TABLE 12
SUMMARY OF RELATIVE ABSORPTION FACTORS FOR CHEMICALS OF POTENTIAL CONCERN
FORMER BROOKFIELD MILL SITE

	Ingestion, Soil		Dermal Contact, Soil		Ingestion, Surface Water or Groundwater		Dermal Contact, Surface Water or Groundwater		Inhalation	
Contaminants of Concern	Noncancer Chronic RAF	Cancer RAF	Noncancer Chronic RAF	Cancer RAF	Noncancer Chronic RAF	Cancer RAF	Noncancer Chronic RAF	Cancer RAF	Noncancer Chronic RAF	Cancer RAF
C9-C12 Aliphatics	1	NC	0.5	NC	1	NC	1	NC	1	NC
C9-C18 Aliphatics	1	NC	0.5	NC	1	NC	1	NC	1	NC
C19-C36 Aliphatics	1	NC	0.1	NC	1	NC	1	NC	1	NC
C11-C22 Aromatics	0.36	NC	0.1	NC	0.91	NC	1	NC	1	NC
2-Methylnaphthalene	0.36	NC	0.1	NC	1	NC	1	NC	1	NC
Dibenz(a,h)anthracene	0.28	0.28	0.02	0.02	0.91	1	1	1	1	1
Aroclor-1260	0.85	0.85	0.16	0.16	1	1	1	1	1	1
Aluminum	1	NC	0.1	NC	1	NC	1	NC	1	NC
Antimony	1	NC	0.1	NC	1	NC	1	NC	1	NC
Barium	1	NC	0.05	NC	1	NC	1	NC	1	NC
Beryllium	1	NC	0.03	NC	1	NC	1	NC	1	1
Chromium	1	NC	0.09	NC	1	NC	1	NC	1	1
Cobalt	1	NC	0.1	NC	1	NC	1	NC	1	NC
Copper	1	NC	0.3	NC	1	NC	1	NC	1	NC
Iron	1	NC	0.14	NC	1	NC	1	NC	1	NC
Lead	0.5	NC	0.006	NC	0.5	NC	1	NC	1	NC
Manganese	1	NC	0.14	NC	1	NC	1	NC	1	NC
Mercury	1	NC	0.05	NC	1	NC	1	NC	1	NC
Nickel	1	NC	0.35	NC	1	NC	1	NC	1	1
Selenium	1	NC	0.002	NC	1	NC	1	NC	1	NC
Silver	1	NC	0.25	NC	1	NC	1	NC	1	NC
Thallium	1	NC	0.01	NC	1	NC	1	NC	1	NC
Vanadium	1	NC	0.03	NC	1	NC	1	NC	1	NC
Zinc	1	NC	0.02	NC	1	NC	1	NC	1	NC

NC - Not Carcinogenic or Not Calculated

TABLE 13
PHYSICAL AND CHEMICAL PROPERTIES OF CHEMICALS OF POTENTIAL CONCERN

Analytes	Molecular Weight		Henry's Law Constant H[1]		Log Octanol/Water Partition Coefficient Log Kow		Kp	
Units:	g/mole		atm-m³/mole				cm/hr	
C9-C12 Aliphatics	149	a	1.56E+00	a	5.52	d	1.1E+00	e
C9-C18 Aliphatics	170	a	1.7E+00	a	5.94	d	1.5E+00	e
C19-C36 Aliphatics	NA	a	NA	a	11	d	NA	
C11-C22 Aromatics	150	a	7.20E-04	a	5.09	d	5.4E-01	e
2-Methylnaphthalene	142	a	5.18E-04	a	3.86	a	9.8E-02	a
Dibenz(a,h)anthracene	278	a	1.23E-07	a	6.84	a	1.7E+00	a
Phenanthrene	178	a	4.23E-05	a	4.46	a	1.6E-01	a
Aroclor-1260	328	a	4.15E-04	a	6.72	a	7.3E-01	a
Aluminum	27	b	NA		NA		1.0E-03	c
Antimony	122	a	NA		NA		1.0E-03	a
Barium	137	a	NA		NA		1.0E-03	a
Beryllium	9	a	NA		NA		1.0E-03	a
Chromium	52	a	NA		NA		2.0E-03	a
Cobalt	59	b	NA		NA		4.0E-04	c
Copper	64	b	NA		NA		1.0E-03	c
Iron	56	b	NA		NA		1.0E-03	c
Lead	207	a	NA		NA		1.0E-04	a
Manganese	55	b	NA		NA		1.0E-03	c
Mercury	201	a	NA		NA		1.0E-03	a
Nickel	59	a	NA		NA		2.0E-04	a
Selenium	79	a	NA		NA		1.0E-03	a
Thallium	204	a	NA		NA		1.0E-03	a
Vanadium	51	a	NA		NA		1.0E-03	a
Zinc	65	a	NA		NA		6.0E-04	a

NOTES:

(a) MassDEP, 2006. MCP Numeric Standards Derivation (http://www.mass.gov/dep/cleanup/laws/pubnot04.htm)

(b) EPA Win - EPA software - EPI (Estimation Programs Interface) Suite. Developed by EPA's Office of Pollution Prevention Toxics and Syracuse Research Corporation (SRC). 2000.

(c) EPA 2004. RAGS Part E

(d) MassDEP *Residential Scenario Shortform*, version 1.3, February 2007

(e) Calculated values utilizing formula from RAGs part E Eq. 3.8: log Kp = -2.805603 + 0.6645865 log Kow - 0.0056118 MW (Equation more accurate in spreadsheet than in report) (Final - EPA/540/R/99/005, July 2004)

TABLE 14
EXPOSURE PROFILE SUMMARY FOR THE
FORMER BROOKFIELD MILL SITE

Receptor	Exposure Point	Exposure Pathway	Exposure Route	Pathway Selected	Reason for Selection or Exclusion
Current Adolescent Trespasser/ Recreational User	Former Brookfield Mill Site and Quaboag River	Surface Soil	Dermal Contact Incidental Ingestion	Yes	Soil contamination is less than 3 feet below ground surface.
			Inhalation of VOCs	No	VOCs will disperse and dilute into ambient air.
		Fugitive Dust	Inhalation	Yes	Soil contamination is less than 3 feet below ground surface.
		Groundwater	Inhalation of Volatiles	No	No volatile COPCs have been selected for this pathway.
		Surface Water	Dermal Contact Incidental Ingestion	Yes	Older children may be exposed after discharge of groundwater contaminants to nearby surface water of Quaboag River and wetlands.
Current Town Worker Adult	Former Brookfield Mill Site	Surface Soil	Dermal Contact Incidental Ingestion	Yes	Soil contamination is less than 3 feet below ground surface.
			Inhalation of Volatiles	No	VOCs will disperse and dilute into ambient air. No currently occupied buildings exist on-site.
		Fugitive Dust	Inhalation	Yes	Soil contamination is less than 3 feet below ground surface.
		Groundwater	Inhalation of Volatiles	No	No volatile COPCs have been selected for this pathway.
Future On-Site Worker Adult	Former Brookfield Mill Site	Surface and Subsurface Soil	Dermal Contact Incidental Ingestion	Yes	Future commercial workers may be exposed to soil contaminants moved to the surface during future on-site development.
			Inhalation of Volatiles	Yes	Employees may be exposed to volatile contaminants eminating from soil to indoor air.
		Fugitive Dust	Inhalation	Yes	Future commercial workers may be exposed to soil contaminants moved to the surface during future construction of on-site building(s).
		Groundwater	Inhalation of Volatiles	No	Employees may be exposed to volatile contaminants eminating from groundwater to indoor air. Howerver, no volatile COPCs have been selected for this pathway.
Future Construction Worker Adult	Former Brookfield Mill Site	Surface and Subsurface Soil	Dermal Contact Incidental Ingestion	Yes	Construction workers may be exposed to contaminated soils during future redevelopment activities at the site.
			Inhalation of Volatiles	Yes	Construction workers may be exposed to volatile contaminants eminating from soil to outdoor air.
		Fugitive Dust	Inhalation	Yes	Construction workers may be exposed to contaminants in fugitive dust while excavating.
		Groundwater	Dermal Contact Incidental Ingestion	Yes	Construction workers may encounter contaminated groundwater during trenching activities.
			Inhalation of Volatiles	No	Construction workers may be exposed to volatile contaminants eminating from groundwater to outdoor air. However, no volatile COPCs have been selected for this pathway.

TABLE 14
EXPOSURE PROFILE SUMMARY FOR THE
FORMER BROOKFIELD MILL SITE

Receptor	Exposure Point	Exposure Pathway	Exposure Route	Pathway Selected	Reason for Selection or Exclusion
Future Resident Child/Adult	Former Brookfield Mill Site	Surface and Subsurface Soil	Dermal Contact Ingestion	Yes	Residents may be exposed to soil contaminants moved to the surface during gardening, playing and other outdoor activities.
			Inhalation of Volatiles	Yes	Residents may be exposed to volatile contaminants in soil after migration to indoor air.
		Fugitive Dust	Inhalation	Yes	Residents may be exposed to soil contaminants during gardening, playing and other outdoor activities.
		Groundwater	Inhalation of Volatiles	No	Residents may be exposed to groundwater contaminants after migration of volatiles to indoor air. However, no volatile COPCs have been selected for this pathway.
		Surface Water	Dermal Contact Incidental Ingestion	Yes	Residents may be exposed after discharge of groundwater contaminants to surface water.
		Home Grown Fruits and Vegetables	Ingestion	Yes	Residents may be exposed by ingesting fruits and vegetables grown in contaminated soil.
Future Adolescent Trespasser/ Recreational User	Former Brookfield Mill Site and Quaboag River	Surface and Subsurface Soil	Dermal Contact Incidental Ingestion	Yes	Soil contamination is less than 3 feet below ground surface.
			Inhalation of VOCs	No	VOCs will disperse and dilute into ambient air.
		Fugitive Dust	Inhalation	Yes	Soil contamination is less than 3 feet below ground surface.
		Groundwater	Inhalation of Volatiles	No	No volatile COPCs have been selected for this pathway.
		Surface Water	Dermal Contact Incidental Ingestion	Yes	Older children may be exposed after discharge of groundwater contaminants to surface water.

TABLE 15
EXPOSURE ASSUMPTIONS
FORMER BROOKFIELD MILL SITE

Receptor		Adolescent Trespasser/Rec. User		Town Worker		Resident				Construction Worker		On-Site Worker	
Occurence		Current/Future		Current		Future				Future		Future	
Location		Outdoors		Outdoors		Indoors/Outdoors				Outdoors		Indoors/Outdoors	
Exposure		Chronic		Chronic		Chronic				Subchronic		Chronic	
Age	yr	Child (11-16)		Adult		Child (0-7)		Adult		Adult		Adult	
Body Weight	kg	51.8	(1)	70	(1)	15	(1)	70	(1)	70	(1)	70	(1)
Carcinogenic Averaging Period	yr	75	(1)	75	(1)	75	(1)	75	(1)	75	(1)	75	(1)
Non-Carcinogenic Averaging Period	yr	7	(1)	25	(1)	7	(1)	30	(1)	1	(1)	25	(1)
Soil													
Incidental Ingestion													
Ingestion Rate	mg/day	50	(1)	50	(1)	100	(1)	50	(1)	100	(4)	50	(1)
Exposure Frequency	day/yr	52	(1)	23	(1)	153	(1)	109	(1)	125	(1)	125	(1)
Exposure Duration	yr	7	(1)	25	(1)	7	(1)	30	(1)	1	(1)	25	(1)
Dermal Contact													
Skin Surface Area	cm^2	2928	(5d)	3477	(5c)	2434	(5a)	5657	(5b)	3477	(5c)	3477	(5c)
Soil Adherence Factor	mg/cm^2	0.14	(5d)	0.18	(5c)	0.35	(5a)	0.13	(5b)	0.29	(5c)	0.03	(5c)
Exposure Frequency	day/yr	52	(1)	23	(1)	153	(1)	109	(1)	125	(1)	125	(1)
Exposure Duration	yr	7	(1)	25	(1)	7	(1)	30	(1)	1	(1)	25	(1)
Inhalation of Fugitive Dust													
Respirable Dust - PM_{10}	ug/m^3	32	(1)	32	(1)	32	(1)	32	(1)	60	(1)	32	(1)
Inhalation Rate	m^3/hr	0.8	(1)	1.2	(1)	0.36	(1)	1.2	(1)	3.6	(1)	1.2	(1)
Exposure Time	hr/day	1	(2)	1	(2)	1.5	(2)	1	(2)	8	(2)	8	(2)
Exposure Frequency	day/yr	52	(1)	23	(1)	153	(1)	109	(1)	125	(1)	125	(1)
Exposure Duration	yr	7	(1)	25	(1)	7	(1)	30	(1)	1	(1)	25	(1)
Conversion Factor	kg/ug	1.0E-09		1.0E-09		1.0E-09		1.0E-09		1.0E-09		1.0E-09	
Ingestion of Home Grown Fruits and Vegetables													
Ingestion Rate	g/day	NE		NE		NA	(3)	NA	(3)	NE		NE	
Exposure Frequency	day/yr	NE		NE		NA	(3)	NA	(3)	NE		NE	
Exposure Duration	yr	NE		NE		NA	(3)	NA	(3)	NE		NE	
Groundwater and Surface Water													
Incidental Ingestion													
Ingestion Rate	ml/day	50	(1)	NE		50	(1)	50	(1)	50	(1)	NE	
Exposure Frequency	day/yr	52	(1)	NE		109	(1)	52	(1)	125	(1)	NE	
Exposure Duration	yr	7	(1)	NE		7	(1)	30	(1)	1	(1)	NE	
Conversion Factor	L/ml	1.0E-03		NE		1.0E-03		1.0E-03		1.0E-03		NE	
Dermal Contact													
Skin Surface Area	cm^2	4820	(1e)	NE		2434	(5a)	5657	(5b)	3477	(5c)	NE	
Exposure Time	hr/day	1	(1)	NE		1	(1)	1	(1)	8	(1)	NE	
Exposure Frequency	day/yr	52	(1)	NE		109	(1)	52	(1)	125	(1)	NE	
Exposure Duration	yr	7	(1)	NE		7	(1)	30	(1)	1	(1)	NE	
Air													
Inhalation of Indoor or Outdoor Air													
Exposure Time	hr/day	NE		NE		24	(2)	24	(2)	8	(2)	8	(2)
Exposure Frequency	day/yr	NE		NE		350	(1)	350	(1)	125	(1)	250	(1)
Exposure Duration	yr	NE		NE		7	(1)	30	(1)	1	(1)	25	(1)
Conversion Factor	hr/day	NE		NE		24		24		24		24	

(1) MassDEP, 1995; *Guidance for Disposal Site Risk Characterization.*
(2) USEPA, 1997; *Exposure Factors Handbook.*
(3) MassDEP, 1997; *Residential Scenario Shortform, December.*
(4) MassDEP, 2002; *Calculation of an Enhanced Soil Ingestion Rate - Technical Update.*
(5) MassDEP, 2002; *Weighted skin-soil Adherence Factors - Technical Update.*
a Assumes exposure to hands, arms, legs, feet, and face (5<6).
b Assumes exposure to hands, forearms, lower legs, feet, and face.
c Assumes exposure to hands, forearms, face, and feet.
d Assumes exposure to hands, forearms, and feet.
e Assumes exposure to hands, forearms, lower legs, and feet.
NA Not applicable; used *Residential Scenario Shortform* to evaluate this pathway.
NE Not evaluated

