Appendix D

Detailed Risk Calculations

Risk Calculation Locations by Address

Address	Workbook	House Tab
102 S. Marquette	MKC HHRA_Part1	H1
106 S. Marquette	MKC HHRA_Part1	H2
110 S. Marquette	MKC HHRA_Part1	H3
114 S. Marquette	MKC HHRA_Part1	H4
118 S. Marquette	MKC HHRA_Part1	H5
126 S. Marquette	MKC HHRA_Part1	H6
128 S. Marquette	MKC HHRA_Part1	H7
130 S. Marquette	MKC HHRA_Part1	H8
134 S. Marquette	MKC HHRA_Part1	H9
138 S. Marquette	MKC HHRA_Part1	H10
142 S. Marquette	MKC HHRA_Part1	H11
146 S. Marquette	MKC HHRA_Part2	H1
150 S. Marquette	MKC HHRA_Part2	H2
154 S. Marquette	MKC HHRA_Part2	H3
162 S. Marquette	MKC HHRA_Part2	H4
166 S. Marquette	MKC HHRA_Part2	H5
202 S. Marquette	MKC HHRA_Part2	H6
206 S. Marquette	MKC HHRA_Part2	H7
210 S. Marquette	MKC HHRA_Part2	H8
214 S. Marquette	MKC HHRA_Part2	H9
222 S. Marquette	MKC HHRA_Part2	H10
226 S. Marquette	MKC HHRA_Part2	H11
230 S. Marquette	MKC HHRA_Part2	H12
233 Waubesa	MKC HHRA_Part3	H1
241 Waubesa	MKC HHRA_Part3	H2
245 Waubesa	MKC HHRA_Part3	H3
249 Waubesa	MKC HHRA_Part3	H4
253 Waubesa	MKC HHRA_Part3	H5
257 Waubesa	MKC HHRA_Part3	H6
261 Waubesa	MKC HHRA_Part3	H7
265 Waubesa	MKC HHRA_Part3	H8

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H6_Ing	126 S. Marquette	Table D.23 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H6_Derm	126 S. Marquette	Table D.24 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H6_Inh	126 S. Marquette	Table D.25 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
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H7_Derm	128 S. Marquette	Table D.27 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
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H9_Derm	134 S. Marquette	Table D.33 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H9_Inh	134 S. Marquette	Table D.34 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
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H10_Inh	138 S. Marquette	Table D.37 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H11_Ing	142 S. Marquette	Table D.38 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
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H11_Inh	142 S. Marquette	Table D.40 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure

Table D.1 Soil Exposure Point Concentrations (mg/kg)

COPC	102 S. Marquette	106 S. Marquette	110 S. Marquette	114 S. Marquette	118 S. Marquette	126 S. Marquette	128 S. Marquette	130 S. Marquette	134 S. Marquette	138 S. Marquette	142 S. Marquette
PAHs											
1-Methylnaphthalene	ND	0.086	ND	ND	ND	0.033	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	0.062	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	0.012	ND	0.017	ND	0.013	ND	ND	ND	ND	ND	ND
Acenaphthylene	0.021	0.012	0.022	ND	ND	ND	ND	ND	0.011	ND	ND
Anthracene	0.05	0.041	0.043	0.017	0.046	0.022	0.018	ND	0.03	0.014	0.026
Benzo[a]anthracene	0.29	0.2	0.21	0.082	0.32	0.13	0.11	0.047	0.11	0.077	0.13
Benzo[a]pyrene	0.29	0.19	0.23	0.089	0.3	0.12	0.11	0.05	0.12	0.076	0.17
Benzo[b]fluoranthene	0.25	0.29	0.28	0.11	0.39	0.18	0.13	0.066	0.16	0.093	0.19
Benzo(g,h,i)perylene	0.2	0.14	0.17	0.066	0.19	0.085	0.077	0.04	0.085	0.075	0.35
Benzo(k)fluoranthene	0.33	0.11	0.17	0.049	0.16	0.061	0.087	0.031	0.061	0.052	0.091
Chrysene	0.33	0.26	0.23	0.1	0.39	0.15	0.13	0.056	0.14	0.083	0.17
Dibenz(a,h)anthracene	0.057	0.039	0.042	0.018	0.057	0.022	0.015	ND	0.022	0.024	0.14
Fluoranthene	0.61	0.39	0.49	0.19	0.61	0.29	0.2	0.092	0.26	0.16	0.28
Fluorene	0.016	0.016	0.021	ND	0.015	0.0085	ND	ND	0.0094	ND	0.011
Indeno[1,2,3-cd]pyrene	0.17	0.12	0.15	0.051	0.16	0.074	0.069	0.032	0.072	0.063	0.18
Naphthalene	0.0096	0.039	0.009	ND	0.011	0.02	ND	ND	ND	ND	0.0079
Phenanthrene	0.27	0.31	0.21	0.11	0.26	0.14	0.088	0.034	0.11	0.079	0.15
Pyrene	0.53	0.35	0.4	0.17	0.49	0.22	0.17	0.082	0.19	0.12	0.24
PCBs											
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.072	0.016
Aroclor-1260	ND	ND	0.096	ND	ND	ND	ND	ND	ND	ND	ND
VOCs											
Tetrachloroethene	2.2	3.6	1.500	0.087	0.10	0.099	0.36	0.052	0.11	0.20	0.092
Trichloroethene	0.45	0.71	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table D.1 Soil Exposure Point Concentrations (mg/kg)

COPC	146 S. Marquette	150 S. Marquette	154 S. Marquette	162 S. Marquette	166 S. Marquette	202 S. Marquette	206 S. Marquette	210 S. Marquette	214 S. Marquette	222 S. Marquette	226 S. Marquette	230 S. Marquette
PAHs												
1-Methylnaphthalene	ND	ND	ND	ND	ND	0.03	0.019	0.022	0.02	0.019	0.018	-
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Acenaphthene	ND	0.012	ND	ND	ND	0.1	0.048	0.028	0.03	0.022	0.012	-
Acenaphthylene	ND	0.0083	0.075	ND	ND	0.12	ND	0.01	0.0091	ND	0.018	-
Anthracene	ND	0.028	0.033	ND	0.019	0.27	0.2	0.073	0.082	0.026	0.028	-
Benzo[a]anthracene	0.031	0.11	0.13	0.041	0.071	0.79	0.32	0.23	0.29	0.0082	0.13	-
Benzo[a]pyrene	0.031	0.11	0.18	0.041	0.067	0.82	0.28	0.16	0.2	0.13	0.19	-
Benzo[b]fluoranthene	0.045	0.15	0.21	0.052	0.1	1.1	0.31	0.27	0.23	0.16	0.18	-
Benzo(g,h,i)perylene	0.032	0.076	0.15	0.035	0.051	0.58	0.13	0.11	0.15	0.1	0.11	-
Benzo(k)fluoranthene	0.017	0.058	0.065	0.027	0.058	0.48	0.15	0.26	0.15	0.084	0.14	-
Chrysene	0.039	0.12	0.16	0.047	0.083	0.96	0.37	0.23	0.28	0.15	0.2	-
Dibenz(a,h)anthracene	0.011	0.022	0.038	ND	0.018	0.17	0.073	0.05	0.067	0.032	0.044	-
Fluoranthene	0.056	0.24	0.2	0.09	0.15	2	0.69	0.49	0.58	0.27	0.29	-
Fluorene	ND	0.011	0.014	ND	ND	0.13	0.06	0.045	0.044	0.027	0.014	-
Indeno[1,2,3-cd]pyrene	0.026	0.064	0.11	0.027	0.043	0.5	0.12	0.09	0.11	0.078	0.087	-
Naphthalene	ND	0.0072	0.0088	ND	ND	0.04	0.064	0.027	0.016	0.026	0.012	-
Phenanthrene	0.035	0.14	0.1	0.052	0.11	1.3	0.61	0.52	0.45	0.22	0.17	-
Pyrene	0.052	0.2	0.21	0.084	0.13	1.5	0.6	0.46	0.5	0.21	0.25	-
PCBs												
Aroclor-1242	ND	0.094	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Aroclor-1254	0.11	0.079	0.019	ND	ND	ND	0.024	ND	ND	ND	ND	-
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.021	-
VOCs												
Tetrachloroethene	0.83	0.45	0.61	0.033	ND	0.065	ND	0.038	ND	ND	ND	-
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

Table D.1 Soil Exposure Point Concentrations (mg/kg)

