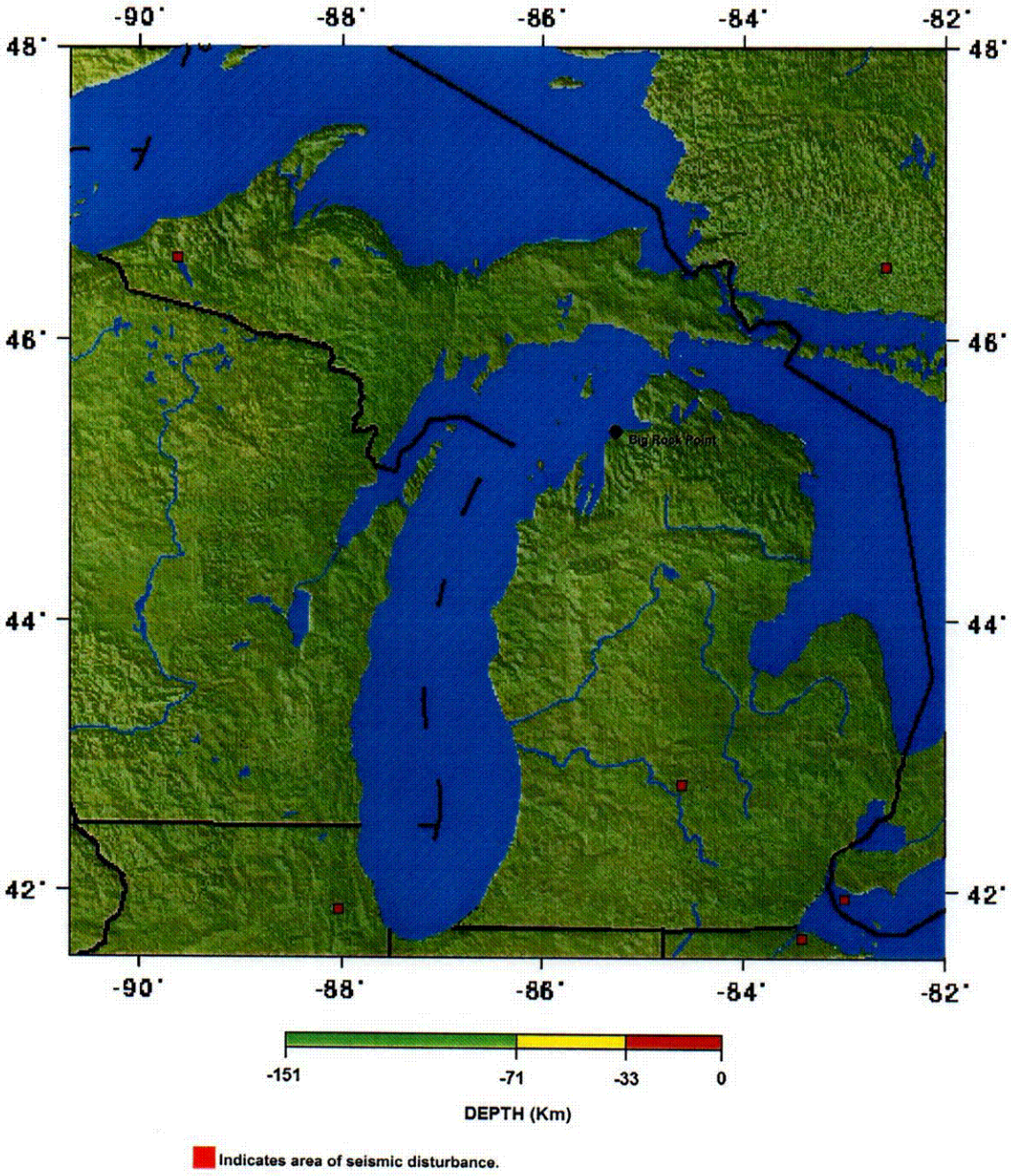

Figure 8-5. USGS Seismic History for Michigan (1977 - 1996)