TABLE 16
CALCULATION OF NORMALIZED AVERAGE DAILY INTAKE RATES AND NORMALIZED AVERAGE DAILY CONTACT RATES

Ingestion of Soil	**mg/kg*day**		**mg/day**		**day/yr**		**yr**		**kg**		**day**
	$NADSIR_{soil}$	=	**IR**	x	**EF**	x	**ED**	/	**BW**	x	**AP**
Resident Adult	2.1E-01	=	50	x	109	x	30	/	70	x	10950
Resident Child	2.8E+00	=	100	x	153	x	7	/	15	x	2555
ConstructionWorker	4.9E-01	=	100	x	125	x	1	/	70	x	365
Town Worker (Current)	4.5E-02	=	50	x	23	x	25	/	70	x	9125
On-Site Worker (Future)	2.4E-01	=	50	x	125	x	25	/	70	x	9125
Adolescent Trespasser	1.4E-01	=	50	x	52	x	7	/	51.8	x	2555

Dermal Contact of Soil	**mg/kg*day**		**cm2**		**day/yr**		**yr**		**mg/cm2**		**kg**		**day**
	$NADSCR_{soil}$	=	**SA**	x	**EF**	x	**ED**	x	**AF**	/	**BW**	x	**AP**
Resident Adult	3.1E+00	=	5657	x	109	x	30	x	0.13	/	70	x	10950
Resident Child	2.4E+01	=	2434	x	153	x	7	x	0.35	/	15	x	2555
ConstructionWorker	4.9E+00	=	3477	x	125	x	1	x	0.29	/	70	x	365
Town Worker (Current)	5.6E-01	=	3477	x	23	x	25	x	0.18	/	70	x	9125
On-Site Worker (Future)	5.1E-01	=	3477	x	125	x	25	x	0.03	/	70	x	9125
Adolescent Trespasser	1.1E+00	=	2928	x	52	x	7	x	0.14	/	51.8	x	2555

Inhalation of Fugitive Dust from Soil	**$(day)^{-1}$**		**m3/hr**		**hr/day**		**day/yr**		**yr**		**ug/m3**		**kg/ug**		**kg**		**day**
	$NADSIR_{dust}$	=	**IR**	x	**ET**	x	**EF**	x	**ED**	x	**PM10**	x	**CF**	/	**BW**	x	**AP**
Resident Adult	1.6E-10	=	1.2	x	1	x	109	x	30	x	32	x	1.0E-09	/	70	x	10950
Resident Child	4.8E-10	=	0.36	x	1.5	x	153	x	7	x	32	x	1.0E-09	/	15	x	2555
Construction Worker	8.5E-09	=	3.6	x	8	x	125	x	1	x	60	x	1.0E-09	/	70	x	365
Town Worker (Current)	3.5E-11	=	1.2	x	1	x	23	x	25	x	32	x	1.0E-09	/	70	x	9125
On-Site Worker (Future)	1.5E-09	=	1.2	x	8	x	125	x	25	x	32	x	1.0E-09	/	70	x	9125
Adolescent Trespasser	7.0E-11	=	0.8	x	1	x	52	x	7	x	32	x	1.0E-09	/	51.8	x	2555

Incidental Ingestion of Groundwater	**L/kg*day**		**L/day**		**day/yr**		**yr**		**kg**		**day**
or Surface Water	**$NADSIR_{gw/sw}$**	=	**IR**	x	**EF**	x	**ED**	/	**BW**	x	**AP**
Resident Adult	1.0E-04	=	0.05	x	52	x	30	/	70	x	10950
Resident Child	1.0E-03	=	0.05	x	109	x	7	/	15	x	2555
Construction Worker	2.4E-04	=	0.05	x	125	x	1	/	70	x	365
Adolescent Rec. User	1.4E-04	=	0.05	x	52	x	7	/	51.8	x	2555

Dermal Contact with Groundwater	**cm^2-hr/kg*day**		**cm2**		**hr/day**		**day/yr**		**yr**		**kg**		**day**
or Surface Water	**$NADSCR_{gw/sw}$**	=	**SA**	x	**ET**	x	**EF**	x	**ED**	/	**BW**	x	**AP**
Resident Adult	1.2E+01	=	5657	x	1	x	52	x	30	/	70	x	10950
Resident Child	4.8E+01	=	2434	x	1	x	109	x	7	/	15	x	2555
Construction Worker	1.4E+02	=	3477	x	8	x	125	x	1	/	70	x	365
Adolescent Rec. User	1.3E+01	=	4820	x	1	x	52	x	7	/	51.8	x	2555

Inhalation of Indoor/Outdoor Air			**hr/day**		**day/yr**		**yr**		**day**		**hr/day**
	$NADSIR_{air}$	=	**ET**	x	**EF**	x	**ED**	/	**AP**	x	**CF**
Resident Adult	9.6E-01	=	24	x	350	x	30	/	10950	x	24
Resident Child	9.6E-01	=	24	x	350	x	7	/	2555	x	24
ConstructionWorker	1.1E-01	=	8	x	125	x	1	/	365	x	24
On-Site Worker (Future)	2.3E-01	=	8	x	250	x	25	/	9125	x	24

AF = Adherence Factor
AP = Averaging Period
BW = Body Weight
CF = Conversion Factor
EF = Exposure Frequency
ED = Exposure Duration
ET = Exposure Time
IR = Ingestion Rate; Inhalation Rate
NADSCR = Normalized Average Daily Contact Rate
NADSIR = Normalized Average Daily Intake Rate
PM_{10} = Particulate material less than 10 microns in diameter
SA = Surface Area

TABLE 17
CALCULATION OF NORMALIZED LIFETIME AVERAGE DAILY INTAKE RATES AND NORMALIZED LIFETIME AVERAGE DAILY CONTACT RATES

Ingestion of Soil	**mg/kg*day**		**mg/day**		**day/yr**		**yr**		**kg**		**day**				
	$NLADIR_{soil}$	=	**IR**	x	**EF**	x	**ED**	/	**BW**	x	**AP**				
Resident Adult	8.5E-02	=	50	x	109	x	30	/	70	x	27375				
Resident Child	2.6E-01	=	100	x	153	x	7	/	15	x	27375				
ConstructionWorker	6.5E-03	=	100	x	125	x	1	/	70	x	27375				
Town Worker (Current)	1.5E-02	=	50	x	23	x	25	/	70	x	27375				
On-Site Worker (Future)	8.2E-02	=	50	x	125	x	25	/	70	x	27375				
Adolescent Trespasser	1.3E-02	=	50	x	52	x	7	/	51.8	x	27375				
Dermal Contact of Soil	**mg/kg*day**		**cm2**		**day/yr**		**yr**		**mg/cm2**		**kg**		**day**		
	$NLADCR_{soil}$	=	**SA**	x	**EF**	x	**ED**	x	**AF**	/	**BW**	x	**AP**		
Resident Adult	1.3E+00	=	5657	x	109	x	30	x	0.13	/	70	x	27375		
Resident Child	2.2E+00	=	2434	x	153	x	7	x	0.35	/	15	x	27375		
ConstructionWorker	6.6E-02	=	3477	x	125	x	1	x	0.29	/	70	x	27375		
Town Worker (Current)	1.9E-01	=	3477	x	23	x	25	x	0.18	/	70	x	27375		
On-Site Worker (Future)	1.7E-01	=	3477	x	125	x	25	x	0.03	/	70	x	27375		
Adolescent Trespasser	1.1E-01	=	2928	x	52	x	7	x	0.14	/	51.8	x	27375		
Inhalation of Fugitive Dust from Soil	**$(day)^{-1}$**		**m3/hr**		**hr/day**		**day/yr**		**yr**		**ug/m3**		**kg/ug**		**kg**		**day**
	$NLADIR_{dust}$	=	**IR**	x	**ET**	x	**EF**	x	**ED**	x	**PM10**	x	**CF**	/	**BW**	x	**AP**
Resident Adult	6.6E-11	=	1.2	x	1	x	109	x	30	x	32	x	1.0E-09	/	70	x	27375
Resident Child	4.5E-11	=	0.36	x	1.5	x	153	x	7	x	32	x	1.0E-09	/	15	x	27375
Construction Worker	1.1E-10	=	3.6	x	8	x	125	x	1	x	60	x	1.0E-09	/	70	x	27375
Town Worker (Current)	1.2E-11	=	1.2	x	1	x	23	x	25	x	32	x	1.0E-09	/	70	x	27375
On-Site Worker (Future)	5.0E-10	=	1.2	x	8	x	125	x	25	x	32	x	1.0E-09	/	70	x	27375
Adolescent Trespasser	6.6E-12	=	0.8	x	1	x	52	x	7	x	32	x	1.0E-09	/	51.8	x	27375
Incidental Ingestion of Groundwater	**L/kg*day**		**L/day**		**day/yr**		**yr**		**kg**		**day**				
or Surface Water	**$NLADIR_{gw/sw}$**	=	**IR**	x	**EF**	x	**ED**	/	**BW**	x	**AP**				
Resident Adult	4.1E-05	=	0.05	x	52	x	30	/	70	x	27375				
Resident Child	9.3E-05	=	0.05	x	109	x	7	/	15	x	27375				
Construction Worker	3.3E-06	=	0.05	x	125	x	1	/	70	x	27375				
Adolescent Rec. User	1.3E-05	=	0.05	x	52	x	7	/	51.8	x	27375				
Dermal Contact with Groundwater	**cm^2-hr/kg*day**		**cm2**		**hr/day**		**day/yr**		**yr**		**kg**		**day**		
or Surface Water	**$NADSCR_{gw/sw}$**	=	**SA**	x	**ET**	x	**EF**	x	**ED**	/	**BW**	x	**AP**		
Resident Adult	4.6E+00	=	5657	x	1	x	52	x	30	/	70	x	27375		
Resident Child	4.5E+00	=	2434	x	1	x	109	x	7	/	15	x	27375		
Construction Worker	1.8E+00	=	3477	x	8	x	125	x	1	/	70	x	27375		
Adolescent Rec. User	1.2E+00	=	4820	x	1	x	52	x	7	/	51.8	x	27375		
Inhalation of Indoor/Outdoor Air			**hr/day**		**day/yr**		**yr**		**day**		**hr/day**				
	$NLADSIR_{air}$	=	**ET**	x	**EF**	x	**ED**	/	**AP**	x	**CF**				
Resident Adult	3.8E-01	=	24	x	350	x	30	/	27375	x	24				
Resident Child	8.9E-02	=	24	x	350	x	7	/	27375	x	24				
ConstructionWorker	1.5E-03	=	8	x	125	x	1	/	27375	x	24				
On-Site Worker (Future)	7.6E-02	=	8	x	250	x	25	/	27375	x	24				

AF = Adherence Factor
AP = Averaging Period
BW = Body Weight
CF = Conversion Factor
EF = Exposure Frequency
ED = Exposure Duration
ET = Exposure Time
IR = Ingestion Rate; Inhalation Rate
NLADCR = Normalized Lifetime Average Daily Contact Rate
NLADIR = Normalized Lifetime Average Daily Intake Rate
PM_{10} = Particulate material less than 10 microns in diameter
SA = Surface Area

TABLE 18
SUMMARY OF SITE HAZARD INDICES AND EXCESS LIFETIME CANCER RISK ESTIMATES

	CURRENT USE:				FUTURE USE:									
	HI	ELCR	HI	ELCR	HI	ELCR	HI	ELCR	HI	ELCR	HI	ELCR	HI	ELCR
	ADOLESCENT TRESPASSER/ RECREATIONAL USER		TOWN WORKER		ADOLESCENT TRESPASSER/ RECREATIONAL USER		CONSTRUCTION WORKER		ON-SITE WORKER		RESIDENT CHILD		RESIDENT ADULT	
SOIL:														
Incidental Ingestion	7E-02	2E-08	2E-02	2E-08	8E-02	2E-08	3E-01	8E-09	1E-01	1E-07	2E+00	3E-07	1E-01	1E-07
Dermal Contact	5E-02	1E-08	3E-02	2E-08	5E-02	1E-08	1E-01	8E-09	2E-02	2E-08	1E+00	3E-07	1E-01	1E-07
Inhalation of Fugitive Dust	9E-04	4E-09	4E-04	8E-09	1E-03	3E-09	1E-01	5E-08	2E-02	2E-07	7E-03	2E-08	3E-03	3E-08
Ingestion of Homegrown Fruits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2E-01	8E-06	NA	NA
Total	**1E-01**	**4E-08**	**5E-02**	**5E-08**	**1E-01**	**3E-08**	**5E-01**	**7E-08**	**2E-01**	**4E-07**	**3E+00**	**8E-06**	**3E-01**	**3E-07**
GROUNDWATER:														
Incidental Ingestion	NA	NA	NA	NA	NA	NA	2E-03	NA	NA	NA	NA	NA	NA	NA
Dermal Contact	NA	NA	NA	NA	NA	NA	3E-04	NA	NA	NA	NA	NA	NA	NA
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**2E-03**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
SURFACE WATER:														
Incidental Ingestion	1E-04	NA	NA	NA	1E-04	NA	NA	NA	NA	NA	9E-04	NA	9E-05	NA
Dermal Contact	3E-06	NA	NA	NA	3E-06	NA	NA	NA	NA	NA	9E-06	NA	2E-06	NA
Total	**1E-04**	**NA**	**NA**	**NA**	**1E-04**	**NA**	**NA**	**NA**	**NA**	**NA**	**9E-04**	**NA**	**9E-05**	**NA**
INDOOR/OUTDOOR AIR:														
Soil	NA	NA	NA	NA	NA	NA	7E-06	NA	2E-01	NA	9E-01	NA	9E-01	NA
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**7E-06**	**NA**	**2E-01**	**NA**	**9E-01**	**NA**	**9E-01**	**NA**
SITE TOTAL	**1E-01**	**4E-08**	**5E-02**	**5E-08**	**1E-01**	**3E-08**	**5E-01**	**7E-08**	**4E-01**	**4E-07**	**4E+00**	**8E-06**	**1E+00**	**3E-07**

Total Cancer Risk (Child plus Adult): **8E-06**

HI - Hazard Index
ELCR - Excess Lifetime Cancer Risk
NA - Not Applicable

Shaded Hazard Indices and Excess Lifetime Cancer Risks are above the MCP risk limits of 1 for HIs and 1E-05 for ELCRs.