COPC	233 Waubesa	241 Waubesa	245 Waubesa	249 Waubesa	253 Waubesa	257 Waubesa	261 Waubesa	265 Waubesa
PAHs								
1-Methylnaphthalene	ND	0.063	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ND	0.054	ND	ND	ND	ND	ND	ND
Acenaphthene	0.021	0.11	ND	0.063	ND	0.011	ND	0.016
Acenaphthylene	0.046	0.017	ND	0.014	ND	0.028	ND	0.013
Anthracene	0.12	0.25	0.036	0.16	0.023	0.047	0.016	0.039
Benzo[a]anthracene	0.5	0.63	0.14	0.55	0.12	0.29	0.054	0.21
Benzo[a]pyrene	0.46	0.59	0.14	0.5	0.12	0.31	0.076	0.23
Benzo[b]fluoranthene	0.58	0.71	0.19	0.6	0.15	0.41	0.081	0.32
Benzo(g,h,i)perylene	0.32	0.41	0.12	0.34	0.089	0.26	0.042	0.15
Benzo(k)fluoranthene	0.29	0.38	0.072	0.33	0.082	0.17	0.06	0.13
Chrysene	0.52	0.62	0.16	0.58	0.14	0.34	0.09	0.27
Dibenz(a,h)anthracene	0.099	0.13	0.046	0.11	0.035	0.078	0.014	0.068
Fluoranthene	1.3	1.4	0.29	1.3	0.21	0.57	0.13	0.41
Fluorene	0.027	0.13	0.013	0.051	0.011	0.013	ND	0.017
Indeno[1,2,3-cd]pyrene	0.27	0.36	0.1	0.31	0.08	0.19	0.03	0.14
Naphthalene	0.01	0.078	ND	0.01	ND	0.019	0.015	0.0097
Phenanthrene	0.53	1	0.18	0.85	0.16	0.28	0.07	0.2
Pyrene	0.87	1.1	0.23	1.1	0.22	0.55	0.13	0.4
PCBs								
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	0.13
Aroclor-1248	ND	ND	23	0.21	0.24	0.37	ND	0.094
Aroclor-1254	0.064	0.7	0.14	0.081	0.046	ND	ND	ND
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND
VOCs								
Tetrachloroethene	0.1	0.067	ND	ND	0.17	0.052	ND	0.086
Trichloroethene	ND	ND	0.022	ND	ND	ND	ND	ND

Notes:
COPC - Compound of Potential Concern.
The maximum surface soil concentration from the 0-4 ft depth interval, from 2011 or 2012, was used as the soil EPC.
No data was collected at 237 Waubesa, and 269 Waubesa.
"-" = Not sampled or not analyzed.
ND = Not detected.

Table D.2 Indoor Air Exposure Point Concentrations (µg/m^3)

COPC	102 S. Marquette	106 S. Marquette	110 S. Marquette	114 S. Marquette	118 S. Marquette	126 S. Marquette	128 S. Marquette	130 S. Marquette	134 S. Marquette	138 S. Marquette	142 S. Marquette	146 S. Marquette	150 S. Marquette	154 S. Marquette	162 S. Marquette	166 S. Marquette
VOCs																
Tetrachloroethene	0.22	0.41	0.41	0.62	2.2	0.31	ND	0.24	0.95	ND	ND	ND	ND	4.5	ND	1.2
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	0.038	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table D.2 Indoor Air Exposure Point Concentrations (µg/m^3)

COPC	202 S. Marquette	206 S. Marquette	210 S. Marquette	214 S. Marquette	222 S. Marquette	226 S. Marquette	230 S. Marquette	233 Waubesa	241 Waubesa	245 Waubesa	249 Waubesa	253 Waubesa	257 Waubesa	261 Waubesa	265 Waubesa
VOCs															
Tetrachloroethene	ND	3.3	ND	-	ND	ND	ND	2.5	ND	3.6	40	0.67	0.73	-	-
Trichloroethene	ND	0.66	ND	-	ND	0.75	ND	ND	ND	ND	3.9	ND	ND	-	-
Vinyl Chloride	ND	ND	ND	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-

Notes:
COPC - Compound of Potential Concern.
The maximum indoor air concentration from 2011 and 2012 regardless of sampling location (basement versus floor) was used as the EPC.
No data was collected at 237 Waubesa, and 269 Waubesa.
"-" = Not sampled or not analyzed.
ND = Not detected.

Table D.3 Exposure Factor Input Values

Exposure Pathway/Exposure Factor	Acronym	Adult Resident		Child Resident	
		Value	Comment (Reference)	Value	Comment (Reference)
General					
Body Weight (kg)	BW	70	Average adult body weight (US EPA, 1991b, 2012h)	15	Average child body weight (US EPA, 1991b, 2012h)
Exposure Duration (yr)	ED	24	90th percentile for time at one residence; 24 yrs as adult (US EPA, 2012h)	6	90th percentile for time at one residence; 6 years as child (US EPA, 2012h)
Exposure Frequency (days/yr)	EF	350	Assumes 2 week/yr spent away from residence (US EPA, 2012h)	350	Assumes 2 week/yr spent away from residence (US EPA, 2012h)
Averaging Period - Cancer (days)	AT-C	25,550	70 years x 365 days/year (US EPA, 2012h)	25,550	70 years x 365 days/year (US EPA, 2012h)
Averaging Period - Non-cancer (days)	AT-NC	8,760	24 yrs x 365 days/yr (US EPA, 2012h)	2,190	6 year x 365 days/year (US EPA, 2012h)
Incidental Ingestion of Soil and Sediment					
Soil/Sediment Ingestion Rate (mg/d)	IR-S	100	RME soil ingestion rate for adults (Calabrese, 1990, as cited in US EPA, 1997d; US EPA, 2012h).	200	RME soil ingestion rate for young children (3-6 years old) [US EPA 2011e (Chapter 5.6), 1997d, 1991b, 2012h]
Fraction Soil/Sediment from Contaminated Source	FR-S	1	100% of soil/sediment ingestion occurs on Site	1	100% of soil ingestion occurs on Site
Dermal Contact with Soil and Sediment					
Surface Area Exposed to Soil/Sediment (cm^2/d)	SA-S	5,700	Recommended exposure surface for adult resident; based on the 50th percentile for males and females over 18 year old (US EPA, 2004a).	2,800	Recommended exposure surface for child resident; based on the 50th percentile for males and females 1-6 year old (US EPA, 2004a).
Soil-Sediment/Skin Adherence Factor (mg/cm^2)	AF-S	0.07	RME value for adult resident (US EPA, 2004a, 2012h)	0.2	RME value for child resident (US EPA, 2004a, 2012h)
Inhalation of Ambient Air					
Resident Air Exposure Time (hours/day)	ET	24	Assumes whole day exposure (US EPA, 2012h).	24	Assumes whole day exposure (US EPA, 2012h).
Early Life Mutagen Exposure					
Exposure Duration 0-2 years old (yr)	ED_{0-2}	NA	--	2	Exposure Duration - age segment 0-2 (yr) (US EPA, 2012h).
Exposure Duration 2-6 years old (yr)	ED_{2-6}	NA	--	4	Exposure Duration - age segment 2-6 (yr) (US EPA, 2012h).
Exposure Duration 6-16 years old (yr)	ED_{6-16}	10	Exposure Duration - age segment 6-16 (yr) (US EPA, 2012h).	NA	--
Exposure Duration 16-30 years old (yr)	ED_{16-30}	14	Exposure Duration - age segment 16-30 (yr) (US EPA, 2012h).	NA	--
Toxicity Adjustment Factor 0-2 years old	TAF_{0-2}	NA	--	10	Toxicity adjustment for the age group (US EPA, 2012h).
Toxicity Adjustment Factor 2-6 years old	TAF_{2-6}	NA	--	3	Toxicity adjustment for the age group (US EPA, 2012h).
Toxicity Adjustment Factor 6-16 years old	TAF_{6-16}	3	Toxicity adjustment for the age group (US EPA, 2012h).	NA	--
Toxicity Adjustment Factor 16-30 years old	TAF_{16-30}	1	Toxicity adjustment for the age group (US EPA, 2012h).	NA	--

NA - Not Applicable

Sources:

US EPA, 1991b.
US EPA, 1997d.
US EPA, 2004a.
US EPA, 2011e.
US EPA, 2012h.

