TABLE T-21
EXPOSURE PARAMETERS: HYPOTHETICAL OFFSITE RESIDENT
VALUES USED FOR SOIL/SEDIMENT/SOIL VAPOR INTAKE CALCULATIONS

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equations
General Parameters	Cs	Chemical Concentration in Soil/Sediment	mg/kg	chem-specific	--	
	EF	Exposure Frequency	days/year	350	USEPA 1991	For evaluating noncarcinogens (child only):
	EDa	Exposure Duration (adult)	years	24	USEPA 1991	$ADD_{ingestion}$ = Cs x IngRc x EF x EDc x CF x 1/BWc x 1/AT-N
	EDc	Exposure Duration (child)	years	6	USEPA 1991	ADD_{dermal} = Cs x SAc x EFc x EDc x AFc x AbsD x CF x 1/BWc x 1/AT-N
	BWa	Body Weight (adult)	kilograms	70	USEPA 1989	Outdoor $ADD_{inhalation}$ = Cs x InhR x EF x ED x (1/PEF or VF) x 1/BW x 1/AT-N
	BWc	Body Weight (child)	kilograms	15	USEPA 1991	Indoor $ADD_{inhalation}$ = Ca x InhR x EF x ED x 1/BW x 1/AT-N
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	
	AT-N	Averaging Time (Noncancer)	days	ED x 365	USEPA 1989	
Incidental Ingestion	IngRa	Ingestion Rate of Soil/Sediment (adult)	mg/day	100	USEPA 1991	For evaluating carcinogens (combined adult and child):
	IngRc	Ingestion Rate of Soil/Sediment (child)	mg/day	200	USEPA 1991	IngFadj = (EDc x IngRc / BWc) + (EDa x IngRa / BWa)
	CF	Conversion Factor	kg/mg	1.0E-06	na	Therefore, LADDadj = Cs x EF x CF x IngFadj x 1/AT-C
Dermal Contact	SAa	Surface Area Available for Contact (adult)	cm^2	5,700	USEPA 2004b	
	SAc	Surface Area Available for Contact (child)	cm^2	2,800	USEPA 2004b	For evaluating carcinogens (combined adult and child):
	AFa	Adherence Factor (adult)	mg/cm^2	0.07	USEPA 2004b	SFSadj =
	AFc	Adherence Factor (child)	mg/cm^2	0.2	USEPA 2004b	= [(EFc x EDc x SAc x AFc) / BWc] + [(EFa x EDa x SAa x AFa) / BWa]
	AbsD	Dermal Absorption	unitless	chem-specific	USEPA 2004b	Therefore, LADDadj = Cs x CF x AbsD x SFSadj x 1/AT-C
	CF	Conversion Factor	kg/mg	1.0E-06	na	
Inhalation (Indoor and Outdoor)	Ca	Chemical Concentration in Air	mg/m^3	Cs / (PEF or VF)	--	For evaluating carcinogens (combined adult and child):
	InhRa	Inhalation Rate (adult)	m^3/day	20	USEPA 1991	Outdoor LADD = Cs x EF x InhFadj x (1/PEF or VF) x 1/AT-C
	InhRc	Inhalation Rate (child)	m^3/day	10[a]	USEPA 1997	Indoor LADD = Ca x EF x InhFadj x 1/AT-C
	PEF[b]	Particulate Emission Factor (offiste soil/sediment)	m^3/kg	1.1E+10	USEPA 2002	Where InhFadj = (EDc x InhRc / BWc) + (EDa x InhRa / BWa)
	PEF[c]	Particulate Emission Factor (onsite soil)	m^3/kg	1.7E+10	USEPA 2002	
	VF	Volatilization Factor	m^3/kg	chem-specific	USEPA 2002	

NOTES: na: not applicable; -- not available; LADD: lifetime average daily dose (carcinogens); ADD = average daily dose (noncarcinogens)

a) Inhalation rate based on long term exposure for 6-8 year olds (Table 5-23 in EPA 1997).

b) PEF derived assuming offiste resident is exposed to offsite soil/sediment

c) PEF derived assuming offiste resident is exposed to onsite soils

Sources: USEPA 1989. Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (HHEM), Part A. OERR. EPA/540/1-89/002.

USEPA 1991. RAGS. Volume I: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

USEPA 1997. Exposure Factors Handbook. Volumes I-III. An update to Exposure Factors Handbook EPA/600/8-89/043-May 1989. EPA/600/P-95-002Fa. August.

USEPA 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA 2004b. RAGS. Volume I: HHEM (Part E, Supplemental Guidance for Dermal Risk Assessment), Interim Guidance. EPA/540/R-99/005. PB99-963312. OSWER 9285.7-02EP.