TABLE 19
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS FOR CURRENT ADOLESCENT TRESPASSER EXPOSURES TO SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure RAF (b)	Chronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Soil Dermal Contact Exposure RAF (b)	Chronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	10	1	1.4E-06	0.5	5.6E-06	1.0E-01	1.4E-05	5.6E-05	6.9E-05
C9-C18 Aliphatics	53	1	7.3E-06	0.5	3.0E-05	1.0E-01	7.3E-05	3.0E-04	3.7E-04
C19-C36 Aliphatics	459	1	6.3E-05	0.1	5.2E-05	2.0E+00	3.2E-05	2.6E-05	5.7E-05
C11-C22 Aromatics	80	0.36	3.9E-06	0.1	9.0E-06	3.0E-02	1.3E-04	3.0E-04	4.3E-04
2-Methylnaphthalene	0.56	0.36	2.8E-08	0.1	6.4E-08	4.0E-03	7.0E-06	1.6E-05	2.3E-05
Dibenz(a,h)anthracene	0.58	0.28	2.2E-08	0.02	1.3E-08	3.0E-02	7.4E-07	4.3E-07	1.2E-06
Aroclor-1260	0.14	0.85	1.6E-08	0.16	2.5E-08	2.0E-05	8.2E-04	1.3E-03	2.1E-03
Aluminum	10545	1	1.5E-03	0.1	1.2E-03	1.0E+00	1.5E-03	1.2E-03	2.6E-03
Antimony	0.78	1	1.1E-07	0.1	8.8E-08	4.0E-04	2.7E-04	2.2E-04	4.9E-04
Barium	468	1	6.4E-05	0.05	2.6E-05	7.0E-02	9.2E-04	3.8E-04	1.3E-03
Beryllium	0.44	1	6.0E-08	0.03	1.5E-08	2.0E-03	3.0E-05	7.4E-06	3.7E-05
Chromium	31	1	4.2E-06	0.09	3.1E-06	3.0E-03	1.4E-03	1.0E-03	2.4E-03
Cobalt	6.6	1	9.0E-07	0.1	7.4E-07	2.0E-02	4.5E-05	3.7E-05	8.2E-05
Copper	2164	1	3.0E-04	0.3	7.3E-04	3.0E-02	9.9E-03	2.4E-02	3.4E-02
Iron	37252	1	5.1E-03	0.143	6.0E-03	3.0E-01	1.7E-02	2.0E-02	3.7E-02
Lead	406	0.5	2.8E-05	0.006	2.7E-06	7.5E-04	3.7E-02	3.7E-03	4.1E-02
Manganese	226	1	3.1E-05	0.143	3.6E-05	7.0E-02	4.4E-04	5.2E-04	9.7E-04
Mercury	0.19	1	2.6E-08	0.05	1.1E-08	3.0E-04	8.6E-05	3.5E-05	1.2E-04
Nickel	9.8	1	1.3E-06	0.35	3.9E-06	2.0E-02	6.7E-05	1.9E-04	2.6E-04
Selenium	1.3	1	1.8E-07	0.002	2.9E-09	5.0E-03	3.6E-05	5.9E-07	3.6E-05
Silver	1.2	1	1.7E-07	0.25	3.4E-07	5.0E-03	3.3E-05	6.8E-05	1.0E-04
Thallium	1.3	1	1.8E-07	0.01	1.5E-08	8.0E-05	2.2E-03	1.8E-04	2.4E-03
Vanadium	26	1	3.6E-06	0.03	8.8E-07	9.0E-03	4.0E-04	9.8E-05	5.0E-04
Zinc	359	1	4.9E-05	0.02	8.1E-06	3.0E-01	1.6E-04	2.7E-05	1.9E-04

TOTAL HAZARD INDEX = 7.3E-02 + 5.4E-02 = 1E-01

NOTES:

(a) EPCs presented in Table 1.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 1.4E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 1.1E+00 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 20
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR CURRENT ADOLESCENT TRESPASSER EXPOSURES TO SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	10	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	459	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	80	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.56	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.58	0.28	2.1E-09	0.02	1.2E-09	7.3E+00	1.5E-08	8.8E-09	2.4E-08
Aroclor-1260	0.14	0.85	1.5E-09	0.16	2.4E-09	2.0E+00	3.1E-09	4.7E-09	7.8E-09
Aluminum	10545	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	0.78	NC	NC	NC	NC	NA	NC	NC	NC
Barium	468	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.44	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	31	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	6.6	NC	NC	NC	NC	NA	NC	NC	NC
Copper	2164	NC	NC	NC	NC	NA	NC	NC	NC
Iron	37252	NC	NC	NC	NC	NA	NC	NC	NC
Lead	406	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	226	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.19	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	9.8	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	1.2	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	26	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	359	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 1.8E-08 + 1.4E-08 = 3E-08

NOTES:

(a) EPCs presented in Table 1.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:
Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 1.3E-02 mg soil/kg-day
(d) The soil dermal contact ADD is calculated by the following equation:
Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 1.1E-01 mg soil/kg-day
(e) Excess Lifetime Cancer Risk = LADD * SF

TABLE 21
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR CURRENT ADOLESCENT TRESPASSER EXPOSURES TO FUGITIVE DUST FROM SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	10	1	1.4E-9	1	3.5E-10	1.0E-01	2.0E-01	1.4E-8	6.1E-9	2.0E-8
C9-C18 Aliphatics	53	1	7.5E-9	1	1.9E-9	1.0E-01	2.0E-01	7.5E-8	3.3E-8	1.1E-7
C19-C36 Aliphatics	459	1	6.5E-8	1	1.6E-8	2.0E+00	NA	3.2E-8	NC	3.2E-8
C11-C22 Aromatics	80	0.36	4.0E-9	1	2.8E-9	3.0E-02	5.0E-02	1.3E-7	2.0E-7	3.3E-7
2-Methylnaphthalene	0.56	0.36	2.9E-11	1	2.0E-11	4.0E-03	5.0E-02	7.2E-9	1.4E-9	8.5E-9
Dibenz(a,h)anthracene	0.58	0.28	2.3E-11	1	2.0E-11	3.0E-02	5.0E-02	7.6E-10	1.4E-9	2.2E-9
Aroclor-1260	0.14	0.85	1.7E-11	1	4.9E-12	2.0E-05	2.0E-05	8.4E-7	8.6E-7	1.7E-6
Aluminum	10545	1	1.5E-6	1	3.7E-7	1.0E+00	NA	1.5E-6	NC	1.5E-6
Antimony	0.78	1	1.1E-10	1	2.7E-11	4.0E-04	1.0E-02	2.7E-7	9.6E-9	2.8E-7
Barium	468	1	6.6E-8	1	1.6E-8	7.0E-02	5.0E-04	9.4E-7	1.2E-4	1.2E-4
Beryllium	0.44	1	6.1E-11	1	1.5E-11	2.0E-03	2.0E-05	3.1E-8	2.7E-6	2.7E-6
Chromium	31	1	4.3E-9	1	1.1E-9	3.0E-03	1.0E-04	1.4E-6	3.8E-5	3.9E-5
Cobalt	6.6	1	9.2E-10	1	2.3E-10	2.0E-02	NA	4.6E-8	NC	4.6E-8
Copper	2164	1	3.0E-7	1	7.6E-8	3.0E-02	NA	1.0E-5	NC	1.0E-5
Iron	37252	1	5.2E-6	1	1.3E-6	3.0E-01	NA	1.7E-5	NC	1.7E-5
Lead	406	0.5	2.9E-8	1	1.4E-8	7.5E-04	1.0E-03	3.8E-5	5.0E-5	8.8E-5
Manganese	226	1	3.2E-8	1	8.0E-9	7.0E-02	5.0E-05	4.6E-7	5.6E-4	5.6E-4
Mercury	0.19	1	2.6E-11	1	6.6E-12	3.0E-04	3.0E-04	8.8E-8	7.7E-8	1.7E-7
Nickel	9.8	1	1.4E-9	1	3.4E-10	2.0E-02	1.0E-03	6.9E-8	1.2E-6	1.3E-6
Selenium	1.3	1	1.8E-10	1	4.6E-11	5.0E-03	3.0E-03	3.7E-8	5.3E-8	9.0E-8
Silver	1.2	1	1.7E-10	1	4.2E-11	5.0E-03	1.4E-04	3.4E-8	1.1E-6	1.1E-6
Thallium	1.3	1	1.8E-10	1	4.6E-11	8.0E-05	1.4E-05	2.3E-6	1.1E-5	1.4E-5
Vanadium	26	1	3.7E-9	1	9.2E-10	9.0E-03	1.0E-03	4.1E-7	3.2E-6	3.6E-6
Zinc	359	1	5.0E-8	1	1.3E-8	3.0E-01	1.4E-03	1.7E-7	3.2E-5	3.2E-5

TOTAL HAZARD INDEX = 7.5E-05 + 8.1E-04 = 9E-04

NOTES:

(a) EPCs presented in Table 1.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 7.0E-11 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 22
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR CURRENT ADOLESCENT TRESPASSER EXPOSURES TO FUGITIVE DUST FROM SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	10	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	459	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	80	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.56	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.58	0.28	2.1E-12	1	1.9E-12	7.3E+00	2.1E+00	1.5E-11	1.4E-11	2.9E-11
Aroclor-1260	0.14	0.85	1.6E-12	1	4.6E-13	2.0E+00	1.0E-01	3.1E-12	1.6E-13	3.3E-12
Aluminum	10545	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	0.78	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	468	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.44	NC	NC	1	1.4E-12	NA	2.4E+00	NC	1.2E-11	1.2E-11
Chromium	31	NC	NC	1	1.0E-10	NA	1.2E+01	NC	4.2E-9	4.2E-9
Cobalt	6.6	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	2164	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	37252	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	406	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	226	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.19	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	9.8	NC	NC	1	3.2E-11	NA	4.8E-01	NC	5.4E-11	5.4E-11
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	1.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	26	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	359	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 1.9E-11 + 4.3E-09 = 4E-09

NOTES:

(a) EPCs presented in Table 1.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$ where, $NLADSIR_{fugd}$ = 6.6E-12 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 23
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR CURRENT/FUTURE ADOLESCENT RECREATIONAL USER EXPOSURES TO SURFACE WATER

Contaminant of Concern	EPC(a) (ug/L)	Chronic Ingestion Exposure RAF (b)	Chronic Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Dermal Contact Exposure RAF (b)	Chronic Dermal Contact Exposure Kp (cm/hr)	Chronic Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
Lead	1.3E+00	0.5	8.8E-08	1	1.0E-04	1.7E-09	7.5E-04	1.2E-04	2.3E-06	1.2E-04
Zinc	1.3E+01	1	1.7E-06	1	6.0E-04	1.0E-07	3.0E-01	5.8E-06	3.3E-07	6.1E-06

TOTAL HAZARD INDEX = 1.2E-04 + 2.6E-06 = 1E-04

NOTES:

(a) EPCs presented in Table 4.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion average daily dose ADD is calculated by the following equation:

SW Ingestion ADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NADSIRsw where, NADSIRsw = 1.4E-04 L_{sw}/kg-day

(d) The SW dermal contact ADD is calculated by the following equation:

SW Contact ADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NADSCRsw where, NADSCRsw = 1.3E+01 $cm^2{}_{sw}$-hr/kg-day

TABLE 24
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR CURRENT/FUTURE ADOLESCENT RECREATIONAL USER EXPOSURES TO SURFACE WATER

		Ingestion Exposure		Dermal Contact Exposure				Chemical-Specific ELCR		Chemical-Specific
Contaminant of Concern	EPC(a) (ug/L)	RAF (b)	LADD (c) (mg/kg-day)	RAF (b)	Kp (cm/hr)	LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Ingestion (e)	Dermal (e)	ELCR (e)
Lead	1.3E+00	NC	NA	NC	1.0E-04	NA	NA	NA	NA	NA
Zinc	1.3E+01	NC	NA	NC	6.0E-04	NA	NA	NA	NA	NA

ELCR = NA + NA = NA

NOTES:

(a) EPCs presented in Table 4.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion lifetime average daily dose LADD is calculated by the following equation:

SW Ingestion LADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NLADSIRsw where, NLADSIRsw = 1.3E-05 L_{sw}/kg-day

(d) The SW dermal contact LADD is calculated by the following equation:

SW Contact LADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NLADSCRsw where, NLADSCRsw = 1.2E+00 $cm^2{}_{sw}$-hr/kg-day

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 25
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS FOR CURRENT TOWN WORKER EXPOSURES TO SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure RAF (b)	Chronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Soil Dermal Contact Exposure RAF (b)	Chronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	10	1	4.5E-07	0.5	2.8E-06	1.0E-01	4.5E-06	2.8E-05	3.2E-05
C9-C18 Aliphatics	53	1	2.4E-06	0.5	1.5E-05	1.0E-01	2.4E-05	1.5E-04	1.7E-04
C19-C36 Aliphatics	459	1	2.1E-05	0.1	2.6E-05	2.0E+00	1.0E-05	1.3E-05	2.3E-05
C11-C22 Aromatics	80	0.36	1.3E-06	0.1	4.5E-06	3.0E-02	4.3E-05	1.5E-04	1.9E-04
2-Methylnaphthalene	0.56	0.36	9.1E-09	0.1	3.2E-08	4.0E-03	2.3E-06	8.0E-06	1.0E-05
Dibenz(a,h)anthracene	0.58	0.28	7.3E-09	0.02	6.5E-09	3.0E-02	2.4E-07	2.2E-07	4.6E-07
Aroclor-1260	0.14	0.85	5.4E-09	0.16	1.3E-08	2.0E-05	2.7E-04	6.3E-04	9.0E-04
Aluminum	10545	1	4.7E-04	0.1	5.9E-04	1.0E+00	4.7E-04	5.9E-04	1.1E-03
Antimony	0.78	1	3.5E-08	0.1	4.4E-08	4.0E-04	8.7E-05	1.1E-04	2.0E-04
Barium	468	1	2.1E-05	0.05	1.3E-05	7.0E-02	3.0E-04	1.9E-04	4.9E-04
Beryllium	0.44	1	2.0E-08	0.03	7.4E-09	2.0E-03	9.8E-06	3.7E-06	1.3E-05
Chromium	31	1	1.4E-06	0.09	1.6E-06	3.0E-03	4.6E-04	5.2E-04	9.8E-04
Cobalt	6.6	1	2.9E-07	0.1	3.7E-07	2.0E-02	1.5E-05	1.8E-05	3.3E-05
Copper	2164	1	9.7E-05	0.3	3.7E-04	3.0E-02	3.2E-03	1.2E-02	1.5E-02
Iron	37252	1	1.7E-03	0.143	3.0E-03	3.0E-01	5.6E-03	1.0E-02	1.6E-02
Lead	406	0.5	9.1E-06	0.006	1.4E-06	7.5E-04	1.2E-02	1.8E-03	1.4E-02
Manganese	226	1	1.0E-05	0.143	1.8E-05	7.0E-02	1.5E-04	2.6E-04	4.1E-04
Mercury	0.19	1	8.5E-09	0.05	5.3E-09	3.0E-04	2.8E-05	1.8E-05	4.6E-05
Nickel	9.8	1	4.4E-07	0.35	1.9E-06	2.0E-02	2.2E-05	9.6E-05	1.2E-04
Selenium	1.3	1	5.9E-08	0.002	1.5E-09	5.0E-03	1.2E-05	2.9E-07	1.2E-05
Silver	1.2	1	5.4E-08	0.25	1.7E-07	5.0E-03	1.1E-05	3.4E-05	4.5E-05
Thallium	1.3	1	5.9E-08	0.01	7.3E-09	8.0E-05	7.3E-04	9.2E-05	8.2E-04
Vanadium	26	1	1.2E-06	0.03	4.4E-07	9.0E-03	1.3E-04	4.9E-05	1.8E-04
Zinc	359	1	1.6E-05	0.02	4.0E-06	3.0E-01	5.4E-05	1.3E-05	6.7E-05

TOTAL HAZARD INDEX = 2.4E-02 + 2.7E-02 = 5E-02

NOTES:

(a) EPCs presented in Table 1.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 4.5E-02 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 5.6E-01 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 26
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR CURRENT TOWN WORKER EXPOSURES TO SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	10	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	459	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	80	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.56	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.58	0.28	2.4E-09	0.02	2.2E-09	7.3E+00	1.8E-08	1.6E-08	3.3E-08
Aroclor-1260	0.14	0.85	1.8E-09	0.16	4.2E-09	2.0E+00	3.6E-09	8.4E-09	1.2E-08
Aluminum	10545	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	0.78	NC	NC	NC	NC	NA	NC	NC	NC
Barium	468	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.44	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	31	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	6.6	NC	NC	NC	NC	NA	NC	NC	NC
Copper	2164	NC	NC	NC	NC	NA	NC	NC	NC
Iron	37252	NC	NC	NC	NC	NA	NC	NC	NC
Lead	406	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	226	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.19	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	9.8	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	1.2	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	26	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	359	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 2.1E-08 + 2.4E-08 = 5E-08

NOTES:
(a) EPCs presented in Table 1.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:
Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 1.5E-02 mg soil/kg-day
(d) The soil dermal contact ADD is calculated by the following equation:
Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 1.9E-01 mg soil/kg-day
(e) Excess Lifetime Cancer Risk = LADD * SF