Table D.4 Toxicity Factors for Compounds of Potential Concern

COPC	Cancer Oral Slope Factor[a] $(mg/kg\text{-}d)^{-1}$		Non-Cancer Oral RfD[a] (mg/kg-d)		Dermal Slope Factor $(mg/kg\text{-}d)^{-1}$	Dermal RfD (mg/kg-d)	Dermal Absorption (ABS)[a]	GI Absorption[a]	Bioavailability (B)[b]	Mutagen[a]	Inhalation Unit Risk[a] $(\mu g/m^3)^{-1}$		Inhalation RfC[a] (mg/m^3)	
PAHs														
1-Methylnaphthalene	0.029	P	7.0E-02	ATSDR	2.9E-02	7.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	4.0E-03	IRIS	NA	4.0E-03	0.13	1	0.5	No	NA	NA	NA	NA
Acenaphthene	NA	NA	6.0E-02	IRIS	NA	6.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	0.5	No	NA	NA	NA	NA
Anthracene	NA	NA	3.0E-01	IRIS	NA	3.0E-01	0.13	1	0.5	No	NA	NA	NA	NA
Benzo[a]anthracene	0.73	E	NA	NA	7.3E-01	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Benzo[a]pyrene	7.3	IRIS	NA	NA	7.3E+00	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Benzo[b]fluoranthene	0.73	E	NA	NA	7.3E-01	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.5	No	NA	NA	NA	NA
Benzo(k)fluoranthene	0.073	E	NA	NA	7.3E-02	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Chrysene	0.0073	E	NA	NA	7.3E-03	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Dibenz(a,h)anthracene	7.3	E	NA	NA	7.3E+00	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Fluoranthene	NA	NA	4.0E-02	IRIS	NA	4.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
Fluorene	NA	NA	4.0E-02	IRIS	NA	4.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	0.73	E	NA	NA	7.3E-01	NA	0.13	1	0.5	Yes	NA	NA	NA	NA
Naphthalene	NA	NA	2.0E-02	IRIS	NA	2.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.5	No	NA	NA	NA	NA
Pyrene	NA	NA	3.0E-02	IRIS	NA	3.0E-02	0.13	1	0.5	No	NA	NA	NA	NA
PCBs					0.0E+00	0.0E+00								
Aroclor-1242	2.0E+00	S	NA	NA	2.0E+00	NA	0.14	1	1	No	NA	NA	NA	NA
Aroclor-1248	2.0E+00	S	NA	NA	2.0E+00	NA	0.14	1	1	No	NA	NA	NA	NA
Aroclor-1254	2.0E+00	S	0.00002	IRIS	2.0E+00	2.0E-05	0.14	1	1	No	NA	NA	NA	NA
Aroclor-1260	2.0E+00	S	NA	NA	2.0E+00	NA	0.14	1	1	No	NA	NA	NA	NA
VOCs														
Tetrachloroethene	2.1E-03	IRIS	6.0E-03	IRIS	2.1E-03	6.0E-03	NA	1	1	No	2.6E-07	IRIS	4.0E-02	IRIS
Trichloroethene	4.6E-02	IRIS	5.0E-04	IRIS	4.6E-02	5.0E-04	NA	1	1	Yes	4.1E-06	IRIS	2.0E-03	IRIS
Vinyl Chloride	7.2E-01	IRIS	3.0E-03	IRIS	7.2E-01	3.0E-03	NA	1	1	Yes	4.4E-06	IRIS	1.0E-01	IRIS

Notes:

Toxicity factors, absorption factors (Dermal and GI), and mutagen identification from US EPA (2012e). US EPA Regional Screening Levels Table, November 2012.

US EPA (2012e) cites the following sources for toxicity values (Cancer Slope Factor, Reference Dose, Unit Risk and Reference Concentration):

IRIS: US EPA Integrated Risk Information System.

ATSDR: Agency for Toxic Substances and Disease Registry

P: PPRTV: Provisional Peer Reviewed Toxicity Values

E: US EPA Environmental Criteria and Assessment Office

S: Special criteria described in RSL User Guide Section 5

GI = Gastrointestinal.

NA = Not available or not applicable because pathway not evaluated.

RfC = Reference concentration.

RfD = Reference dose.

(a) US EPA, 2012e.

(b) Bioavailability assessments vary by chemical and are described in the report text.

NA - Not available.

Table D.5 Summary of Total Cancer and Non-Cancer Risks by Property

Property Address	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard Adult	Non-Cancer Hazard Child
102 S. Marquette	2E-05	7E-03	2E-02
106 S. Marquette	1E-05	1E-02	4E-02
110 S. Marquette	2E-05	1E-02	1E-02
114 S. Marquette	6E-06	1E-02	2E-02
118 S. Marquette	2E-05	5E-02	5E-02
126 S. Marquette	8E-06	8E-03	8E-03
128 S. Marquette	7E-06	1E-04	9E-04
130 S. Marquette	3E-06	6E-03	6E-03
134 S. Marquette	8E-06	2E-02	2E-02
138 S. Marquette	6E-06	8E-03	6E-02
142 S. Marquette	2E-05	2E-03	1E-02

Note:

Values that exceed a Total Excess Lifetime Cancer Risk of 1×10^{-4} or a Hazard Quotient of 1 are highlighted in bold.

Table D.6 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	102 S. Marquette				106 S. Marquette				110 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	2E-03	24%	Trichloroethene	70%	3E-03	21%	Trichloroethene	70%	4E-04	4%	Tetrachloroethene	95%
Dermal Contact with Soil	2E-05	<1%	Pyrene	52%	3E-05	<1%	2-Methylnaphthalene	38%	2E-05	<1%	Pyrene	49%
Inhalation of Indoor Air	5E-03	75%	Tetrachloroethene	100%	1E-02	78%	Tetrachloroethene	96%	1E-02	96.2%	Tetrachloroethene	100%
Total Hazard:	**7E-03**				**1E-02**				**1E-02**			
Child Resident												
Incidental Ingestion of Soil	2E-02	75%	Trichloroethene	70%	3E-02	71%	Trichloroethene	70%	3E-03	25%	Tetrachloroethene	95%
Dermal Contact with Soil	2E-04	<1%	Pyrene	52%	2E-04	<1%	2-Methylnaphthalene	38%	1E-04	<1%	Pyrene	49%
Inhalation of Indoor Air	5E-03	25%	Tetrachloroethene	100%	1E-02	28%	Tetrachloroethene	96%	1E-02	74%	Tetrachloroethene	100%
Total Hazard:	**2E-02**				**4E-02**				**1E-02**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	1E-05	57%	Benzo[a]pyrene	68%	7E-06	56%	Benzo[a]pyrene	63%	9E-06	57%	Benzo[a]pyrene	66%
Dermal Contact with Soil	8E-06	43%	Benzo[a]pyrene	69%	5E-06	42%	Benzo[a]pyrene	65%	6E-06	43%	Benzo[a]pyrene	67%
Inhalation of Indoor Air	2E-08	<1%	Tetrachloroethene	100%	3E-07	2%	Vinyl Chloride	84%	4E-08	<1%	Tetrachloroethene	100%
Total Risk:	**2E-05**				**1E-05**				**2E-05**			

Table D.6 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	114 S. Marquette				118 S. Marquette				126 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	3E-05	<1%	Tetrachloroethene	73%	5E-05	<1%	Tetrachloroethene	51%	3E-05	<1%	Tetrachloroethene	67%
Dermal Contact with Soil	7E-06	<1%	Pyrene	54%	2E-05	<1%	Pyrene	50%	1E-05	<1%	Pyrene	45%
Inhalation of Indoor Air	1E-02	99.8%	Tetrachloroethene	100%	5E-02	99.9%	Tetrachloroethene	100%	7E-03	99%	Tetrachloroethene	100%
Total Hazard:	**1E-02**				**5E-02**				**8E-03**			
Child Resident												
Incidental Ingestion of Soil	3E-04	2%	Tetrachloroethene	73%	4E-04	<1%	Tetrachloroethene	51%	3E-04	4%	Tetrachloroethene	67%
Dermal Contact with Soil	5E-05	<1%	Pyrene	54%	2E-04	<1%	Pyrene	50%	8E-05	<1%	Pyrene	45%
Inhalation of Indoor Air	1E-02	98%	Tetrachloroethene	100%	5E-02	99%	Tetrachloroethene	100%	7E-03	95%	Tetrachloroethene	100%
Total Hazard:	**2E-02**				**5E-02**				**8E-03**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	3E-06	56%	Benzo[a]pyrene	67%	1E-05	56%	Benzo[a]pyrene	67%	4E-06	56%	Benzo[a]pyrene	66%
Dermal Contact with Soil	2E-06	43%	Benzo[a]pyrene	67%	8E-06	43%	Benzo[a]pyrene	67%	3E-06	43%	Benzo[a]pyrene	66%
Inhalation of Indoor Air	7E-08	1%	Tetrachloroethene	100%	2E-07	1%	Tetrachloroethene	100%	3E-08	<1%	Tetrachloroethene	100%
Total Risk:	**6E-06**				**2E-05**				**8E-06**			