C-02

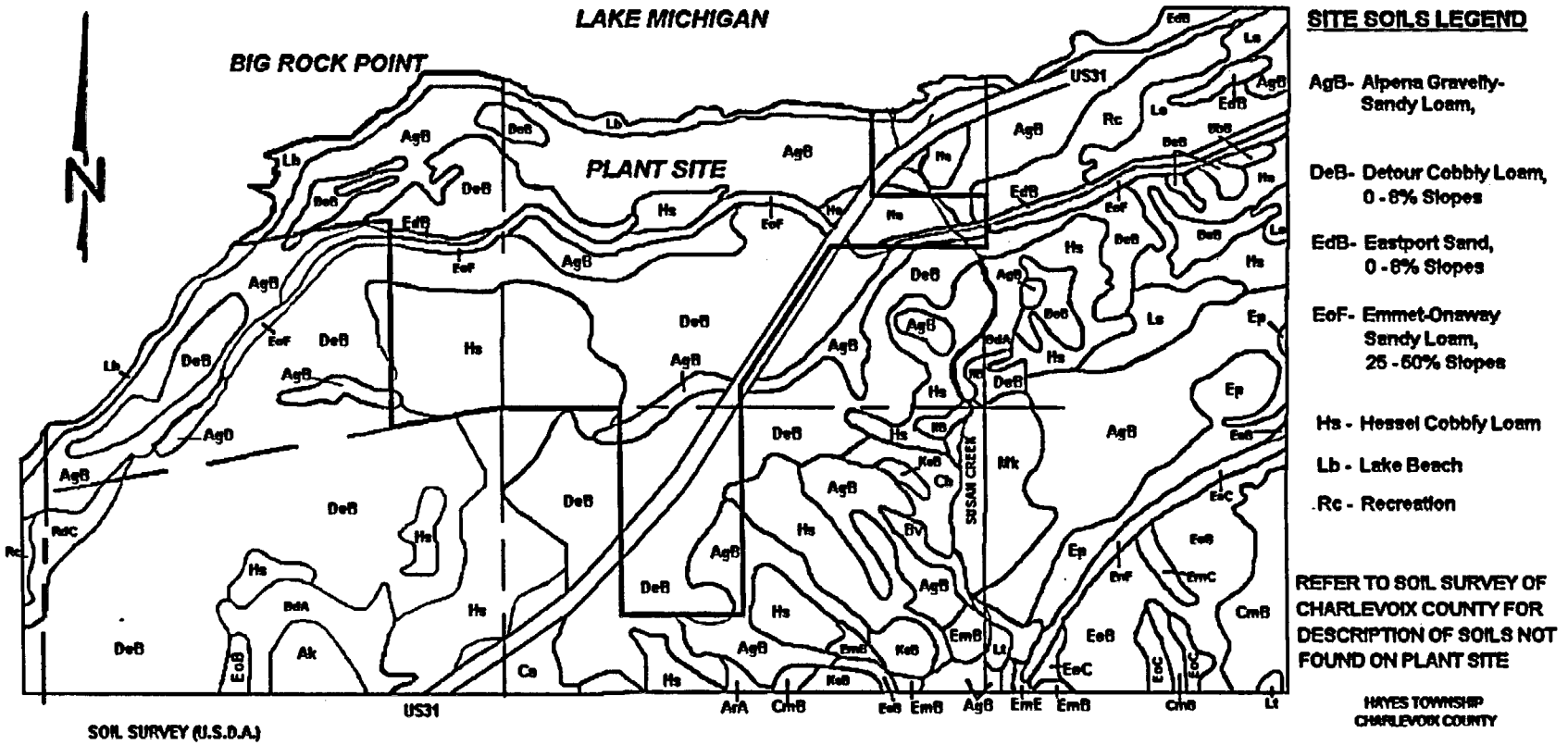

Figure 8-6. Big Rock Point Soil Types

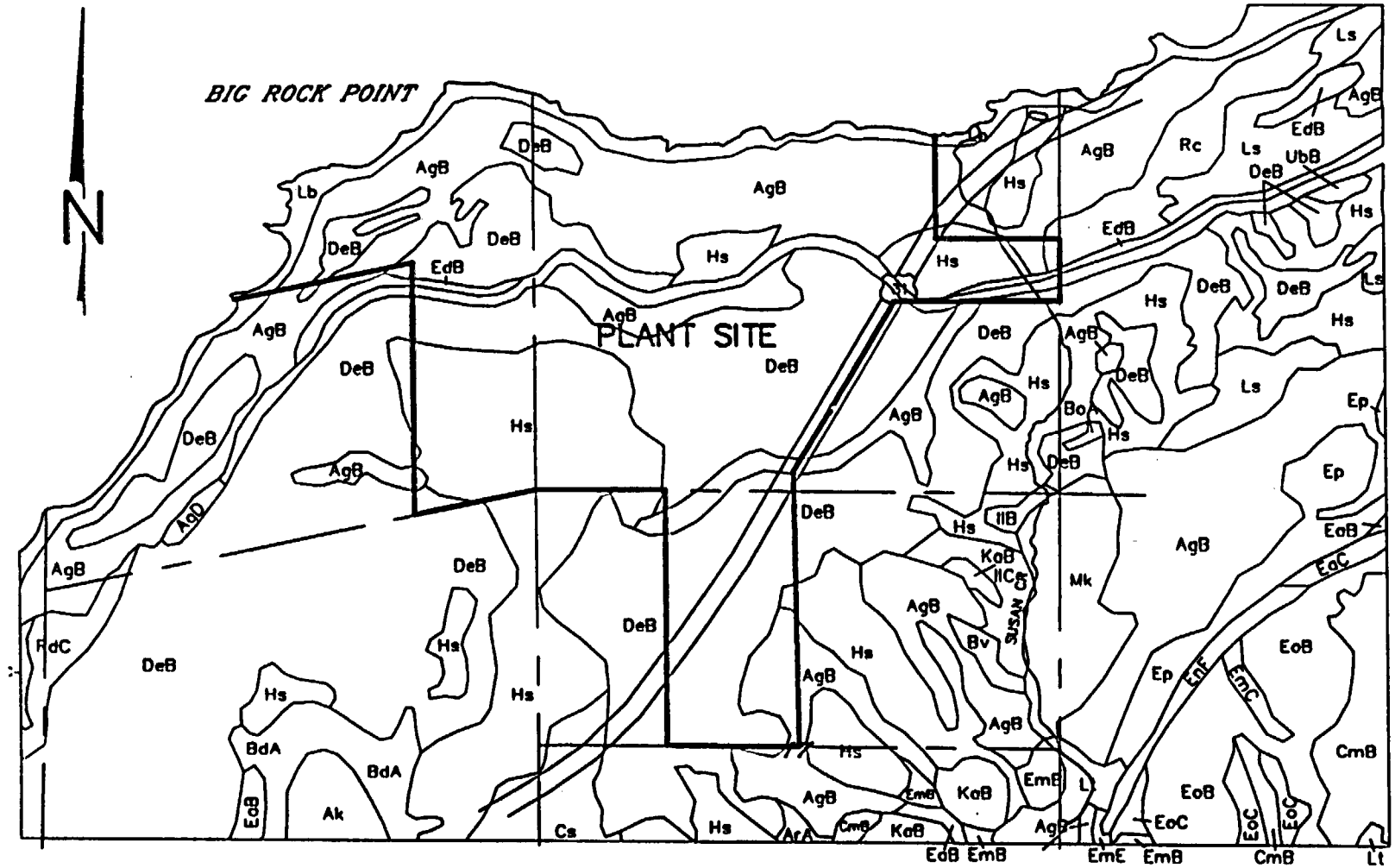

Figure 8-7. Big Rock Point Land Cover Types

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