TABLE 27
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR CURRENT TOWN WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	10	1	6.8E-10	1	1.7E-10	1.0E-01	2.0E-01	6.8E-9	3.0E-9	9.8E-9
C9-C18 Aliphatics	53	1	3.7E-9	1	9.2E-10	1.0E-01	2.0E-01	3.7E-8	1.6E-8	5.3E-8
C19-C36 Aliphatics	459	1	3.2E-8	1	7.9E-9	2.0E+00	NA	1.6E-8	NC	1.6E-8
C11-C22 Aromatics	80	0.36	2.0E-9	1	1.4E-9	3.0E-02	5.0E-02	6.6E-8	9.6E-8	1.6E-7
2-Methylnaphthalene	0.56	0.36	1.4E-11	1	9.8E-12	4.0E-03	5.0E-02	3.5E-9	6.8E-10	4.2E-9
Dibenz(a,h)anthracene	0.58	0.28	1.1E-11	1	1.0E-11	3.0E-02	5.0E-02	3.7E-10	7.0E-10	1.1E-9
Aroclor-1260	0.14	0.85	8.2E-12	1	2.4E-12	2.0E-05	2.0E-05	4.1E-7	4.2E-7	8.3E-7
Aluminum	10545	1	7.3E-7	1	1.8E-7	1.0E+00	NA	7.3E-7	NC	7.3E-7
Antimony	0.78	1	5.4E-11	1	1.3E-11	4.0E-04	1.0E-02	1.3E-7	4.7E-9	1.4E-7
Barium	468	1	3.2E-8	1	8.1E-9	7.0E-02	5.0E-04	4.6E-7	5.7E-5	5.7E-5
Beryllium	0.44	1	3.0E-11	1	7.5E-12	2.0E-03	2.0E-05	1.5E-8	1.3E-6	1.3E-6
Chromium	31	1	2.1E-9	1	5.3E-10	3.0E-03	1.0E-04	7.0E-7	1.9E-5	1.9E-5
Cobalt	6.6	1	4.5E-10	1	1.1E-10	2.0E-02	NA	2.3E-8	NC	2.3E-8
Copper	2164	1	1.5E-7	1	3.7E-8	3.0E-02	NA	5.0E-6	NC	5.0E-6
Iron	37252	1	2.6E-6	1	6.4E-7	3.0E-01	NA	8.6E-6	NC	8.6E-6
Lead	406	0.5	1.4E-8	1	7.0E-9	7.5E-04	1.0E-03	1.9E-5	2.5E-5	4.3E-5
Manganese	226	1	1.6E-8	1	3.9E-9	7.0E-02	5.0E-05	2.2E-7	2.7E-4	2.7E-4
Mercury	0.19	1	1.3E-11	1	3.3E-12	3.0E-04	3.0E-04	4.3E-8	3.8E-8	8.1E-8
Nickel	9.8	1	6.8E-10	1	1.7E-10	2.0E-02	1.0E-03	3.4E-8	5.9E-7	6.3E-7
Selenium	1.3	1	9.0E-11	1	2.2E-11	5.0E-03	3.0E-03	1.8E-8	2.6E-8	4.4E-8
Silver	1.2	1	8.3E-11	1	2.1E-11	5.0E-03	1.4E-04	1.7E-8	5.2E-7	5.4E-7
Thallium	1.3	1	9.0E-11	1	2.2E-11	8.0E-05	1.4E-05	1.1E-6	5.6E-6	6.7E-6
Vanadium	26	1	1.8E-9	1	4.5E-10	9.0E-03	1.0E-03	2.0E-7	1.6E-6	1.8E-6
Zinc	359	1	2.5E-8	1	6.2E-9	3.0E-01	1.4E-03	8.3E-8	1.5E-5	1.6E-5

TOTAL HAZARD INDEX = 3.7E-05 + 4.0E-04 = 4E-04

NOTES:

(a) EPCs presented in Table 1.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 3.5E-11 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 28
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR CURRENT TOWN WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	10	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	459	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	80	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.56	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.58	0.28	3.7E-12	1	3.3E-12	7.3E+00	2.1E+00	2.7E-11	2.4E-11	5.1E-11
Aroclor-1260	0.14	0.85	2.7E-12	1	8.1E-13	2.0E+00	1.0E-01	5.5E-12	2.8E-13	5.8E-12
Aluminum	10545	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	0.78	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	468	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.44	NC	NC	1	2.5E-12	NA	2.4E+00	NC	2.1E-11	2.1E-11
Chromium	31	NC	NC	1	1.8E-10	NA	1.2E+01	NC	7.4E-9	7.4E-9
Cobalt	6.6	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	2164	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	37252	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	406	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	226	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.19	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	9.8	NC	NC	1	5.6E-11	NA	4.8E-01	NC	9.5E-11	9.5E-11
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	1.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	26	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	359	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 3.3E-11 + 7.5E-09 = 8E-09

NOTES:

(a) EPCs presented in Table 1.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$ where, $NLADSIR_{fugd}$ = 1.2E-11 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 29
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE ADOLESCENT TRESPASSER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure RAF (b)	Chronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Soil Dermal Contact Exposure RAF (b)	Chronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	7.0E-07	0.5	2.9E-06	1.0E-01	7.0E-06	2.9E-05	3.6E-05
C9-C18 Aliphatics	53	1	7.3E-06	0.5	3.0E-05	1.0E-01	7.3E-05	3.0E-04	3.7E-04
C19-C36 Aliphatics	245	1	3.4E-05	0.1	2.8E-05	2.0E+00	1.7E-05	1.4E-05	3.1E-05
C11-C22 Aromatics	85	0.36	4.2E-06	0.1	9.6E-06	3.0E-02	1.4E-04	3.2E-04	4.6E-04
2-Methylnaphthalene	0.43	0.36	2.1E-08	0.1	4.8E-08	4.0E-03	5.3E-06	1.2E-05	1.7E-05
Dibenz(a,h)anthracene	0.52	0.28	2.0E-08	0.02	1.2E-08	3.0E-02	6.7E-07	3.9E-07	1.1E-06
Aroclor-1260	0.12	0.85	1.5E-08	0.16	2.2E-08	2.0E-05	7.3E-04	1.1E-03	1.9E-03
Aluminum	10730	1	1.5E-03	0.1	1.2E-03	1.0E+00	1.5E-03	1.2E-03	2.7E-03
Antimony	1.0	1	1.4E-07	0.1	1.1E-07	4.0E-04	3.4E-04	2.8E-04	6.2E-04
Barium	1007	1	1.4E-04	0.05	5.7E-05	7.0E-02	2.0E-03	8.1E-04	2.8E-03
Beryllium	0.32	1	4.4E-08	0.03	1.1E-08	2.0E-03	2.2E-05	5.4E-06	2.7E-05
Chromium	22	1	3.0E-06	0.09	2.2E-06	3.0E-03	1.0E-03	7.5E-04	1.8E-03
Cobalt	9.2	1	1.3E-06	0.1	1.0E-06	2.0E-02	6.4E-05	5.2E-05	1.2E-04
Copper	1431	1	2.0E-04	0.3	4.8E-04	3.0E-02	6.6E-03	1.6E-02	2.3E-02
Iron	33363	1	4.6E-03	0.143	5.4E-03	3.0E-01	1.5E-02	1.8E-02	3.3E-02
Lead	562	0.5	3.9E-05	0.006	3.8E-06	7.5E-04	5.2E-02	5.1E-03	5.7E-02
Manganese	238	1	3.3E-05	0.143	3.8E-05	7.0E-02	4.7E-04	5.5E-04	1.0E-03
Mercury	0.60	1	8.2E-08	0.05	3.4E-08	3.0E-04	2.7E-04	1.1E-04	3.9E-04
Nickel	16	1	2.2E-06	0.35	6.2E-06	2.0E-02	1.1E-04	3.1E-04	4.2E-04
Selenium	1.3	1	1.8E-07	0.002	2.9E-09	5.0E-03	3.6E-05	5.9E-07	3.6E-05
Silver	2.1	1	2.8E-07	0.25	5.8E-07	5.0E-03	5.7E-05	1.2E-04	1.7E-04
Thallium	1.3	1	1.8E-07	0.01	1.5E-08	8.0E-05	2.2E-03	1.8E-04	2.4E-03
Vanadium	28	1	3.8E-06	0.03	9.4E-07	9.0E-03	4.3E-04	1.0E-04	5.3E-04
Zinc	637	1	8.8E-05	0.02	1.4E-05	3.0E-01	2.9E-04	4.8E-05	3.4E-04

TOTAL HAZARD INDEX = 8.3E-02 + 4.5E-02 = 1E-01

NOTES:

(a) EPCs presented in Table 2.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 1.4E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 1.1E+00 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 30
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE ADOLESCENT TRESPASSER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.9E-09	0.02	1.1E-09	7.3E+00	1.4E-08	8.0E-09	2.2E-08
Aroclor-1260	0.12	0.85	1.4E-09	0.16	2.1E-09	2.0E+00	2.7E-09	4.2E-09	6.9E-09
Aluminum	10730	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.32	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	22	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	9.2	NC	NC	NC	NC	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	16	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 1.6E-08 + 1.2E-08 = 3E-08

NOTES:

(a) EPCs presented in Table 2.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:
Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 1.3E-02 mg soil/kg-day
(d) The soil dermal contact ADD is calculated by the following equation:
Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 1.1E-01 mg soil/kg-day
(e) Excess Lifetime Cancer Risk = LADD * SF
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 31
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE ADOLESCENT TRESPASSER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	7.2E-10	1	1.8E-10	1.0E-01	2.0E-01	7.2E-9	3.1E-9	1.0E-8
C9-C18 Aliphatics	53	1	7.4E-9	1	1.9E-9	1.0E-01	2.0E-01	7.4E-8	3.3E-8	1.1E-7
C19-C36 Aliphatics	245	1	3.5E-8	1	8.6E-9	2.0E+00	NA	1.7E-8	NC	1.7E-8
C11-C22 Aromatics	85	0.36	4.3E-9	1	3.0E-9	3.0E-02	5.0E-02	1.4E-7	2.1E-7	3.5E-7
2-Methylnaphthalene	0.43	0.36	2.2E-11	1	1.5E-11	4.0E-03	5.0E-02	5.4E-9	1.1E-9	6.5E-9
Dibenz(a,h)anthracene	0.52	0.28	2.0E-11	1	1.8E-11	3.0E-02	5.0E-02	6.8E-10	1.3E-9	2.0E-9
Aroclor-1260	0.12	0.85	1.5E-11	1	4.4E-12	2.0E-05	2.0E-05	7.4E-7	7.7E-7	1.5E-6
Aluminum	10730	1	1.5E-6	1	3.8E-7	1.0E+00	NA	1.5E-6	NC	1.5E-6
Antimony	1.0	1	1.4E-10	1	3.5E-11	4.0E-04	1.0E-02	3.5E-7	1.2E-8	3.6E-7
Barium	1007	1	1.4E-7	1	3.5E-8	7.0E-02	5.0E-04	2.0E-6	2.5E-4	2.5E-4
Beryllium	0.32	1	4.5E-11	1	1.1E-11	2.0E-03	2.0E-05	2.2E-8	2.0E-6	2.0E-6
Chromium	22	1	3.1E-9	1	7.8E-10	3.0E-03	1.0E-04	1.0E-6	2.7E-5	2.8E-5
Cobalt	9.2	1	1.3E-9	1	3.3E-10	2.0E-02	NA	6.5E-8	NC	6.5E-8
Copper	1431	1	2.0E-7	1	5.0E-8	3.0E-02	NA	6.7E-6	NC	6.7E-6
Iron	33363	1	4.7E-6	1	1.2E-6	3.0E-01	NA	1.6E-5	NC	1.6E-5
Lead	562	0.5	4.0E-8	1	2.0E-8	7.5E-04	1.0E-03	5.3E-5	6.9E-5	1.2E-4
Manganese	238	1	3.3E-8	1	8.4E-9	7.0E-02	5.0E-05	4.8E-7	5.9E-4	5.9E-4
Mercury	0.60	1	8.4E-11	1	2.1E-11	3.0E-04	3.0E-04	2.8E-7	2.5E-7	5.3E-7
Nickel	16	1	2.2E-9	1	5.5E-10	2.0E-02	1.0E-03	1.1E-7	1.9E-6	2.0E-6
Selenium	1.3	1	1.8E-10	1	4.6E-11	5.0E-03	3.0E-03	3.7E-8	5.3E-8	9.0E-8
Silver	2.1	1	2.9E-10	1	7.3E-11	5.0E-03	1.4E-04	5.8E-8	1.8E-6	1.9E-6
Thallium	1.3	1	1.8E-10	1	4.6E-11	8.0E-05	1.4E-05	2.3E-6	1.1E-5	1.4E-5
Vanadium	28	1	3.9E-9	1	9.8E-10	9.0E-03	1.0E-03	4.4E-7	3.4E-6	3.9E-6
Zinc	637	1	9.0E-8	1	2.2E-8	3.0E-01	1.4E-03	3.0E-7	5.6E-5	5.6E-5

TOTAL HAZARD INDEX = 8.5E-05 + 1.0E-03 = 1E-03

NOTES:

(a) EPCs presented in Table 2.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 7.0E-11 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 32
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE ADOLESCENT TRESPASSER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.9E-12	1	1.7E-12	7.3E+00	2.1E+00	1.4E-11	1.2E-11	2.6E-11
Aroclor-1260	0.12	0.85	1.4E-12	1	4.1E-13	2.0E+00	1.0E-01	2.8E-12	1.4E-13	2.9E-12
Aluminum	10730	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.32	NC	NC	1	1.0E-12	NA	2.4E+00	NC	8.8E-12	8.8E-12
Chromium	22	NC	NC	1	7.3E-11	NA	1.2E+01	NC	3.1E-9	3.1E-9
Cobalt	9.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	16	NC	NC	1	5.2E-11	NA	4.8E-01	NC	8.7E-11	8.7E-11
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 1.7E-11 + 3.2E-09 = 3E-09

NOTES:

(a) EPCs presented in Table 2.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$

where, $NLADSIR_{fugd}$ = 6.6E-12 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 33
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Subchronic Soil Ingestion Exposure RAF (b)	Subchronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Subchronic Soil Dermal Contact Exposure RAF (b)	Subchronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Subchronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	2.5E-6	0.5	1.3E-5	1.0E+00	2.5E-6	1.3E-5	1.5E-5
C9-C18 Aliphatics	53	1	2.6E-5	0.5	1.3E-4	1.0E+00	2.6E-5	1.3E-4	1.6E-4
C19-C36 Aliphatics	245	1	1.2E-4	0.1	1.2E-4	6.0E+00	2.0E-5	2.0E-5	4.0E-5
C11-C22 Aromatics	85	0.36	1.5E-5	0.1	4.2E-5	3.0E-01	5.0E-5	1.4E-4	1.9E-4
2-Methylnaphthalene	0.43	0.36	7.6E-8	0.1	2.1E-7	4.0E-02	1.9E-6	5.3E-6	7.2E-6
Dibenz(a,h)anthracene	0.52	0.28	7.1E-8	0.02	5.1E-8	3.0E-01	2.4E-7	1.7E-7	4.1E-7
Aroclor-1260	0.12	0.85	5.2E-8	0.16	9.8E-8	5.0E-05	1.0E-3	2.0E-3	3.0E-3
Aluminum	10730	1	5.2E-3	0.1	5.3E-3	1.0E+00	5.2E-3	5.3E-3	1.1E-2
Antimony	1.0	1	4.9E-7	0.1	4.9E-7	4.0E-04	1.2E-3	1.2E-3	2.5E-3
Barium	1007	1	4.9E-4	0.05	2.5E-4	7.0E-02	7.0E-3	3.5E-3	1.1E-2
Beryllium	0.32	1	1.6E-7	0.03	4.7E-8	5.0E-03	3.1E-5	9.5E-6	4.1E-5
Chromium	22	1	1.1E-5	0.09	9.8E-6	2.0E-02	5.4E-4	4.9E-4	1.0E-3
Cobalt	9.2	1	4.5E-6	0.1	4.6E-6	2.0E-02	2.3E-4	2.3E-4	4.5E-4
Copper	1431	1	7.0E-4	0.3	2.1E-3	3.0E-01	2.3E-3	7.1E-3	9.4E-3
Iron	33363	1	1.6E-2	0.14	2.4E-2	3.0E-01	5.4E-2	7.8E-2	1.3E-1
Lead	562	0.5	1.4E-4	0.01	1.7E-5	7.5E-04	1.8E-1	2.2E-2	2.1E-1
Manganese	238	1	1.2E-4	0.14	1.7E-4	7.0E-02	1.7E-3	2.4E-3	4.1E-3
Mercury	0.60	1	2.9E-7	0.05	1.5E-7	3.0E-04	9.7E-4	4.9E-4	1.5E-3
Nickel	16	1	7.7E-6	0.35	2.7E-5	2.0E-02	3.8E-4	1.4E-3	1.7E-3
Selenium	1.3	1	6.4E-7	0	1.3E-8	5.0E-03	1.3E-4	2.6E-6	1.3E-4
Silver	2.1	1	1.0E-6	0.25	2.6E-6	5.0E-03	2.0E-4	5.1E-4	7.1E-4
Thallium	1.3	1	6.4E-7	0.01	6.4E-8	8.0E-04	8.0E-4	8.0E-5	8.8E-4
Vanadium	28	1	1.4E-5	0.03	4.1E-6	9.0E-03	1.5E-3	4.6E-4	2.0E-3
Zinc	637	1	3.1E-4	0.02	6.3E-5	3.0E-01	1.0E-3	2.1E-4	1.2E-3