Table D.6 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	128 S. Marquette				130 S. Marquette				134 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	9E-05	92%	Tetrachloroethene	92%	2E-05	<1%	Tetrachloroethene	78%	3E-05	<1%	Tetrachloroethene	74%
Dermal Contact with Soil	8E-06	8%	Pyrene	53%	4E-06	<1%	Pyrene	54%	9E-06	<1%	Fluoranthene	49%
Inhalation of Indoor Air	NA				6E-03	99.7%	Tetrachloroethene	100%	2E-02	99.8%	Tetrachloroethene	100%
Total Hazard:	**1E-04**	Air: ND			**6E-03**				**2E-02**			
Child Resident												
Incidental Ingestion of Soil	8E-04	94%	Tetrachloroethene	92%	1E-04	2%	Tetrachloroethene	78%	3E-04	1%	Tetrachloroethene	74%
Dermal Contact with Soil	5E-05	6%	Pyrene	53%	2E-05	<1%	Pyrene	54%	6E-05	<1%	Fluoranthene	49%
Inhalation of Indoor Air	NA				6E-03	97%	Tetrachloroethene	100%	2E-02	98%	Tetrachloroethene	100%
Total Hazard:	**9E-04**	Air: ND			**6E-03**				**2E-02**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	4E-06	57%	Benzo[a]pyrene	70%	2E-06	56%	Benzo[a]pyrene	77%	4E-06	56%	Benzo[a]pyrene	68%
Dermal Contact with Soil	3E-06	43%	Benzo[a]pyrene	70%	1E-06	43%	Benzo[a]pyrene	77%	3E-06	43%	Benzo[a]pyrene	68%
Inhalation of Indoor Air	NA				3E-08	<1%	Tetrachloroethene	100%	1E-07	1%	Tetrachloroethene	100%
Total Risk:	**7E-06**	Air: ND			**3E-06**				**8E-06**			

Table D.6 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	138 S. Marquette				142 S. Marquette			
Non-Cancer Hazard								
Receptor/Exposure Pathway	**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non-Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident								
Incidental Ingestion of Soil	5E-03	64%	Aroclor-1254	99%	1E-03	64%	Aroclor-1254	97%
Dermal Contact with Soil	3E-03	36%	Aroclor-1254	100%	6E-04	36%	Aroclor-1254	98%
Inhalation of Indoor Air	NA				NA			
Total Hazard:	**8E-03**	Air: ND			**2E-03**	Air: ND		
Child Resident								
Incidental Ingestion of Soil	5E-02	72%	Aroclor-1254	99%	1E-02	72%	Aroclor-1254	97%
Dermal Contact with Soil	2E-02	28%	Aroclor-1254	100%	4E-03	28%	Aroclor-1254	98%
Inhalation of Indoor Air	NA				NA			
Total Hazard:	**6E-02**	Air: ND			**1E-02**	Air: ND		
Cancer Risk								
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident								
Incidental Ingestion of Soil	3E-06	57%	Benzo[a]pyrene	57%	9E-06	57%	Benzo[a]pyrene	47%
Dermal Contact with Soil	2E-06	43%	Benzo[a]pyrene	59%	7E-06	43%	Benzo[a]pyrene	47%
Inhalation of Indoor Air	NA				NA			
Total Risk:	**6E-06**	Air: ND			**2E-05**	Air: ND		

Notes:
ND - Not detected.
Blank - Values are not relevant because the risks could not be calculated.
COPC - Compound of Potential Concern.