TOTAL HAZARD INDEX = 2.6E-01 + 1.3E-01 = 4E-01

NOTES:

(a) EPCs presented in Table 2.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion ADD is calculated by the following equation:

Soil Ingestion ADD = $[OHM]_{soil} * 10^{-6}$ kg/mg * RAF_{ing} * $NADSIR_{soil}$ where, $NADSIR_{soil}$ = 4.9E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = $[OHM]_{soil} * 10^{-6}$ kg/mg * RAF_{derm} * $NADSCR_{soil}$ where, $NADSCR_{soil}$ = 4.9E+00 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 34
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Subchronic Soil Ingestion Exposure		Subchronic Soil Dermal Contact Exposure		SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR		Chemical-Specific ELCR (e)
		RAF (b)	LADD (c) (mg/kg-day)	RAF (b)	LADD (d) (mg/kg-day)		Ingestion (e)	Dermal (e)	
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	9.5E-10	0.02	6.8E-10	7.3E+00	6.9E-09	5.0E-09	1.2E-08
Aroclor-1260	0.12	0.85	6.9E-10	0.16	1.3E-09	2.0E+00	1.4E-09	2.6E-09	4.0E-09
Aluminum	10730	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.32	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	22	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	9.2	NC	NC	NC	NC	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	16	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NC	NC	NC

ECLR = 8.3E-09 + 7.6E-09 = 2E-08

NOTES:
(a) EPCs presented in Table 2.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The soil ingestion LADD is calculated by the following equation:
Soil Ingestion LADD = $[OHM]_{soil} * 10^{-6}$ kg/mg * RAF_{ing} * $NLADSIR_{soil}$ where, $NLADSIR_{soil}$ = 6.5E-03 mg soil/kg-day
(d) The soil dermal contact LADD is calculated by the following equation:
Soil Contact LADD = $[OHM]_{soil} * 10^{-6}$ kg/mg * RAF_{derm} * $NLADSCR_{soil}$ where, $NLADSCR_{soil}$ = 6.6E-02 mg soil/kg-day
(e) Excess Lifetime Cancer Risk = LADD * SF
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 35
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Subchronic Soil GI Inhalation Exposure RAF (b)	Subchronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Subchronic Soil Respiratory Exposure RAF (b)	Subchronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Subchronic RfD (b) (mg/kg-day)	Subchronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	8.6E-8	1	2.1E-8	1.0E+00	2.0E-01	8.6E-8	3.8E-7	4.6E-7
C9-C18 Aliphatics	53	1	8.9E-7	1	2.2E-7	1.0E+00	2.0E-01	8.9E-7	3.9E-6	4.8E-6
C19-C36 Aliphatics	245	1	4.1E-6	1	1.0E-6	6.0E+00	NA	6.9E-7	NC	6.9E-7
C11-C22 Aromatics	85	0.36	5.2E-7	1	3.6E-7	3.0E-01	5.0E-02	1.7E-6	2.5E-5	2.7E-5
2-Methylnaphthalene	0.43	0.36	2.6E-9	1	1.8E-9	4.0E-02	5.0E-01	6.5E-8	1.3E-8	7.8E-8
Dibenz(a,h)anthracene	0.52	0.28	2.5E-9	1	2.2E-9	3.0E-01	5.0E-01	8.2E-9	1.5E-8	2.4E-8
Aroclor-1260	0.12	0.85	1.8E-9	1	5.3E-10	5.0E-05	2.0E-05	3.6E-5	9.2E-5	1.3E-4
Aluminum	10730	1	1.8E-4	1	4.5E-5	1.0E+00	NA	1.8E-4	NC	1.8E-4
Antimony	1.0	1	1.7E-8	1	4.2E-9	4.0E-04	1.0E-02	4.2E-5	1.5E-6	4.4E-5
Barium	1007	1	1.7E-5	1	4.3E-6	7.0E-02	5.0E-03	2.4E-4	3.0E-3	3.2E-3
Beryllium	0.32	1	5.4E-9	1	1.4E-9	5.0E-03	2.0E-05	1.1E-6	2.4E-4	2.4E-4
Chromium	22	1	3.7E-7	1	9.4E-8	2.0E-02	3.0E-04	1.9E-5	1.1E-3	1.1E-3
Cobalt	9.2	1	1.6E-7	1	3.9E-8	2.0E-02	NA	7.8E-6	NC	7.8E-6
Copper	1431	1	2.4E-5	1	6.1E-6	3.0E-01	NA	8.1E-5	NC	8.1E-5
Iron	33363	1	5.6E-4	1	1.4E-4	3.0E-01	NA	1.9E-3	NC	1.9E-3
Lead	562	0.5	4.8E-6	1	2.4E-6	7.5E-04	1.0E-03	6.3E-3	8.3E-3	1.5E-2
Manganese	238	1	4.0E-6	1	1.0E-6	7.0E-02	5.0E-05	5.7E-5	7.0E-2	7.0E-2
Mercury	0.60	1	1.0E-8	1	2.5E-9	3.0E-04	3.0E-04	3.4E-5	2.9E-5	6.3E-5
Nickel	16	1	2.7E-7	1	6.7E-8	2.0E-02	1.0E-03	1.3E-5	2.3E-4	2.5E-4
Selenium	1.3	1	2.2E-8	1	5.5E-9	5.0E-03	3.0E-03	4.4E-6	6.4E-6	1.1E-5
Silver	2.1	1	3.5E-8	1	8.7E-9	5.0E-03	1.4E-04	7.0E-6	2.2E-4	2.3E-4
Thallium	1.3	1	2.2E-8	1	5.5E-9	8.0E-04	1.4E-05	2.7E-5	1.4E-3	1.4E-3
Vanadium	28	1	4.7E-7	1	1.2E-7	9.0E-03	1.0E-03	5.2E-5	4.1E-4	4.6E-4
Zinc	637	1	1.1E-5	1	2.7E-6	3.0E-01	1.4E-03	3.6E-5	6.7E-3	6.8E-3

TOTAL HAZARD INDEX = 9.1E-03 + 9.2E-02 = 1E-01

NOTES:

(a) EPCs presented in Table 2.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 8.5E-09 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 36
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Subchronic Soil GI Inhalation Exposure RAF (b)	Subchronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Subchronic Soil Respiratory Exposure RAF (b)	Subchronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	3.3E-11	1	2.9E-11	7.3E+00	2.1E+00	2.4E-10	2.1E-10	4.5E-10
Aroclor-1260	0.12	0.85	2.4E-11	1	7.0E-12	2.0E+00	1.0E-01	4.8E-11	2.5E-12	5.0E-11
Aluminum	10730	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.32	NC	NC	1	1.8E-11	NA	2.4E+00	NC	1.5E-10	1.5E-10
Chromium	22	NC	NC	1	1.2E-9	NA	1.2E+01	NC	5.2E-8	5.2E-8
Cobalt	9.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	16	NC	NC	1	8.9E-10	NA	4.8E-01	NC	1.5E-9	1.5E-9
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 2.9E-10 + 5.4E-08 = 5E-08

NOTES:

(a) EPCs presented in Table 2.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$ where, $NLADSIR_{fugd}$ = 1.1E-10 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 37
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO GROUNDWATER

Contaminant of Concern	EPC(a) (ug/L)	Subchronic Ingestion Exposure RAF (b)	Subchronic Ingestion Exposure ADD (c) (mg/kg-day)	Subchronic Dermal Contact Exposure RAF (b)	Subchronic Dermal Contact Exposure Kp (cm/hr)	Subchronic Dermal Contact Exposure ADD (d) (mg/kg-day)	Subchronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
Lead	13	0.5	1.6E-06	1	1.0E-04	1.7E-07	7.5E-04	2.1E-03	2.3E-04	2.3E-03
Zinc	126	1	3.1E-05	1	6.0E-04	1.0E-05	3.0E-01	1.0E-04	3.4E-05	1.4E-04

TOTAL HAZARD INDEX = 2.2E-03 + 2.7E-04 = 2E-03

NOTES:

(a) EPCs presented in Table 4.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The groundwater ingestion average daily dose ADD is calculated by the following equation:

GW Ingestion ADD = [OHM]gw * 10^{-3} mg/ug * RAFing * NADSIRgw where, NADSIRgw = 2.4E-04 L_{gw}/kg-day

(d) The GW dermal contact ADD is calculated by the following equation:

GW Contact ADD = [OHM]gw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NADSCRgw where, NADSCRgw = 1.4E+02 $cm^2{}_{gw}$-hr/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 38
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO GROUNDWATER

Contaminant of Concern	EPC(a) (ug/L)	Ingestion Exposure RAF (b)	Ingestion Exposure LADD (c) (mg/kg-day)	Dermal Contact Exposure RAF (b)	Dermal Contact Exposure Kp (cm/hr)	Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
Lead	13	NC	NA	NC	1.0E-04	NA	NA	NA	NA	NA
Zinc	126	NC	NA	NC	6.0E-04	NA	NA	NA	NA	NA

ELCR = NA + NA = NA

NOTES:

(a) EPCs presented in Table 4.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The groundwater ingestion lifetime average daily dose LADD is calculated by the following equation:

GW Ingestion LADD = [OHM]gw * 10^{-3} mg/ug * RAFing * NLADSIRgw where, NLADSIRgw = 3.3E-06 L_{gw}/kg-day

(d) The GW dermal contact LADD is calculated by the following equation:

GW Contact LADD = [OHM]gw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NLADSCRgw where, NLADSCRgw = 1.8E+00 $cm^2{}_{gw}$-hr/kg-day

(e) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 39
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO SOIL IN OUTDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure ADD (c) (mg/m^3)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Inhalation (d)
C9-C12 Aliphatics	2.6E-06	3.0E-07	2.0E-01	1.5E-06
C9-C18 Aliphatics	6.5E-06	7.4E-07	2.0E-01	3.7E-06
C11-C22 Aromatics	6.1E-07	7.0E-08	5.0E-02	1.4E-06
2-Methylnaphthalene	1.3E-09	1.4E-10	5.0E-02	2.9E-09
Phenanthrene	3.0E-11	3.4E-12	5.0E-02	6.9E-11

TOTAL HAZARD INDEX = 7E-06

NOTES:

(a) EPCs presented in Table 9.

(b) RfC values taken from Table 11.

(c) The soil gas inhalation average daily dose ADD is calculated by the following equation:

Soil Gas Inhalation ADD = [OHM]air * $NADSIR_{air}$ where, NADSIRair = 1.1E-01

(d) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 40
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE CONSTRUCTION WORKER EXPOSURES TO SOIL IN OUTDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure LADD (c) (mg/m^3)	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Inhalation (e)
C9-C12 Aliphatics	2.6E-06	3.9E-09	NA	NC
C9-C18 Aliphatics	6.5E-06	9.8E-09	NA	NC
C11-C22 Aromatics	6.1E-07	9.3E-10	NA	NC
2-Methylnaphthalene	1.3E-09	1.9E-12	NA	NC
Phenanthrene	3.0E-11	4.6E-14	NA	NC
			ELCR =	NA

NOTES:

(a) EPCs presented in Table 9.

(b) Unit Risk values taken from Table 11.

(c) The soil gas inhalation lifetime average daily dose LADD is calculated by the following equation:

Soil Gas Inhalation LADD = [OHM]air * $NLADSIR_{air}$ where, NLADSIRair = 1.5E-03

(d) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 41
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE ON-SITE WORKER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure RAF (b)	Chronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Soil Dermal Contact Exposure RAF (b)	Chronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	1.2E-06	0.5	1.3E-06	1.0E-01	1.2E-05	1.3E-05	2.5E-05
C9-C18 Aliphatics	53	1	1.3E-05	0.5	1.3E-05	1.0E-01	1.3E-04	1.3E-04	2.6E-04
C19-C36 Aliphatics	245	1	6.0E-05	0.1	1.3E-05	2.0E+00	3.0E-05	6.3E-06	3.6E-05
C11-C22 Aromatics	85	0.36	7.5E-06	0.1	4.3E-06	3.0E-02	2.5E-04	1.4E-04	3.9E-04
2-Methylnaphthalene	0.43	0.36	3.8E-08	0.1	2.2E-08	4.0E-03	9.5E-06	5.5E-06	1.5E-05
Dibenz(a,h)anthracene	0.52	0.28	3.6E-08	0.02	5.3E-09	3.0E-02	1.2E-06	1.8E-07	1.4E-06
Aroclor-1260	0.12	0.85	2.6E-08	0.16	1.0E-08	2.0E-05	1.3E-03	5.1E-04	1.8E-03
Aluminum	10730	1	2.6E-03	0.1	5.5E-04	1.0E+00	2.6E-03	5.5E-04	3.2E-03
Antimony	1.0	1	2.4E-07	0.1	5.1E-08	4.0E-04	6.1E-04	1.3E-04	7.4E-04
Barium	1007	1	2.5E-04	0.05	2.6E-05	7.0E-02	3.5E-03	3.7E-04	3.9E-03
Beryllium	0.32	1	7.8E-08	0.03	4.9E-09	2.0E-03	3.9E-05	2.4E-06	4.2E-05
Chromium	22	1	5.4E-06	0.09	1.0E-06	3.0E-03	1.8E-03	3.4E-04	2.1E-03
Cobalt	9.2	1	2.3E-06	0.1	4.7E-07	2.0E-02	1.1E-04	2.4E-05	1.4E-04
Copper	1431	1	3.5E-04	0.3	2.2E-04	3.0E-02	1.2E-02	7.3E-03	1.9E-02
Iron	33363	1	8.2E-03	0.143	2.4E-03	3.0E-01	2.7E-02	8.1E-03	3.5E-02
Lead	562	0.5	6.9E-05	0.006	1.7E-06	7.5E-04	9.2E-02	2.3E-03	9.4E-02
Manganese	238	1	5.8E-05	0.143	1.7E-05	7.0E-02	8.3E-04	2.5E-04	1.1E-03
Mercury	0.60	1	1.5E-07	0.05	1.5E-08	3.0E-04	4.9E-04	5.1E-05	5.4E-04
Nickel	16	1	3.8E-06	0.35	2.8E-06	2.0E-02	1.9E-04	1.4E-04	3.3E-04
Selenium	1.3	1	3.2E-07	0.002	1.3E-09	5.0E-03	6.4E-05	2.7E-07	6.4E-05
Silver	2.1	1	5.1E-07	0.25	2.6E-07	5.0E-03	1.0E-04	5.3E-05	1.5E-04
Thallium	1.3	1	3.2E-07	0.01	6.6E-09	8.0E-05	4.0E-03	8.3E-05	4.1E-03
Vanadium	28	1	6.8E-06	0.03	4.3E-07	9.0E-03	7.6E-04	4.7E-05	8.0E-04
Zinc	637	1	1.6E-04	0.02	6.5E-06	3.0E-01	5.2E-04	2.2E-05	5.4E-04

TOTAL HAZARD INDEX = 1.5E-01 + 2.1E-02 = 2E-01

NOTES:

(a) EPCs presented in Table 2.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 2.4E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 5.1E-01 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 42
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE ON-SITE WORKER EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.2E-08	0.02	1.8E-09	7.3E+00	8.6E-08	1.3E-08	9.9E-08
Aroclor-1260	0.12	0.85	8.6E-09	0.16	3.4E-09	2.0E+00	1.7E-08	6.8E-09	2.4E-08
Aluminum	10730	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.32	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	22	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	9.2	NC	NC	NC	NC	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	16	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 1.0E-07 + 2.0E-08 = 1E-07

NOTES:

(a) EPCs presented in Table 2.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:

Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 8.2E-02 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 1.7E-01 mg soil/kg-day

(e) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 43
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE ON-SITE WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	1.5E-8	1	3.8E-9	1.0E-01	2.0E-01	1.5E-7	6.7E-8	2.2E-7
C9-C18 Aliphatics	53	1	1.6E-7	1	4.0E-8	1.0E-01	2.0E-01	1.6E-6	7.0E-7	2.3E-6
C19-C36 Aliphatics	245	1	7.4E-7	1	1.8E-7	2.0E+00	NA	3.7E-7	NC	3.7E-7
C11-C22 Aromatics	85	0.36	9.2E-8	1	6.4E-8	3.0E-02	5.0E-02	3.1E-6	4.5E-6	7.5E-6
2-Methylnaphthalene	0.43	0.36	4.6E-10	1	3.2E-10	4.0E-03	5.0E-02	1.2E-7	2.3E-8	1.4E-7
Dibenz(a,h)anthracene	0.52	0.28	4.4E-10	1	3.9E-10	3.0E-02	5.0E-02	1.5E-8	2.7E-8	4.2E-8
Aroclor-1260	0.12	0.85	3.2E-10	1	9.4E-11	2.0E-05	2.0E-05	1.6E-5	1.6E-5	3.2E-5
Aluminum	10730	1	3.2E-5	1	8.1E-6	1.0E+00	NA	3.2E-5	NC	3.2E-5
Antimony	1.0	1	3.0E-9	1	7.5E-10	4.0E-04	1.0E-02	7.5E-6	2.6E-7	7.8E-6
Barium	1007	1	3.0E-6	1	7.6E-7	7.0E-02	5.0E-04	4.3E-5	5.3E-3	5.3E-3
Beryllium	0.32	1	9.6E-10	1	2.4E-10	2.0E-03	2.0E-05	4.8E-7	4.2E-5	4.2E-5
Chromium	22	1	6.7E-8	1	1.7E-8	3.0E-03	1.0E-04	2.2E-5	5.8E-4	6.0E-4
Cobalt	9.2	1	2.8E-8	1	7.0E-9	2.0E-02	NA	1.4E-6	NC	1.4E-6
Copper	1431	1	4.3E-6	1	1.1E-6	3.0E-02	NA	1.4E-4	NC	1.4E-4
Iron	33363	1	1.0E-4	1	2.5E-5	3.0E-01	NA	3.3E-4	NC	3.3E-4
Lead	562	0.5	8.5E-7	1	4.2E-7	7.5E-04	1.0E-03	1.1E-3	1.5E-3	2.6E-3
Manganese	238	1	7.1E-7	1	1.8E-7	7.0E-02	5.0E-05	1.0E-5	1.2E-2	1.3E-2
Mercury	0.60	1	1.8E-9	1	4.5E-10	3.0E-04	3.0E-04	6.0E-6	5.2E-6	1.1E-5
Nickel	16	1	4.7E-8	1	1.2E-8	2.0E-02	1.0E-03	2.4E-6	4.1E-5	4.4E-5
Selenium	1.3	1	3.9E-9	1	9.8E-10	5.0E-03	3.0E-03	7.8E-7	1.1E-6	1.9E-6
Silver	2.1	1	6.2E-9	1	1.6E-9	5.0E-03	1.4E-04	1.2E-6	3.9E-5	4.0E-5
Thallium	1.3	1	3.9E-9	1	9.8E-10	8.0E-05	1.4E-05	4.9E-5	2.4E-4	2.9E-4
Vanadium	28	1	8.4E-8	1	2.1E-8	9.0E-03	1.0E-03	9.3E-6	7.3E-5	8.2E-5
Zinc	637	1	1.9E-6	1	4.8E-7	3.0E-01	1.4E-03	6.4E-6	1.2E-3	1.2E-3

TOTAL HAZARD INDEX = 1.8E-03 + 2.2E-02 = 2E-02

NOTES:

(a) EPCs presented in Table 2.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 1.5E-09 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 44
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE ON-SITE WORKER EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.5E-10	1	1.3E-10	7.3E+00	2.1E+00	1.1E-9	9.5E-10	2.0E-9
Aroclor-1260	0.12	0.85	1.1E-10	1	3.1E-11	2.0E+00	1.0E-01	2.1E-10	1.1E-11	2.2E-10
Aluminum	10730	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.32	NC	NC	1	8.0E-11	NA	2.4E+00	NC	6.7E-10	6.7E-10
Chromium	22	NC	NC	1	5.5E-9	NA	1.2E+01	NC	2.3E-7	2.3E-7
Cobalt	9.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	16	NC	NC	1	3.9E-9	NA	4.8E-01	NC	6.6E-9	6.6E-9
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 1.3E-09 + 2.4E-07 = 2E-07

NOTES:

(a) EPCs presented in Table 2.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$

where, $NLADSIR_{fugd}$ = 5.0E-10 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 45
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE ON-SITE WORKER EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure ADD (c) (mg/m^3)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Inhalation (d)
C9-C12 Aliphatics	5.1E-02	1.2E-02	2.0E-01	5.8E-02
C9-C18 Aliphatics	1.3E-01	2.9E-02	2.0E-01	1.4E-01
Phenanthrene	5.7E-07	1.3E-07	5.0E-02	2.6E-06

TOTAL HAZARD INDEX = 2E-01

NOTES:

(a) EPCs presented in Table 9.

(b) RfC values taken from Table 11.

(c) The soil gas inhalation average daily dose ADD is calculated by the following equation:

Soil Gas Inhalation ADD = [OHM]air * $NADSIR_{air}$ where, NADSIRair = 2.3E-01

(d) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 46
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE ON-SITE WORKER EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure LADD (c) (mg/m^3)	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Inhalation (e)
C9-C12 Aliphatics	5.1E-02	3.9E-03	NA	NC
C9-C18 Aliphatics	1.3E-01	9.6E-03	NA	NC
Phenanthrene	5.7E-07	4.4E-08	NA	NC
			ELCR =	NA

NOTES:

(a) EPCs presented in Table 9.

(b) Unit Risk values taken from Table 11.

(c) The soil gas inhalation lifetime average daily dose LADD is calculated by the following equation:

Soil Gas Inhalation LADD = [OHM]air * $NLADSIR_{air}$ where, NLADSIRair = 7.6E-02

(d) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 47
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure		Chronic Soil Dermal Contact Exposure		Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient		Chemical-Specific Hazard Index (e)
		RAF (b)	ADD (c) (mg/kg-day)	RAF (b)	ADD (d) (mg/kg-day)		Ingestion (e)	Dermal (e)	
C9-C12 Aliphatics	5.1	1	1.4E-05	0.5	6.0E-05	1.0E-01	1.4E-04	6.0E-04	7.5E-04
C9-C18 Aliphatics	53	1	1.5E-04	0.5	6.3E-04	1.0E-01	1.5E-03	6.3E-03	7.8E-03
C19-C36 Aliphatics	245	1	6.8E-04	0.1	5.8E-04	2.0E+00	3.4E-04	2.9E-04	6.3E-04
C11-C22 Aromatics	85	0.36	8.6E-05	0.1	2.0E-04	3.0E-02	2.9E-03	6.7E-03	9.6E-03
2-Methylnaphthalene	0.43	0.36	4.3E-07	0.1	1.0E-06	4.0E-03	1.1E-04	2.6E-04	3.6E-04
Dibenz(a,h)anthracene	0.52	0.28	4.1E-07	0.02	2.5E-07	3.0E-02	1.4E-05	8.2E-06	2.2E-05
Aroclor-1260	0.12	0.85	3.0E-07	0.16	4.7E-07	2.0E-05	1.5E-02	2.4E-02	3.8E-02
Aluminum	10730	1	3.0E-02	0.1	2.6E-02	1.0E+00	3.0E-02	2.6E-02	5.6E-02
Antimony	1.0	1	2.8E-06	0.1	2.4E-06	4.0E-04	7.0E-03	5.9E-03	1.3E-02
Barium	1007	1	2.8E-03	0.05	1.2E-03	7.0E-02	4.0E-02	1.7E-02	5.7E-02
Beryllium	0.32	1	8.9E-07	0.03	2.3E-07	2.0E-03	4.5E-04	1.1E-04	5.6E-04
Chromium	22	1	6.2E-05	0.09	4.7E-05	3.0E-03	2.1E-02	1.6E-02	3.6E-02
Cobalt	9.2	1	2.6E-05	0.1	2.2E-05	2.0E-02	1.3E-03	1.1E-03	2.4E-03
Copper	1431	1	4.0E-03	0.3	1.0E-02	3.0E-02	1.3E-01	3.4E-01	4.7E-01
Iron	33363	1	9.3E-02	0.143	1.1E-01	3.0E-01	3.1E-01	3.8E-01	6.9E-01
Lead	562	0.5	7.9E-04	0.006	8.0E-05	7.5E-04	1.0E+00	1.1E-01	1.2E+00
Manganese	238	1	6.6E-04	0.143	8.1E-04	7.0E-02	9.5E-03	1.2E-02	2.1E-02
Mercury	0.60	1	1.7E-06	0.05	7.1E-07	3.0E-04	5.6E-03	2.4E-03	7.9E-03
Nickel	16	1	4.4E-05	0.35	1.3E-04	2.0E-02	2.2E-03	6.6E-03	8.8E-03
Selenium	1.3	1	3.6E-06	0.002	6.2E-08	5.0E-03	7.3E-04	1.2E-05	7.4E-04
Silver	2.1	1	5.8E-06	0.25	1.2E-05	5.0E-03	1.2E-03	2.5E-03	3.6E-03
Thallium	1.3	1	3.6E-06	0.01	3.1E-07	8.0E-05	4.5E-02	3.9E-03	4.9E-02
Vanadium	28	1	7.8E-05	0.03	2.0E-05	9.0E-03	8.6E-03	2.2E-03	1.1E-02
Zinc	637	1	1.8E-03	0.02	3.0E-04	3.0E-01	5.9E-03	1.0E-03	6.9E-03

TOTAL HAZARD INDEX = 1.7E+00 + 9.6E-01 = 3E+00

NOTES:

(a) EPCs presented in Table 2.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 2.8E+00 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 2.4E+01 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 48
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE RESIDENT CHILD EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	3.8E-08	0.02	2.3E-08	7.3E+00	2.8E-07	1.7E-07	4.4E-07
Aroclor-1260	0.12	0.85	2.8E-08	0.16	4.4E-08	2.0E+00	5.5E-08	8.9E-08	1.4E-07
Aluminum	10730	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.32	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	22	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	9.2	NC	NC	NC	NC	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	16	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 3.3E-07 + 2.6E-07 = 6E-07

NOTES:

(a) EPCs presented in Table 2.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:

Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 2.6E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 2.2E+00 mg soil/kg-day

(e) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 49
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	4.9E-9	1	1.2E-9	1.0E-01	2.0E-01	4.9E-8	2.1E-8	7.1E-8
C9-C18 Aliphatics	53	1	5.1E-8	1	1.3E-8	1.0E-01	2.0E-01	5.1E-7	2.2E-7	7.3E-7
C19-C36 Aliphatics	245	1	2.4E-7	1	5.9E-8	2.0E+00	NA	1.2E-7	NC	1.2E-7
C11-C22 Aromatics	85	0.36	3.0E-8	1	2.1E-8	3.0E-02	5.0E-02	9.9E-7	1.4E-6	2.4E-6
2-Methylnaphthalene	0.43	0.36	1.5E-10	1	1.0E-10	4.0E-03	5.0E-02	3.7E-8	7.3E-9	4.5E-8
Dibenz(a,h)anthracene	0.52	0.28	1.4E-10	1	1.3E-10	3.0E-02	5.0E-02	4.7E-9	8.8E-9	1.3E-8
Aroclor-1260	0.12	0.85	1.0E-10	1	3.0E-11	2.0E-05	2.0E-05	5.1E-6	5.3E-6	1.0E-5
Aluminum	10730	1	1.0E-5	1	2.6E-6	1.0E+00	NA	1.0E-5	NC	1.0E-5
Antimony	1.0	1	9.6E-10	1	2.4E-10	4.0E-04	1.0E-02	2.4E-6	8.4E-8	2.5E-6
Barium	1007	1	9.7E-7	1	2.4E-7	7.0E-02	5.0E-04	1.4E-5	1.7E-3	1.7E-3
Beryllium	0.32	1	3.1E-10	1	7.7E-11	2.0E-03	2.0E-05	1.5E-7	1.4E-5	1.4E-5
Chromium	22	1	2.1E-8	1	5.3E-9	3.0E-03	1.0E-04	7.1E-6	1.9E-4	1.9E-4
Cobalt	9.2	1	8.9E-9	1	2.2E-9	2.0E-02	NA	4.5E-7	NC	4.5E-7
Copper	1431	1	1.4E-6	1	3.5E-7	3.0E-02	NA	4.6E-5	NC	4.6E-5
Iron	33363	1	3.2E-5	1	8.1E-6	3.0E-01	NA	1.1E-4	NC	1.1E-4
Lead	562	0.5	2.7E-7	1	1.4E-7	7.5E-04	1.0E-03	3.6E-4	4.8E-4	8.4E-4
Manganese	238	1	2.3E-7	1	5.7E-8	7.0E-02	5.0E-05	3.3E-6	4.0E-3	4.0E-3
Mercury	0.60	1	5.8E-10	1	1.4E-10	3.0E-04	3.0E-04	1.9E-6	1.7E-6	3.6E-6
Nickel	16	1	1.5E-8	1	3.8E-9	2.0E-02	1.0E-03	7.6E-7	1.3E-5	1.4E-5
Selenium	1.3	1	1.3E-9	1	3.1E-10	5.0E-03	3.0E-03	2.5E-7	3.7E-7	6.2E-7
Silver	2.1	1	2.0E-9	1	5.0E-10	5.0E-03	1.4E-04	4.0E-7	1.2E-5	1.3E-5
Thallium	1.3	1	1.3E-9	1	3.1E-10	8.0E-05	1.4E-05	1.6E-5	7.8E-5	9.4E-5
Vanadium	28	1	2.7E-8	1	6.7E-9	9.0E-03	1.0E-03	3.0E-6	2.4E-5	2.6E-5
Zinc	637	1	6.2E-7	1	1.5E-7	3.0E-01	1.4E-03	2.1E-6	3.8E-4	3.9E-4

TOTAL HAZARD INDEX = 5.8E-04 + 6.9E-03 = 7E-03

NOTES:

(a) EPCs presented in Table 2.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 4.8E-10 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 50
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.3E-11	1	1.2E-11	7.3E+00	2.1E+00	9.6E-11	8.5E-11	1.8E-10
Aroclor-1260	0.12	0.85	9.5E-12	1	2.8E-12	2.0E+00	1.0E-01	1.9E-11	9.8E-13	2.0E-11
Aluminum	10730	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.32	NC	NC	1	7.2E-12	NA	2.4E+00	NC	6.0E-11	6.0E-11
Chromium	22	NC	NC	1	5.0E-10	NA	1.2E+01	NC	2.1E-8	2.1E-8
Cobalt	9.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	16	NC	NC	1	3.5E-10	NA	4.8E-01	NC	6.0E-10	6.0E-10
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 1.1E-10 + 2.2E-08 = 2E-08

NOTES:

(a) EPCs presented in Table 2.