Table D.7 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **102 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	2.8E-09	8.2E-09	NA	6.0E-02	NA		1.4E-07	<1%
Acenaphthylene	2.1E-02	0.5	4.9E-09	1.4E-08	NA	NA	NA		NA	
Anthracene	5.0E-02	0.5	1.2E-08	3.4E-08	NA	3.0E-01	NA		1.1E-07	<1%
Benzo[a]anthracene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E-01	NA	9.1E-08	7%	NA	
Benzo[a]pyrene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E+00	NA	9.1E-07	68%	NA	
Benzo[b]fluoranthene	2.5E-01	0.5	1.1E-07	1.7E-07	7.3E-01	NA	7.9E-08	6%	NA	
Benzo(g,h,i)perylene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	0.5	1.4E-07	2.3E-07	7.3E-02	NA	1.0E-08	<1%	NA	
Chrysene	3.3E-01	0.5	1.4E-07	2.3E-07	7.3E-03	NA	1.0E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	0.5	2.5E-08	3.9E-08	7.3E+00	NA	1.8E-07	13%	NA	
Fluoranthene	6.1E-01	0.5	1.4E-07	4.2E-07	NA	4.0E-02	NA		1.0E-05	<1%
Fluorene	1.6E-02	0.5	3.8E-09	1.1E-08	NA	4.0E-02	NA		2.7E-07	<1%
Indeno[1,2,3-cd]pyrene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E-01	NA	5.3E-08	4%	NA	
Naphthalene	9.6E-03	0.5	2.3E-09	6.6E-09	NA	2.0E-02	NA		3.3E-07	<1%
Phenanthrene	2.7E-01	0.5	6.3E-08	1.8E-07	NA	NA	NA		NA	
Pyrene	5.3E-01	0.5	1.2E-07	3.6E-07	NA	3.0E-02	NA		1.2E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.2E+00	1	1.0E-06	3.0E-06	2.1E-03	6.0E-03	2.2E-09	<1%	5.0E-04	29%
Trichloroethene	4.5E-01	1	3.8E-07	6.1E-07	4.6E-02	5.0E-04	1.8E-08	1%	1.2E-03	70%
						Total Cancer Risk:	1.3E-06	**Hazard Index:**	1.7E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	6.6E-09	7.7E-08	NA	6.0E-02	NA		1.3E-06	<1%
Acenaphthylene	2.1E-02	0.5	1.2E-08	1.3E-07	NA	NA	NA		NA	
Anthracene	5.0E-02	0.5	2.7E-08	3.2E-07	NA	3.0E-01	NA		1.1E-06	<1%
Benzo[a]anthracene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E-01	NA	6.2E-07	7%	NA	
Benzo[a]pyrene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E+00	NA	6.2E-06	68%	NA	
Benzo[b]fluoranthene	2.5E-01	0.5	7.3E-07	1.6E-06	7.3E-01	NA	5.3E-07	6%	NA	
Benzo(g,h,i)perylene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	0.5	9.6E-07	2.1E-06	7.3E-02	NA	7.0E-08	<1%	NA	
Chrysene	3.3E-01	0.5	9.6E-07	2.1E-06	7.3E-03	NA	7.0E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	0.5	1.7E-07	3.6E-07	7.3E+00	NA	1.2E-06	13%	NA	
Fluoranthene	6.1E-01	0.5	3.3E-07	3.9E-06	NA	4.0E-02	NA		9.7E-05	<1%
Fluorene	1.6E-02	0.5	8.8E-09	1.0E-07	NA	4.0E-02	NA		2.6E-06	<1%
Indeno[1,2,3-cd]pyrene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E-01	NA	3.6E-07	4%	NA	
Naphthalene	9.6E-03	0.5	5.3E-09	6.1E-08	NA	2.0E-02	NA		3.1E-06	<1%
Phenanthrene	2.7E-01	0.5	1.5E-07	1.7E-06	NA	NA	NA		NA	
Pyrene	5.3E-01	0.5	2.9E-07	3.4E-06	NA	3.0E-02	NA		1.1E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	2.2E+00	1	2.4E-06	2.8E-05	2.1E-03	6.0E-03	5.0E-09	<1%	4.7E-03	29%
Trichloroethene	4.5E-01	1	2.6E-06	5.7E-06	4.6E-02	5.0E-04	1.2E-07	1%	1.1E-02	70%
						Total Cancer Risk:	9.1E-06	**Hazard Index:**	1.6E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a] 0-2 yrs	Mutagens[a] 2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.1E-07	7%
Benzo[a]pyrene	7.1E-06	68%
Benzo[b]fluoranthene	6.1E-07	6%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	8.1E-08	<1%
Chrysene	8.1E-09	<1%
Dibenz(a,h)anthracene	1.4E-06	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	4.2E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	7.2E-09	<1%
Trichloroethene	1.4E-07	1%
Total Cancer Risk:	1.0E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.8 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **102 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	2.9E-09	8.5E-09	NA	6.0E-02	NA		1.4E-07	<1%
Acenaphthylene	2.1E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	5.0E-02	1.3E-01	1.2E-08	3.6E-08	NA	3.0E-01	NA		1.2E-07	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E-01	NA	9.5E-08	7%	NA	
Benzo[a]pyrene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E+00	NA	9.5E-07	69%	NA	
Benzo[b]fluoranthene	2.5E-01	1.3E-01	1.1E-07	1.8E-07	7.3E-01	NA	8.2E-08	6%	NA	
Benzo(g,h,i)perylene	2.0E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	1.3E-01	1.5E-07	2.3E-07	7.3E-02	NA	1.1E-08	<1%	NA	
Chrysene	3.3E-01	1.3E-01	1.5E-07	2.3E-07	7.3E-03	NA	1.1E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	1.3E-01	2.5E-08	4.1E-08	7.3E+00	NA	1.9E-07	14%	NA	
Fluoranthene	6.1E-01	1.3E-01	1.5E-07	4.3E-07	NA	4.0E-02	NA		1.1E-05	45%
Fluorene	1.6E-02	1.3E-01	3.9E-09	1.1E-08	NA	4.0E-02	NA		2.8E-07	1%
Indeno[1,2,3-cd]pyrene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E-01	NA	5.5E-08	4%	NA	
Naphthalene	9.6E-03	1.3E-01	2.3E-09	6.8E-09	NA	2.0E-02	NA		3.4E-07	1%
Phenanthrene	2.7E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.3E-01	1.3E-01	1.3E-07	3.8E-07	NA	3.0E-02	NA		1.3E-05	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.2E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	4.5E-01	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	2.4E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	4.8E-09	5.6E-08	NA	6.0E-02	NA		9.3E-07	<1%
Acenaphthylene	2.1E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	5.0E-02	1.3E-01	2.0E-08	2.3E-07	NA	3.0E-01	NA		7.8E-07	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E-01	NA	4.5E-07	7%	NA	
Benzo[a]pyrene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E+00	NA	4.5E-06	69%	NA	
Benzo[b]fluoranthene	2.5E-01	1.3E-01	5.3E-07	1.2E-06	7.3E-01	NA	3.9E-07	6%	NA	
Benzo(g,h,i)perylene	2.0E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	1.3E-01	7.0E-07	1.5E-06	7.3E-02	NA	5.1E-08	<1%	NA	
Chrysene	3.3E-01	1.3E-01	7.0E-07	1.5E-06	7.3E-03	NA	5.1E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	1.3E-01	1.2E-07	2.7E-07	7.3E+00	NA	8.9E-07	14%	NA	
Fluoranthene	6.1E-01	1.3E-01	2.4E-07	2.8E-06	NA	4.0E-02	NA		7.1E-05	45%
Fluorene	1.6E-02	1.3E-01	6.4E-09	7.4E-08	NA	4.0E-02	NA		1.9E-06	1%
Indeno[1,2,3-cd]pyrene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E-01	NA	2.6E-07	4%	NA	
Naphthalene	9.6E-03	1.3E-01	3.8E-09	4.5E-08	NA	2.0E-02	NA		2.2E-06	1%
Phenanthrene	2.7E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.3E-01	1.3E-01	2.1E-07	2.5E-06	NA	3.0E-02	NA		8.2E-05	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.2E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	4.5E-01	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	6.5E-06	**Hazard Index:**	1.6E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.4E-07	7%
Benzo[a]pyrene	5.4E-06	69%
Benzo[b]fluoranthene	4.7E-07	6%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	6.2E-08	<1%
Chrysene	6.2E-09	<1%
Dibenz(a,h)anthracene	1.1E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.2E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	7.9E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.9 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **102 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.2E-01	7.4E-02	2.1E-04	2.6E-07	4.0E-02	1.9E-08	100%	5.4E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	1.9E-08	**Hazard Index:**	5.4E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.2E-01	1.8E-02	2.1E-04	2.6E-07	4.0E-02	4.8E-09	100%	5.4E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	4.8E-09	**Hazard Index:**	5.4E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	2.4E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	2.4E-08	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.10 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **106 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	8.6E-02	0.5	2.0E-08	5.9E-08	2.9E-02	7.0E-02	5.9E-10	<1%	8.4E-07	<1%