(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$ where, $NLADSIR_{fugd}$ = 4.5E-11 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$

(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF

Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 51
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE CHILD RESIDENTIAL EXPOSURES TO HOMEGROWN FRUITS AND VEGETABLES

Contaminant of Concern	EPC(a) (mg/kg)	Subchronic Ingestion Exposure RAF (b)	VEG Multiplier	ADD (c) (mg/kg-day)	Subchronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (d)
C9-C12 Aliphatics	5.1	1	NA	NC	1.0E+00	NC
C9-C18 Aliphatics	53	1	NA	NC	1.0E+00	NC
C19-C36 Aliphatics	245	1	NA	NC	6.0E+00	NC
C11-C22 Aromatics	85	0.36	3.5E-05	1.1E-03	3.0E-01	3.6E-03
2-Methylnaphthalene	0.43	0.36	3.5E-05	5.4E-06	4.0E-02	1.4E-04
Dibenz(a,h)anthracene	0.52	0.28	3.5E-05	5.1E-06	3.0E-01	1.7E-05
Aroclor-1260	0.12	0.85	4.3E-06	4.5E-07	5.0E-05	9.1E-03
Aluminum	10730	1	NA	NC	1.0E+00	NC
Antimony	1.0	1	NA	NC	4.0E-04	NC
Barium	1007	1	NA	NC	7.0E-02	NC
Beryllium	0.32	1	NA	NC	5.0E-03	NC
Chromium	22	1	9.2E-06	2.0E-04	2.0E-02	1.0E-02
Cobalt	9.2	1	NA	NC	2.0E-02	NC
Copper	1431	1	NA	NC	3.0E-01	NC
Iron	33363	1	NA	NC	3.0E-01	NC
Lead	562	0.5	3.8E-07	1.1E-04	7.5E-04	1.4E-01
Manganese	238	1	NA	NC	7.0E-02	NC
Mercury	0.60	1	5.0E-07	3.0E-07	3.0E-04	9.9E-04
Nickel	16	1	1.1E-05	1.7E-04	2.0E-02	8.7E-03
Selenium	1.3	1	NA	NC	5.0E-03	NC
Silver	2.1	1	6.5E-05	1.3E-04	5.0E-03	2.7E-02
Thallium	1.3	1	3.2E-08	4.2E-08	8.0E-04	5.2E-05
Vanadium	28	1	NA	NC	9.0E-03	NC
Zinc	637	1	4.8E-06	3.1E-03	3.0E-01	1.0E-02

TOTAL HAZARD INDEX = 2E-01

NOTES:
(a) EPCs presented in Table 2.
(b) RfD and RAF values taken from Tables 10 and 12, respectively.
(c) The ingestion of food ADD is calculated by the following equation:
Ingestion of food ADD = $[OHM]_{soil}$ * RAF_{ing} * Veg subchronic multiplier
(d) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 52
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE CHILD RESIDENTIAL EXPOSURES TO HOMEGROWN FRUITS AND VEGETABLES

Contaminant of Concern	EPC(a) (mg/kg)	Ingestion Exposure RAF (b)	VEG Multiplier	LADD (c) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (d)
C9-C12 Aliphatics	5.1	NC	NA	NC	NA	NC
C9-C18 Aliphatics	53	NC	NA	NC	NA	NC
C19-C36 Aliphatics	245	NC	NA	NC	NA	NC
C11-C22 Aromatics	85	NC	NA	NC	NA	NC
2-Methylnaphthalene	0.43	NC	NA	NC	NA	NC
Dibenz(a,h)anthracene	0.52	0.28	6.9E-06	1.0E-06	7.3E+00	7.3E-06
Aroclor-1260	0.12	0.85	9.4E-07	9.9E-08	2.0E+00	2.0E-07
Aluminum	10730	NC	NA	NC	NA	NC
Antimony	1.0	NC	NA	NC	NA	NC
Barium	1007	NC	NA	NC	NA	NC
Beryllium	0.32	NC	NA	NC	NA	NC
Chromium	22	NC	NA	NC	NA	NC
Cobalt	9.2	NC	NA	NC	NA	NC
Copper	1431	NC	NA	NC	NA	NC
Iron	33363	NC	NA	NC	NA	NC
Lead	562	NC	NA	NC	NA	NC
Manganese	238	NC	NA	NC	NA	NC
Mercury	0.60	NC	NA	NC	NA	NC
Nickel	16	NC	NA	NC	NA	NC
Selenium	1.3	NC	NA	NC	NA	NC
Silver	2.1	NC	NA	NC	NA	NC
Thallium	1.3	NC	NA	NC	NA	NC
Vanadium	28	NC	NA	NC	NA	NC
Zinc	637	NC	NA	NC	NA	NC

ECLR = 8E-06

NOTES:
(a) EPCs presented in Table 2.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The ingestion of food LADD is calculated by the following equation:
Ingestion of food LADD = $[OHM]_{soil}$ * RAF_{ing} * Veg multiplier
(d) Excess Lifetime Cancer Risk = LADD * SF
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 53
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO SURFACE WATER

Contaminant of Concern	EPC(a) (ug/L)	Chronic Ingestion Exposure RAF (b)	Chronic Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Dermal Contact Exposure RAF (b)	Chronic Dermal Contact Exposure Kp (cm/hr)	Chronic Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
Lead	1.3E+00	0.5	6.3E-07	1	1.0E-04	6.2E-09	7.5E-04	8.5E-04	8.2E-06	8.5E-04
Zinc	1.3E+01	1	1.3E-05	1	6.0E-04	3.7E-07	3.0E-01	4.2E-05	1.2E-06	4.3E-05

TOTAL HAZARD INDEX = 8.9E-04 + 9.5E-06 = 9E-04

NOTES:

(a) EPCs presented in Table 4.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion average daily dose ADD is calculated by the following equation:

SW Ingestion ADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NADSIRsw where, NADSIRsw = 1.0E-03 L_{sw}/kg-day

(d) The SW dermal contact ADD is calculated by the following equation:

SW Contact ADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NADSCRsw where, NADSCRsw = 4.8E+01 $cm^2{}_{sw}$-hr/kg-day

TABLE 54
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO SURFACE WATER

Contaminant of Concern	EPC(a) (ug/L)	Ingestion Exposure RAF (b)	Ingestion Exposure LADD (c) (mg/kg-day)	Dermal Contact Exposure RAF (b)	Dermal Contact Exposure Kp (cm/hr)	Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
Lead	1.3E+00	NC	NA	NC	1.0E-04	NA	NA	NA	NA	NA
Zinc	1.3E+01	NC	NA	NC	6.0E-04	NA	NA	NA	NA	NA

ELCR = NA + NA = NA

NOTES:

(a) EPCs presented in Table 4.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion lifetime average daily dose LADD is calculated by the following equation:

SW Ingestion LADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NLADSIRsw where, NLADSIRsw = 9.3E-05 L_{sw}/kg-day

(d) The SW dermal contact LADD is calculated by the following equation:

SW Contact LADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NLADSCRsw where, NLADSCRsw = 4.5E+00 $cm^2{}_{sw}$-hr/kg-day

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 55
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure ADD (c) (mg/m^3)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Inhalation (d)
C9-C12 Aliphatics	5.1E-02	4.9E-02	2.0E-01	2.4E-01
C9-C18 Aliphatics	1.3E-01	1.2E-01	2.0E-01	6.1E-01
Phenanthrene	5.7E-07	5.5E-07	5.0E-02	1.1E-05

TOTAL HAZARD INDEX = 9E-01

NOTES:

(a) EPCs presented in Table 9.

(b) RfC values taken from Table 11.

(c) The soil gas inhalation average daily dose ADD is calculated by the following equation:

Soil Gas Inhalation ADD = [OHM]air * $NADSIR_{air}$ where, NADSIRair = 9.6E-01

(d) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 56
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE RESIDENT CHILD EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure LADD (c) (mg/m^3)	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Inhalation (e)
C9-C12 Aliphatics	5.1E-02	4.5E-03	NA	NC
C9-C18 Aliphatics	1.3E-01	1.1E-02	NA	NC
Phenanthrene	5.7E-07	5.1E-08	NA	NC
			ELCR =	NA

NOTES:

(a) EPCs presented in Table 9.

(b) Unit Risk values taken from Table 11.

(c) The soil gas inhalation lifetime average daily dose LADD is calculated by the following equation:

Soil Gas Inhalation LADD = [OHM]air * $NLADSIR_{air}$ where, NLADSIRair = 8.9E-02

(d) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 57
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil Ingestion Exposure RAF (b)	Chronic Soil Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Soil Dermal Contact Exposure RAF (b)	Chronic Soil Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	1.1E-06	0.5	8.0E-06	1.0E-01	1.1E-05	8.0E-05	9.1E-05
C9-C18 Aliphatics	53	1	1.1E-05	0.5	8.3E-05	1.0E-01	1.1E-04	8.3E-04	9.4E-04
C19-C36 Aliphatics	245	1	5.2E-05	0.1	7.7E-05	2.0E+00	2.6E-05	3.8E-05	6.5E-05
C11-C22 Aromatics	85	0.36	6.5E-06	0.1	2.7E-05	3.0E-02	2.2E-04	8.9E-04	1.1E-03
2-Methylnaphthalene	0.43	0.36	3.3E-08	0.1	1.3E-07	4.0E-03	8.2E-06	3.4E-05	4.2E-05
Dibenz(a,h)anthracene	0.52	0.28	3.1E-08	0.02	3.3E-08	3.0E-02	1.0E-06	1.1E-06	2.1E-06
Aroclor-1260	0.12	0.85	2.3E-08	0.16	6.2E-08	2.0E-05	1.1E-03	3.1E-03	4.3E-03
Aluminum	10730	1	2.3E-03	0.1	3.4E-03	1.0E+00	2.3E-03	3.4E-03	5.7E-03
Antimony	1.0	1	2.1E-07	0.1	3.1E-07	4.0E-04	5.3E-04	7.8E-04	1.3E-03
Barium	1007	1	2.1E-04	0.05	1.6E-04	7.0E-02	3.1E-03	2.3E-03	5.3E-03
Beryllium	0.32	1	6.8E-08	0.03	3.0E-08	2.0E-03	3.4E-05	1.5E-05	4.9E-05
Chromium	22	1	4.7E-06	0.09	6.2E-06	3.0E-03	1.6E-03	2.1E-03	3.7E-03
Cobalt	9.2	1	2.0E-06	0.1	2.9E-06	2.0E-02	9.9E-05	1.5E-04	2.4E-04
Copper	1431	1	3.1E-04	0.3	1.3E-03	3.0E-02	1.0E-02	4.5E-02	5.5E-02
Iron	33363	1	7.1E-03	0.143	1.5E-02	3.0E-01	2.4E-02	5.0E-02	7.4E-02
Lead	562	0.5	6.0E-05	0.006	1.1E-05	7.5E-04	8.0E-02	1.4E-02	9.4E-02
Manganese	238	1	5.1E-05	0.143	1.1E-04	7.0E-02	7.2E-04	1.5E-03	2.2E-03
Mercury	0.60	1	1.3E-07	0.05	9.4E-08	3.0E-04	4.2E-04	3.1E-04	7.4E-04
Nickel	16	1	3.4E-06	0.35	1.7E-05	2.0E-02	1.7E-04	8.6E-04	1.0E-03
Selenium	1.3	1	2.8E-07	0.002	8.2E-09	5.0E-03	5.5E-05	1.6E-06	5.7E-05
Silver	2.1	1	4.4E-07	0.25	1.6E-06	5.0E-03	8.8E-05	3.2E-04	4.1E-04
Thallium	1.3	1	2.8E-07	0.01	4.1E-08	8.0E-05	3.5E-03	5.1E-04	4.0E-03
Vanadium	28	1	5.9E-06	0.03	2.6E-06	9.0E-03	6.6E-04	2.9E-04	9.5E-04
Zinc	637	1	1.4E-04	0.02	4.0E-05	3.0E-01	4.5E-04	1.3E-04	5.9E-04

TOTAL HAZARD INDEX = 1.3E-01 + 1.3E-01 = 3E-01

NOTES:

(a) EPCs presented in Table 2.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The soil ingestion average daily dose ADD is calculated by the following equation:

Soil Ingestion ADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NADSIRsoil where, NADSIRsoil = 2.1E-01 mg soil/kg-day

(d) The soil dermal contact ADD is calculated by the following equation:

Soil Contact ADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NADSCRsoil where, NADSCRsoil = 3.1E+00 mg soil/kg-day

(e) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 58
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE RESIDENT ADULT EXPOSURES TO SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Soil Ingestion Exposure RAF (b)	Soil Ingestion Exposure LADD (c) (mg/kg-day)	Soil Dermal Contact Exposure RAF (b)	Soil Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.2E-08	0.02	1.3E-08	7.3E+00	9.0E-08	9.5E-08	1.9E-07
Aroclor-1260	0.12	0.85	9.0E-09	0.16	2.5E-08	2.0E+00	1.8E-08	5.0E-08	6.8E-08
Aluminum	10730	NC	NC	NC	NC	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NC	NC	NC
Beryllium	0.32	NC	NC	NC	NC	NA	NC	NC	NC
Chromium	22	NC	NC	NC	NC	NA	NC	NC	NC
Cobalt	9.2	NC	NC	NC	NC	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NC	NC	NC
Nickel	16	NC	NC	NC	NC	NA	NC	NC	NC
Selenium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NC	NC	NC

ELCR = 1.1E-07 + 1.4E-07 = 3E-07

NOTES:
(a) EPCs presented in Table 2.
(b) SF and RAF values taken from Tables 10 and 12, respectively.
(c) The soil ingestion lifetime average daily dose LADD is calculated by the following equation:
Soil Ingestion LADD = [OHM]soil * 10^{-6} kg/mg * RAFing * NLADSIRsoil where, NLADSIRsoil = 8.5E-02 mg soil/kg-day
(d) The soil dermal contact ADD is calculated by the following equation:
Soil Contact LADD = [OHM]soil * 10^{-6} kg/mg * RAFderm * NLADSCRsoil where, NLADSCRsoil = 1.3E+00 mg soil/kg-day
(e) Excess Lifetime Cancer Risk = LADD * SF
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 59
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure ADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Respiratory (e)	Chemical-Specific Hazard Index (e)
C9-C12 Aliphatics	5.1	1	1.7E-9	1	4.2E-10	1.0E-01	2.0E-01	1.7E-8	7.3E-9	2.4E-8
C9-C18 Aliphatics	53	1	1.7E-8	1	4.3E-9	1.0E-01	2.0E-01	1.7E-7	7.6E-8	2.5E-7
C19-C36 Aliphatics	245	1	8.0E-8	1	2.0E-8	2.0E+00	NA	4.0E-8	NC	4.0E-8
C11-C22 Aromatics	85	0.36	1.0E-8	1	7.0E-9	3.0E-02	5.0E-02	3.3E-7	4.9E-7	8.2E-7
2-Methylnaphthalene	0.43	0.36	5.1E-11	1	3.5E-11	4.0E-03	5.0E-02	1.3E-8	2.5E-9	1.5E-8
Dibenz(a,h)anthracene	0.52	0.28	4.8E-11	1	4.2E-11	3.0E-02	5.0E-02	1.6E-9	3.0E-9	4.6E-9
Aroclor-1260	0.12	0.85	3.5E-11	1	1.0E-11	2.0E-05	2.0E-05	1.7E-6	1.8E-6	3.5E-6
Aluminum	10730	1	3.5E-6	1	8.8E-7	1.0E+00	NA	3.5E-6	NC	3.5E-6
Antimony	1.0	1	3.3E-10	1	8.2E-11	4.0E-04	1.0E-02	8.2E-7	2.9E-8	8.5E-7
Barium	1007	1	3.3E-7	1	8.2E-8	7.0E-02	5.0E-04	4.7E-6	5.8E-4	5.8E-4
Beryllium	0.32	1	1.0E-10	1	2.6E-11	2.0E-03	2.0E-05	5.2E-8	4.6E-6	4.6E-6
Chromium	22	1	7.3E-9	1	1.8E-9	3.0E-03	1.0E-04	2.4E-6	6.3E-5	6.6E-5
Cobalt	9.2	1	3.0E-9	1	7.6E-10	2.0E-02	NA	1.5E-7	NC	1.5E-7
Copper	1431	1	4.7E-7	1	1.2E-7	3.0E-02	NA	1.6E-5	NC	1.6E-5
Iron	33363	1	1.1E-5	1	2.7E-6	3.0E-01	NA	3.6E-5	NC	3.6E-5
Lead	562	0.5	9.2E-8	1	4.6E-8	7.5E-04	1.0E-03	1.2E-4	1.6E-4	2.8E-4
Manganese	238	1	7.8E-8	1	1.9E-8	7.0E-02	5.0E-05	1.1E-6	1.4E-3	1.4E-3
Mercury	0.60	1	2.0E-10	1	4.9E-11	3.0E-04	3.0E-04	6.5E-7	5.7E-7	1.2E-6
Nickel	16	1	5.2E-9	1	1.3E-9	2.0E-02	1.0E-03	2.6E-7	4.5E-6	4.8E-6
Selenium	1.3	1	4.3E-10	1	1.1E-10	5.0E-03	3.0E-03	8.5E-8	1.2E-7	2.1E-7
Silver	2.1	1	6.8E-10	1	1.7E-10	5.0E-03	1.4E-04	1.4E-7	4.2E-6	4.4E-6
Thallium	1.3	1	4.3E-10	1	1.1E-10	8.0E-05	1.4E-05	5.3E-6	2.7E-5	3.2E-5
Vanadium	28	1	9.1E-9	1	2.3E-9	9.0E-03	1.0E-03	1.0E-6	8.0E-6	9.0E-6
Zinc	637	1	2.1E-7	1	5.2E-8	3.0E-01	1.4E-03	7.0E-7	1.3E-4	1.3E-4

TOTAL HAZARD INDEX = 2.0E-04 + 2.3E-03 = 3E-03

NOTES:

(a) EPCs presented in Table 2.

(b) RfD, RfC, and RAF values taken from Tables 10, 11, and 12, respectively.

(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:

$ADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NADSIR_{fugd}$ where, $NADSIR_{fugd}$ = 1.6E-10 mg soil/kg-day

(d) The fugitive dust respiratory system ADD is calculated by the following equation:

$ADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NADSIR_{fugd}$

(e) Ingestion Hazard Quotient = $ADD_{inhalation\text{-}GI}$ / RfD

Respiratory Hazard Quotient = ($ADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) / RfC

and Hazard Index = Sum (Hazard Quotients)

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 60
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO FUGITIVE DUST FROM SURFACE/SUBSURFACE SOIL

Contaminant of Concern	EPC(a) (mg/kg)	Chronic Soil GI Inhalation Exposure RAF (b)	Chronic Soil GI Inhalation Exposure LADD (c) (mg/kg-day)	Chronic Soil Respiratory Exposure RAF (b)	Chronic Soil Respiratory Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Respiratory (e)	Chemical-Specific ELCR (e)
C9-C12 Aliphatics	5.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
C9-C18 Aliphatics	53	NC	NC	NC	NC	NA	NA	NC	NC	NC
C19-C36 Aliphatics	245	NC	NC	NC	NC	NA	NA	NC	NC	NC
C11-C22 Aromatics	85	NC	NC	NC	NC	NA	NA	NC	NC	NC
2-Methylnaphthalene	0.43	NC	NC	NC	NC	NA	NA	NC	NC	NC
Dibenz(a,h)anthracene	0.52	0.28	1.9E-11	1	1.7E-11	7.3E+00	2.1E+00	1.4E-10	1.2E-10	2.6E-10
Aroclor-1260	0.12	0.85	1.4E-11	1	4.1E-12	2.0E+00	1.0E-01	2.8E-11	1.4E-12	2.9E-11
Aluminum	10730	NC	NC	NC	NC	NA	NA	NC	NC	NC
Antimony	1.0	NC	NC	NC	NC	NA	NA	NC	NC	NC
Barium	1007	NC	NC	NC	NC	NA	NA	NC	NC	NC
Beryllium	0.32	NC	NC	1	1.0E-11	NA	2.4E+00	NC	8.8E-11	8.8E-11
Chromium	22	NC	NC	1	7.3E-10	NA	1.2E+01	NC	3.0E-8	3.0E-8
Cobalt	9.2	NC	NC	NC	NC	NA	NA	NC	NC	NC
Copper	1431	NC	NC	NC	NC	NA	NA	NC	NC	NC
Iron	33363	NC	NC	NC	NC	NA	NA	NC	NC	NC
Lead	562	NC	NC	NC	NC	NA	NA	NC	NC	NC
Manganese	238	NC	NC	NC	NC	NA	NA	NC	NC	NC
Mercury	0.60	NC	NC	NC	NC	NA	NA	NC	NC	NC
Nickel	16	NC	NC	1	5.2E-10	NA	4.8E-01	NC	8.7E-10	8.7E-10
Selenium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Silver	2.1	NC	NC	NC	NC	NA	NA	NC	NC	NC
Thallium	1.3	NC	NC	NC	NC	NA	NA	NC	NC	NC
Vanadium	28	NC	NC	NC	NC	NA	NA	NC	NC	NC
Zinc	637	NC	NC	NC	NC	NA	NA	NC	NC	NC

ELCR = 1.7E-10 + 3.2E-08 = 3E-08

NOTES:
(a) EPCs presented in Table 2.
(b) SF, Unit Risk, and RAF values taken from Tables 10, 11, and 12, respectively.
(c) The fugitive dust gastrointestinal ingestion ADD is calculated by the following equation:
$LADD_{inhalation\text{-}GI} = [OHM]_{particulate} * 2 * RAF_{ing} * NLADSIR_{fugd}$ where, $NLADSIR_{fugd}$ = 6.6E-11 mg soil/kg-day
(d) The fugitive dust respiratory system ADD is calculated by the following equation:
$LADD_{inhalation} = [OHM]_{particulate} * 0.5 * RAF_{inh} * NLADSIR_{fugd}$
(e) Ingestion ELCR = $LADD_{inhalation\text{-}GI}$ * SF
Respiratory ELCR = ($LADD_{inhalation}$ * Body Weight (70 Kg) / Daily Inhalation Rate (20 m^3/day)) * Unit Risk
and Hazard Index = Sum (Hazard Quotients)
NC = Not calculated
NA = Not Applicable/Available/Analyzed

TABLE 61
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO SURFACE WATER

Contaminant of Concern	EPC(a) (ug/L)	Chronic Ingestion Exposure RAF (b)	Chronic Ingestion Exposure ADD (c) (mg/kg-day)	Chronic Dermal Contact Exposure RAF (b)	Chronic Dermal Contact Exposure Kp (cm/hr)	Chronic Dermal Contact Exposure ADD (d) (mg/kg-day)	Chronic RfD (b) (mg/kg-day)	Chemical-Specific Hazard Quotient Ingestion (e)	Chemical-Specific Hazard Quotient Dermal (e)	Chemical-Specific Hazard Index (e)
Lead	1.3E+00	0.5	6.5E-08	1	1.0E-04	1.5E-09	7.5E-04	8.6E-05	2.0E-06	8.8E-05
Zinc	1.3E+01	1	1.3E-06	1	6.0E-04	8.7E-08	3.0E-01	4.3E-06	2.9E-07	4.6E-06

TOTAL HAZARD INDEX = 9.1E-05 + 2.2E-06 = 9E-05

NOTES:

(a) EPCs presented in Table 4.

(b) RfD and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion average daily dose ADD is calculated by the following equation:

SW Ingestion ADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NADSIRsw where, NADSIRsw = 1.0E-04 L_{sw}/kg-day

(d) The SW dermal contact ADD is calculated by the following equation:

SW Contact ADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NADSCRsw where, NADSCRsw = 1.2E+01 $cm^2{}_{sw}$-hr/kg-day

TABLE 62
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS FOR FUTURE RESIDENT ADULT EXPOSURES TO SURFACE WATER

Contaminant of Concern	EPC(a) (ug/L)	Ingestion Exposure RAF (b)	Ingestion Exposure LADD (c) (mg/kg-day)	Dermal Contact Exposure RAF (b)	Dermal Contact Exposure Kp (cm/hr)	Dermal Contact Exposure LADD (d) (mg/kg-day)	SF (b) $(mg/kg\text{-}day)^{-1}$	Chemical-Specific ELCR Ingestion (e)	Chemical-Specific ELCR Dermal (e)	Chemical-Specific ELCR (e)
Lead	1.3E+00	NC	NA	NC	1.0E-04	NA	NA	NA	NA	NA
Zinc	1.3E+01	NC	NA	NC	6.0E-04	NA	NA	NA	NA	NA

ELCR = NA + NA = NA

NOTES:

(a) EPCs presented in Table 4.

(b) SF and RAF values taken from Tables 10 and 12, respectively.

(c) The surface water ingestion lifetime average daily dose LADD is calculated by the following equation:

SW Ingestion LADD = [OHM]sw * 10^{-3} mg/ug * RAFing * NLADSIRsw where, NLADSIRsw = 4.1E-05 L_{sw}/kg-day

(d) The SW dermal contact LADD is calculated by the following equation:

SW Contact LADD = [OHM]sw* 10^{-3} L/cm^3 *10^{-3}mg/ug *RAFderm *Kp* NLADSCRsw where, NLADSCRsw = 4.6E+00 $cm^2{}_{sw}$-hr/kg-day

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 63
AVERAGE DAILY DOSE AND HAZARD INDEX CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure ADD (c) (mg/m^3)	Chronic RfC (b) (mg/m^3)	Chemical-Specific Hazard Quotient Inhalation (d)
C9-C12 Aliphatics	5.1E-02	4.9E-02	2.0E-01	2.4E-01
C9-C18 Aliphatics	1.3E-01	1.2E-01	2.0E-01	6.1E-01
Phenanthrene	5.7E-07	5.5E-07	5.0E-02	1.1E-05

TOTAL HAZARD INDEX = 9E-01

NOTES:

(a) EPCs presented in Table 9.

(b) RfC values taken from Table 11.

(c) The soil gas inhalation average daily dose ADD is calculated by the following equation:

Soil Gas Inhalation ADD = [OHM]air * $NADSIR_{air}$ where, NADSIRair = 9.6E-01

(d) Hazard Quotient = ADD/RfD and Hazard Index = Sum (Hazard Quotients)

TABLE 64
LIFETIME AVERAGE DAILY DOSE AND EXCESS LIFETIME CANCER RISK CALCULATIONS
FOR FUTURE RESIDENT ADULT EXPOSURES TO SOIL IN INDOOR AIR

Contaminant of Concern	EPC(a) (mg/m^3)	Inhalation Exposure LADD (c) (mg/m^3)	Unit Risk (b) $(mg/m^3)^{-1}$	Chemical-Specific ELCR Inhalation (e)
C9-C12 Aliphatics	5.1E-02	1.9E-02	NA	NC
C9-C18 Aliphatics	1.3E-01	4.9E-02	NA	NC
Phenanthrene	5.7E-07	2.2E-07	NA	NC
			ELCR =	NA

NOTES:

(a) EPCs presented in Table 9.

(b) Unit Risk values taken from Table 11.

(c) The soil gas inhalation lifetime average daily dose LADD is calculated by the following equation:

Soil Gas Inhalation LADD = [OHM]air * $NLADSIR_{air}$ where, NLADSIRair = 3.8E-01

(d) Excess Lifetime Cancer Risk = LADD * SF

NC = Not calculated

NA = Not Applicable/Available/Analyzed

TABLE 65
COMPARISON OF SOIL MAXIMUM DETECTED CONCENTRATIONS TO UPPER CONCENTRATION LIMITS

COPC	Maximum Detected Concentration (a) (mg/Kg)	Upper Concentration Limit for Soil (mg/Kg)
C9-C12 Aliphatics	12	20,000
C9-C18 Aliphatics	53	20,000
C19-C36 Aliphatics	530	20,000
C11-C22 Aromatics	85	10,000
2-Methylnaphthalene	0.85	10,000
Benzo(a)anthracene	0.495	3,000
Benzo(a)pyrene	0.5	300
Benzo(b)fluoranthene	1.25	3,000
Dibenz(a,h)anthracene	0.82	300
Fluoranthene	1.4	10,000
Indeno(1,2,3-cd)pyrene	0.82	3,000
Phenanthrene	1.5	10,000
Pyrene	1.35	10,000
Aroclor-1260	0.14	100
Aluminum	17825	NA
Antimony	2.6	300
Arsenic	8.9	200
Barium	2800	10,000
Beryllium	1.4	30
Cadmium	1.7	300
Calcium	29900	NA
Chromium	71	2,000
Cobalt	33.3	NA
Copper	4520	NA
Iron	63900	NA
Lead	1300	3,000
Magnesium	3660	NA
Manganese	367	NA
Mercury	2.2	300
Nickel	47	7,000
Potassium	3390	NA
Selenium	1.3	8,000
Silver	2.07	2,000
Sodium	2900	NA
Thallium	1.3	800
Vanadium	69.5	10,000
Zinc	1600	10,000

NOTES:
Shaded values exceed criteria.
(a) Concentrations taken from Table 2.
UCLs obtained from 310CMR 40.0996(7), Table 6, 04/03/06.

TABLE 66
COMPARISON OF GROUNDWATER MAXIMUM DETECTED CONCENTRATIONS TO UPPER CONCENTRATION LIMITS

COPC	Site-Wide Maximum Groundwater Concentration (a) (ug/L)	Upper Concentration Limit for Groundwater (ug/L)
Lead	18	150
Zinc	195	50,000

NOTES:
(a) Concentrations taken from Table 4.
UCLs obtained from 310CMR 40.0996(7), Table 6, 04/03/06.

TABLE 68
COMPARISON OF AMBIENT WATER QUALITY CRITERIA TO DILUTED GROUNDWATER CONCENTRATIONS

COPC	Groundwater Exposure Point Concentration (a)	Concentration Diluted 10-fold	Massachusetts AWQC (b)
	ug/L	ug/L	ug/L
Lead	13	1.3	0.5
Zinc	126	12.6	36

NOTES:
Shaded values exceed criteria.
(a) Concentrations taken from Table 4.
(b) AWQCs from 310 CMR 40.1516(1) Environmental Toxicity Values

APPENDIX J

Method 3 Risk Characterization