2-Methylnaphthalene	6.2E-02	0.5	1.5E-08	4.2E-08	NA	4.0E-03	NA		1.1E-05	<1%
Acenaphthene	ND									
Acenaphthylene	1.2E-02	0.5	2.8E-09	8.2E-09	NA	NA	NA		NA	
Anthracene	4.1E-02	0.5	9.6E-09	2.8E-08	NA	3.0E-01	NA		9.4E-08	<1%
Benzo[a]anthracene	2.0E-01	0.5	8.6E-08	1.4E-07	7.3E-01	NA	6.3E-08	7%	NA	
Benzo[a]pyrene	1.9E-01	0.5	8.2E-08	1.3E-07	7.3E+00	NA	6.0E-07	63%	NA	
Benzo[b]fluoranthene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E-01	NA	9.1E-08	10%	NA	
Benzo(g,h,i)perylene	1.4E-01	0.5	3.3E-08	9.6E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-02	NA	3.5E-09	<1%	NA	
Chrysene	2.6E-01	0.5	1.1E-07	1.8E-07	7.3E-03	NA	8.2E-10	<1%	NA	
Dibenz(a,h)anthracene	3.9E-02	0.5	1.7E-08	2.7E-08	7.3E+00	NA	1.2E-07	13%	NA	
Fluoranthene	3.9E-01	0.5	9.2E-08	2.7E-07	NA	4.0E-02	NA		6.7E-06	<1%
Fluorene	1.6E-02	0.5	3.8E-09	1.1E-08	NA	4.0E-02	NA		2.7E-07	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E-01	NA	3.8E-08	4%	NA	
Naphthalene	3.9E-02	0.5	9.2E-09	2.7E-08	NA	2.0E-02	NA		1.3E-06	<1%
Phenanthrene	3.1E-01	0.5	7.3E-08	2.1E-07	NA	NA	NA		NA	
Pyrene	3.5E-01	0.5	8.2E-08	2.4E-07	NA	3.0E-02	NA		8.0E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E+00	1	1.7E-06	4.9E-06	2.1E-03	6.0E-03	3.6E-09	<1%	8.2E-04	29%
Trichloroethene	7.1E-01	1	6.1E-07	9.7E-07	4.6E-02	5.0E-04	2.8E-08	3%	1.9E-03	70%
						Total Cancer Risk:	9.5E-07	**Hazard Index:**	2.8E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
	IR	Ingestion Rate (mg/day)	100	100	100	100
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	8.6E-02	0.5	4.7E-08	5.5E-07	2.9E-02	7.0E-02	1.4E-09	<1%	7.9E-06	<1%
2-Methylnaphthalene	6.2E-02	0.5	3.4E-08	4.0E-07	NA	4.0E-03	NA		9.9E-05	<1%
Acenaphthene	ND									
Acenaphthylene	1.2E-02	0.5	6.6E-09	7.7E-08	NA	NA	NA		NA	
Anthracene	4.1E-02	0.5	2.2E-08	2.6E-07	NA	3.0E-01	NA		8.7E-07	<1%
Benzo[a]anthracene	2.0E-01	0.5	5.8E-07	1.3E-06	7.3E-01	NA	4.3E-07	7%	NA	
Benzo[a]pyrene	1.9E-01	0.5	5.6E-07	1.2E-06	7.3E+00	NA	4.1E-06	63%	NA	
Benzo[b]fluoranthene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E-01	NA	6.2E-07	10%	NA	
Benzo(g,h,i)perylene	1.4E-01	0.5	7.7E-08	8.9E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-02	NA	2.3E-08	<1%	NA	
Chrysene	2.6E-01	0.5	7.6E-07	1.7E-06	7.3E-03	NA	5.5E-09	<1%	NA	
Dibenz(a,h)anthracene	3.9E-02	0.5	1.1E-07	2.5E-07	7.3E+00	NA	8.3E-07	13%	NA	
Fluoranthene	3.9E-01	0.5	2.1E-07	2.5E-06	NA	4.0E-02	NA		6.2E-05	<1%
Fluorene	1.6E-02	0.5	8.8E-09	1.0E-07	NA	4.0E-02	NA		2.6E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E-01	NA	2.6E-07	4%	NA	
Naphthalene	3.9E-02	0.5	2.1E-08	2.5E-07	NA	2.0E-02	NA		1.2E-05	<1%
Phenanthrene	3.1E-01	0.5	1.7E-07	2.0E-06	NA	NA	NA		NA	
Pyrene	3.5E-01	0.5	1.9E-07	2.2E-06	NA	3.0E-02	NA		7.5E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	3.6E+00	1	3.9E-06	4.6E-05	2.1E-03	6.0E-03	8.3E-09	<1%	7.7E-03	29%
Trichloroethene	7.1E-01	1	4.1E-06	9.1E-06	4.6E-02	5.0E-04	1.9E-07	3%	1.8E-02	70%
						Total Cancer Risk:	6.4E-06	**Hazard Index:**	2.6E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	2.0E-09	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	4.9E-07	7%
Benzo[a]pyrene	4.7E-06	63%
Benzo[b]fluoranthene	7.1E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.7E-08	<1%
Chrysene	6.4E-09	<1%
Dibenz(a,h)anthracene	9.5E-07	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.9E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.2E-08	<1%
Trichloroethene	2.2E-07	3%
Total Cancer Risk:	7.4E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.11 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **106 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	8.6E-02	1.3E-01	2.1E-08	6.1E-08	2.9E-02	7.0E-02	6.1E-10	<1%	8.7E-07	3%
2-Methylnaphthalene	6.2E-02	1.3E-01	1.5E-08	4.4E-08	NA	4.0E-03	NA		1.1E-05	38%
Acenaphthene	ND									
Acenaphthylene	1.2E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.1E-02	1.3E-01	1.0E-08	2.9E-08	NA	3.0E-01	NA		9.7E-08	<1%
Benzo[a]anthracene	2.0E-01	1.3E-01	8.9E-08	1.4E-07	7.3E-01	NA	6.5E-08	7%	NA	
Benzo[a]pyrene	1.9E-01	1.3E-01	8.5E-08	1.4E-07	7.3E+00	NA	6.2E-07	65%	NA	
Benzo[b]fluoranthene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E-01	NA	9.5E-08	10%	NA	
Benzo(g,h,i)perylene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-02	NA	3.6E-09	<1%	NA	
Chrysene	2.6E-01	1.3E-01	1.2E-07	1.8E-07	7.3E-03	NA	8.5E-10	<1%	NA	
Dibenz(a,h)anthracene	3.9E-02	1.3E-01	1.7E-08	2.8E-08	7.3E+00	NA	1.3E-07	13%	NA	
Fluoranthene	3.9E-01	1.3E-01	9.5E-08	2.8E-07	NA	4.0E-02	NA		6.9E-06	24%
Fluorene	1.6E-02	1.3E-01	3.9E-09	1.1E-08	NA	4.0E-02	NA		2.8E-07	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E-01	NA	3.9E-08	4%	NA	
Naphthalene	3.9E-02	1.3E-01	9.5E-09	2.8E-08	NA	2.0E-02	NA		1.4E-06	5%
Phenanthrene	3.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	3.5E-01	1.3E-01	8.5E-08	2.5E-07	NA	3.0E-02	NA		8.3E-06	29%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	7.1E-01	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	9.5E-07	**Hazard Index:**	2.9E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	8.6E-02	1.3E-01	3.4E-08	4.0E-07	2.9E-02	7.0E-02	9.9E-10	<1%	5.7E-06	3%
2-Methylnaphthalene	6.2E-02	1.3E-01	2.5E-08	2.9E-07	NA	4.0E-03	NA		7.2E-05	38%
Acenaphthene	ND									
Acenaphthylene	1.2E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.1E-02	1.3E-01	1.6E-08	1.9E-07	NA	3.0E-01	NA		6.4E-07	<1%
Benzo[a]anthracene	2.0E-01	1.3E-01	4.3E-07	9.3E-07	7.3E-01	NA	3.1E-07	7%	NA	
Benzo[a]pyrene	1.9E-01	1.3E-01	4.0E-07	8.8E-07	7.3E+00	NA	3.0E-06	65%	NA	
Benzo[b]fluoranthene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E-01	NA	4.5E-07	10%	NA	
Benzo(g,h,i)perylene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-02	NA	1.7E-08	<1%	NA	
Chrysene	2.6E-01	1.3E-01	5.5E-07	1.2E-06	7.3E-03	NA	4.0E-09	<1%	NA	
Dibenz(a,h)anthracene	3.9E-02	1.3E-01	8.3E-08	1.8E-07	7.3E+00	NA	6.1E-07	13%	NA	
Fluoranthene	3.9E-01	1.3E-01	1.6E-07	1.8E-06	NA	4.0E-02	NA		4.5E-05	24%
Fluorene	1.6E-02	1.3E-01	6.4E-09	7.4E-08	NA	4.0E-02	NA		1.9E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E-01	NA	1.9E-07	4%	NA	
Naphthalene	3.9E-02	1.3E-01	1.6E-08	1.8E-07	NA	2.0E-02	NA		9.1E-06	5%
Phenanthrene	3.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	3.5E-01	1.3E-01	1.4E-07	1.6E-06	NA	3.0E-02	NA		5.4E-05	29%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	7.1E-01	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	4.5E-06	**Hazard Index:**	1.9E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	1.6E-09	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.8E-07	7%
Benzo[a]pyrene	3.6E-06	65%
Benzo[b]fluoranthene	5.4E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.1E-08	<1%
Chrysene	4.9E-09	<1%
Dibenz(a,h)anthracene	7.3E-07	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.3E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	5.5E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.12 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **106 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.1E-01	1.4E-01	4.0E-04	2.6E-07	4.0E-02	3.5E-08	100%	9.9E-03	96%
Trichloroethene	ND								
Vinyl Chloride	3.8E-02	See table C13*	3.7E-05	4.4E-06	1.0E-01	See table D13*	See table D13*	3.7E-04	4%
					Total Cancer Risk:	3.5E-08	**Hazard Index:**	1.0E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Gradient

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR^a$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.1E-01	3.4E-02	4.0E-04	2.6E-07	4.0E-02	8.8E-09	100%	9.9E-03	96%
Trichloroethene	ND								
Vinyl Chloride	3.8E-02	See table C13*	3.7E-05	4.4E-06	1.0E-01	See table D13*	See table D13*	3.7E-04	4%
					Total Cancer Risk:	8.8E-09	**Hazard Index:**	1.0E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Gradient

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	4.4E-08	16%
Trichloroethene		
Vinyl Chloride	2.4E-07	84%
Total Cancer Risk:	2.8E-07	

Notes:

ND = Not detected.

See table D.13* = Vinyl Chloride Cancer Risk is calculated in Table D.13.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Gradient

Table D.13 Excess Lifetime Resident Cancer Risk from Vinyl Chloride

Indoor Air Exposure

Property: 106 S. Marquette

Adult and Child Resident					
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Cancer Risk CR = (EPC x IUR) + (ADE_c x IUR)**	**Percent Contribution to Total Cancer Risk**
VOCs					
Vinyl Chloride	3.8E-02	1.6E-02	4.4E-06	2.4E-07	100%
			Total Cancer Risk:	2.4E-07	

Notes:

Intake Factor (IF) = $\frac{ET \times EF \times ED \times (1day/24h) \times TAF}{AT}$ =			4.1E-01 (cancer)
	ET	Exposure time (hrs/day)	24
	EF	Exposure Frequency (days/yr)	350
	ED	Exposure Duration (yrs)	30
	AT	Averaging Time (d)	25550
	TAF	Toxicity Adjustment Factor	1

ADE ($\mu g/m^3$) = EPC*IF.

Vinyl Chloride Cancer Risk = EPC x IUR + ADE x IUR (RSL User Guide Section 4.8.3 - USEPA, 2012a).

Table D.14 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **110 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.7E-02	0.5	4.0E-09	1.2E-08	NA	6.0E-02	NA		1.9E-07	<1%
Acenaphthylene	2.2E-02	0.5	5.2E-09	1.5E-08	NA	NA	NA		NA	
Anthracene	4.3E-02	0.5	1.0E-08	2.9E-08	NA	3.0E-01	NA		9.8E-08	<1%
Benzo[a]anthracene	2.1E-01	0.5	9.0E-08	1.4E-07	7.3E-01	NA	6.6E-08	6%	NA	
Benzo[a]pyrene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E+00	NA	7.2E-07	63%	NA	
Benzo[b]fluoranthene	2.8E-01	0.5	1.2E-07	1.9E-07	7.3E-01	NA	8.8E-08	8%	NA	
Benzo(g,h,i)perylene	1.7E-01	0.5	4.0E-08	1.2E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E-02	NA	5.3E-09	<1%	NA	
Chrysene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E-03	NA	7.2E-10	<1%	NA	
Dibenz(a,h)anthracene	4.2E-02	0.5	1.8E-08	2.9E-08	7.3E+00	NA	1.3E-07	11%	NA	
Fluoranthene	4.9E-01	0.5	1.2E-07	3.4E-07	NA	4.0E-02	NA		8.4E-06	2%
Fluorene	2.1E-02	0.5	4.9E-09	1.4E-08	NA	4.0E-02	NA		3.6E-07	<1%
Indeno[1,2,3-cd]pyrene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-01	NA	4.7E-08	4%	NA	
Naphthalene	9.0E-03	0.5	2.1E-09	6.2E-09	NA	2.0E-02	NA		3.1E-07	<1%
Phenanthrene	2.1E-01	0.5	4.9E-08	1.4E-07	NA	NA	NA		NA	
Pyrene	4.0E-01	0.5	9.4E-08	2.7E-07	NA	3.0E-02	NA		9.1E-06	3%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	9.6E-02	1	4.5E-08	1.3E-07	2.0E+00	NA	9.0E-08	8%	NA	
VOCs										
Tetrachloroethene	1.5E+00	1	7.0E-07	2.1E-06	2.1E-03	6.0E-03	1.5E-09	<1%	3.4E-04	95%
Trichloroethene	ND									
						Total Cancer Risk:	1.2E-06	**Hazard Index:**	3.6E-04	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.7E-02	0.5	9.3E-09	1.1E-07	NA	6.0E-02	NA		1.8E-06	<1%
Acenaphthylene	2.2E-02	0.5	1.2E-08	1.4E-07	NA	NA	NA		NA	
Anthracene	4.3E-02	0.5	2.4E-08	2.7E-07	NA	3.0E-01	NA		9.2E-07	<1%
Benzo[a]anthracene	2.1E-01	0.5	6.1E-07	1.3E-06	7.3E-01	NA	4.5E-07	6%	NA	
Benzo[a]pyrene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E+00	NA	4.9E-06	66%	NA	
Benzo[b]fluoranthene	2.8E-01	0.5	8.2E-07	1.8E-06	7.3E-01	NA	6.0E-07	8%	NA	
Benzo(g,h,i)perylene	1.7E-01	0.5	9.3E-08	1.1E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E-02	NA	3.6E-08	<1%	NA	
Chrysene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E-03	NA	4.9E-09	<1%	NA	
Dibenz(a,h)anthracene	4.2E-02	0.5	1.2E-07	2.7E-07	7.3E+00	NA	9.0E-07	12%	NA	
Fluoranthene	4.9E-01	0.5	2.7E-07	3.1E-06	NA	4.0E-02	NA		7.8E-05	2%
Fluorene	2.1E-02	0.5	1.2E-08	1.3E-07	NA	4.0E-02	NA		3.4E-06	<1%
Indeno[1,2,3-cd]pyrene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-01	NA	3.2E-07	4%	NA	
Naphthalene	9.0E-03	0.5	4.9E-09	5.8E-08	NA	2.0E-02	NA		2.9E-06	<1%
Phenanthrene	2.1E-01	0.5	1.2E-07	1.3E-06	NA	NA	NA		NA	
Pyrene	4.0E-01	0.5	2.2E-07	2.6E-06	NA	3.0E-02	NA		8.5E-05	3%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	9.6E-02	1	1.1E-07	1.2E-06	2.0E+00	NA	2.1E-07	3%	NA	
VOC										
Tetrachloroethene	1.5E+00	1	1.6E-06	1.9E-05	2.1E-03	6.0E-03	3.5E-09	<1%	3.2E-03	95%
Trichloroethene	ND									
						Total Cancer Risk:	7.4E-06	**Hazard Index:**	3.4E-03	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.1E-07	6%
Benzo[a]pyrene	5.6E-06	66%
Benzo[b]fluoranthene	6.9E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	4.2E-08	<1%
Chrysene	5.6E-09	<1%
Dibenz(a,h)anthracene	1.0E-06	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.7E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260	3.0E-07	4%
VOC		
Tetrachloroethene	4.9E-09	<1%
Trichloroethene		
Total Cancer Risk:	8.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.15 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **110 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.7E-02	1.3E-01	4.1E-09	1.2E-08	NA	6.0E-02	NA		2.0E-07	1%
Acenaphthylene	2.2E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.3E-02	1.3E-01	1.0E-08	3.1E-08	NA	3.0E-01	NA		1.0E-07	<1%
Benzo[a]anthracene	2.1E-01	1.3E-01	9.4E-08	1.5E-07	7.3E-01	NA	6.8E-08	6%	NA	
Benzo[a]pyrene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E+00	NA	7.5E-07	65%	NA	
Benzo[b]fluoranthene	2.8E-01	1.3E-01	1.3E-07	2.0E-07	7.3E-01	NA	9.1E-08	8%	NA	
Benzo(g,h,i)perylene	1.7E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E-02	NA	5.5E-09	<1%	NA	
Chrysene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E-03	NA	7.5E-10	<1%	NA	
Dibenz(a,h)anthracene	4.2E-02	1.3E-01	1.9E-08	3.0E-08	7.3E+00	NA	1.4E-07	12%	NA	
Fluoranthene	4.9E-01	1.3E-01	1.2E-07	3.5E-07	NA	4.0E-02	NA		8.7E-06	45%
Fluorene	2.1E-02	1.3E-01	5.1E-09	1.5E-08	NA	4.0E-02	NA		3.7E-07	2%
Indeno[1,2,3-cd]pyrene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-01	NA	4.9E-08	4%	NA	
Naphthalene	9.0E-03	1.3E-01	2.2E-09	6.4E-09	NA	2.0E-02	NA		3.2E-07	2%
Phenanthrene	2.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.0E-01	1.3E-01	9.7E-08	2.8E-07	NA	3.0E-02	NA		9.5E-06	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	9.6E-02	1.4E-01	2.5E-08	7.3E-08	2.0E+00	NA	5.0E-08	4%	NA	
VOCs										
Tetrachloroethene	1.5E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.2E-06	**Hazard Index:**	1.9E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{SA x AF x EF x ED x CF x TAF}}{\text{BW x AT}} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.7E-02	1.3E-01	6.8E-09	7.9E-08	NA	6.0E-02	NA		1.3E-06	1%
Acenaphthylene	2.2E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.3E-02	1.3E-01	1.7E-08	2.0E-07	NA	3.0E-01	NA		6.7E-07	<1%
Benzo[a]anthracene	2.1E-01	1.3E-01	4.5E-07	9.8E-07	7.3E-01	NA	3.3E-07	6%	NA	
Benzo[a]pyrene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E+00	NA	3.6E-06	67%	NA	
Benzo[b]fluoranthene	2.8E-01	1.3E-01	6.0E-07	1.3E-06	7.3E-01	NA	4.3E-07	8%	NA	
Benzo(g,h,i)perylene	1.7E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E-02	NA	2.6E-08	<1%	NA	
Chrysene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E-03	NA	3.6E-09	<1%	NA	
Dibenz(a,h)anthracene	4.2E-02	1.3E-01	8.9E-08	2.0E-07	7.3E+00	NA	6.5E-07	12%	NA	
Fluoranthene	4.9E-01	1.3E-01	2.0E-07	2.3E-06	NA	4.0E-02	NA		5.7E-05	45%
Fluorene	2.1E-02	1.3E-01	8.4E-09	9.8E-08	NA	4.0E-02	NA		2.4E-06	2%
Indeno[1,2,3-cd]pyrene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	4%	NA	
Naphthalene	9.0E-03	1.3E-01	3.6E-09	4.2E-08	NA	2.0E-02	NA		2.1E-06	2%
Phenanthrene	2.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.0E-01	1.3E-01	1.6E-07	1.9E-06	NA	3.0E-02	NA		6.2E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	9.6E-02	1.4E-01	4.1E-08	4.8E-07	2.0E+00	NA	8.2E-08	2%	NA	
VOCs										
Tetrachloroethene	1.5E+00	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.3E-06	**Hazard Index:**	1.3E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.9E-07	6%
Benzo[a]pyrene	4.3E-06	67%
Benzo[b]fluoranthene	5.3E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.2E-08	<1%
Chrysene	4.3E-09	<1%
Dibenz(a,h)anthracene	7.9E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260	1.3E-07	2%
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	6.5E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.16 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **110 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.1E-01	1.3E-01	3.9E-04	2.6E-07	4.0E-02	3.5E-08	100%	9.8E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	3.5E-08	**Hazard Index:**	9.8E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.1E-01	3.3E-02	3.9E-04	2.6E-07	4.0E-02	8.7E-09	100%	9.8E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	8.7E-09	**Hazard Index:**	9.8E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	4.3E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	4.3E-08	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.17 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **114 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.7E-02	0.5	4.0E-09	1.2E-08	NA	3.0E-01	NA		3.9E-08	<1%
Benzo[a]anthracene	8.2E-02	0.5	3.5E-08	5.6E-08	7.3E-01	NA	2.6E-08	6%	NA	
Benzo[a]pyrene	8.9E-02	0.5	3.8E-08	6.1E-08	7.3E+00	NA	2.8E-07	67%	NA	
Benzo[b]fluoranthene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	8%	NA	
Benzo(g,h,i)perylene	6.6E-02	0.5	1.5E-08	4.5E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.9E-02	0.5	2.1E-08	3.4E-08	7.3E-02	NA	1.5E-09	<1%	NA	
Chrysene	1.0E-01	0.5	4.3E-08	6.8E-08	7.3E-03	NA	3.1E-10	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	0.5	7.7E-09	1.2E-08	7.3E+00	NA	5.7E-08	14%	NA	
Fluoranthene	1.9E-01	0.5	4.5E-08	1.3E-07	NA	4.0E-02	NA		3.3E-06	12%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	5.1E-02	0.5	2.2E-08	3.5E-08	7.3E-01	NA	1.6E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	NA	NA		NA	
Pyrene	1.7E-01	0.5	4.0E-08	1.2E-07	NA	3.0E-02	NA		3.9E-06	14%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.7E-02	1	4.1E-08	1.2E-07	2.1E-03	6.0E-03	8.5E-11	<1%	2.0E-05	73%
Trichloroethene	ND									
						Total Cancer Risk:	4.1E-07	**Hazard Index:**	2.7E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.7E-02	0.5	9.3E-09	1.1E-07	NA	3.0E-01	NA		3.6E-07	<1%
Benzo[a]anthracene	8.2E-02	0.5	2.4E-07	5.2E-07	7.3E-01	NA	1.7E-07	6%	NA	
Benzo[a]pyrene	8.9E-02	0.5	2.6E-07	5.7E-07	7.3E+00	NA	1.9E-06	67%	NA	
Benzo[b]fluoranthene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	8%	NA	
Benzo(g,h,i)perylene	6.6E-02	0.5	3.6E-08	4.2E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.9E-02	0.5	1.4E-07	3.1E-07	7.3E-02	NA	1.0E-08	<1%	NA	
Chrysene	1.0E-01	0.5	2.9E-07	6.4E-07	7.3E-03	NA	2.1E-09	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	0.5	5.3E-08	1.2E-07	7.3E+00	NA	3.8E-07	14%	NA	
Fluoranthene	1.9E-01	0.5	1.0E-07	1.2E-06	NA	4.0E-02	NA		3.0E-05	12%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	5.1E-02	0.5	1.5E-07	3.3E-07	7.3E-01	NA	1.1E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	NA	NA		NA	
Pyrene	1.7E-01	0.5	9.3E-08	1.1E-06	NA	3.0E-02	NA		3.6E-05	14%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	8.7E-02	1	9.5E-08	1.1E-06	2.1E-03	6.0E-03	2.0E-10	<1%	1.8E-04	73%
Trichloroethene	ND									
						Total Cancer Risk:	2.8E-06	**Hazard Index:**	2.5E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.0E-07	6%
Benzo[a]pyrene	2.2E-06	67%
Benzo[b]fluoranthene	2.7E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.2E-08	<1%
Chrysene	2.4E-09	<1%
Dibenz(a,h)anthracene	4.4E-07	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.2E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	2.8E-10	<1%
Trichloroethene		
Total Cancer Risk:	3.2E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.18 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **114 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.7E-02	1.3E-01	4.1E-09	1.2E-08	NA	3.0E-01	NA		4.0E-08	<1%
Benzo[a]anthracene	8.2E-02	1.3E-01	3.7E-08	5.8E-08	7.3E-01	NA	2.7E-08	6%	NA	
Benzo[a]pyrene	8.9E-02	1.3E-01	4.0E-08	6.3E-08	7.3E+00	NA	2.9E-07	67%	NA	
Benzo[b]fluoranthene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	8%	NA	
Benzo(g,h,i)perylene	6.6E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.9E-02	1.3E-01	2.2E-08	3.5E-08	7.3E-02	NA	1.6E-09	<1%	NA	
Chrysene	1.0E-01	1.3E-01	4.5E-08	7.1E-08	7.3E-03	NA	3.3E-10	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	1.3E-01	8.0E-09	1.3E-08	7.3E+00	NA	5.9E-08	14%	NA	
Fluoranthene	1.9E-01	1.3E-01	4.6E-08	1.4E-07	NA	4.0E-02	NA		3.4E-06	45%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	5.1E-02	1.3E-01	2.3E-08	3.6E-08	7.3E-01	NA	1.7E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.7E-01	1.3E-01	4.1E-08	1.2E-07	NA	3.0E-02	NA		4.0E-06	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.7E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	4.3E-07	**Hazard Index:**	7.4E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{SA x AF x EF x ED x CF x TAF}}{\text{BW x AT}} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.7E-02	1.3E-01	6.8E-09	7.9E-08	NA	3.0E-01	NA		2.6E-07	<1%
Benzo[a]anthracene	8.2E-02	1.3E-01	1.7E-07	3.8E-07	7.3E-01	NA	1.3E-07	6%	NA	
Benzo[a]pyrene	8.9E-02	1.3E-01	1.9E-07	4.1E-07	7.3E+00	NA	1.4E-06	67%	NA	
Benzo[b]fluoranthene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	8%	NA	
Benzo(g,h,i)perylene	6.6E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.9E-02	1.3E-01	1.0E-07	2.3E-07	7.3E-02	NA	7.6E-09	<1%	NA	
Chrysene	1.0E-01	1.3E-01	2.1E-07	4.7E-07	7.3E-03	NA	1.6E-09	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	1.3E-01	3.8E-08	8.4E-08	7.3E+00	NA	2.8E-07	14%	NA	
Fluoranthene	1.9E-01	1.3E-01	7.6E-08	8.8E-07	NA	4.0E-02	NA		2.2E-05	45%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	5.1E-02	1.3E-01	1.1E-07	2.4E-07	7.3E-01	NA	7.9E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.7E-01	1.3E-01	6.8E-08	7.9E-07	NA	3.0E-02	NA		2.6E-05	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.7E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.0E-06	**Hazard Index:**	4.9E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.5E-07	6%
Benzo[a]pyrene	1.7E-06	67%
Benzo[b]fluoranthene	2.1E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	9.2E-09	<1%
Chrysene	1.9E-09	<1%
Dibenz(a,h)anthracene	3.4E-07	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	9.6E-08	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.5E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.19 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **114 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	6.2E-01	2.1E-01	6.0E-04	2.6E-07	4.0E-02	5.3E-08	100%	1.5E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	5.3E-08	**Hazard Index:**	1.5E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	6.2E-01	5.1E-02	6.0E-04	2.6E-07	4.0E-02	1.3E-08	100%	1.5E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	1.3E-08	**Hazard Index:**	1.5E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	6.7E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	6.7E-08	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.20 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **118 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.3E-02	0.5	3.1E-09	8.9E-09	NA	6.0E-02	NA		1.5E-07	<1%
Acenaphthylene	ND									
Anthracene	4.6E-02	0.5	1.1E-08	3.2E-08	NA	3.0E-01	NA		1.1E-07	<1%
Benzo[a]anthracene	3.2E-01	0.5	1.4E-07	2.2E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo[a]pyrene	3.0E-01	0.5	1.3E-07	2.1E-07	7.3E+00	NA	9.4E-07	67%	NA	
Benzo[b]fluoranthene	3.9E-01	0.5	1.7E-07	2.7E-07	7.3E-01	NA	1.2E-07	9%	NA	
Benzo(g,h,i)perylene	1.9E-01	0.5	4.5E-08	1.3E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-02	NA	5.0E-09	<1%	NA	
Chrysene	3.9E-01	0.5	1.7E-07	2.7E-07	7.3E-03	NA	1.2E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	0.5	2.5E-08	3.9E-08	7.3E+00	NA	1.8E-07	13%	NA	
Fluoranthene	6.1E-01	0.5	1.4E-07	4.2E-07	NA	4.0E-02	NA		1.0E-05	23%
Fluorene	1.5E-02	0.5	3.5E-09	1.0E-08	NA	4.0E-02	NA		2.6E-07	<1%
Indeno[1,2,3-cd]pyrene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-01	NA	5.0E-08	4%	NA	
Naphthalene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	2.0E-02	NA		3.8E-07	<1%
Phenanthrene	2.6E-01	0.5	6.1E-08	1.8E-07	NA	NA	NA		NA	
Pyrene	4.9E-01	0.5	1.2E-07	3.4E-07	NA	3.0E-02	NA		1.1E-05	24%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.0E-01	1	4.8E-08	1.4E-07	2.1E-03	6.0E-03	1.0E-10	<1%	2.3E-05	51%
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	4.6E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.3E-02	0.5	7.1E-09	8.3E-08	NA	6.0E-02	NA		1.4E-06	<1%
Acenaphthylene	ND									
Anthracene	4.6E-02	0.5	2.5E-08	2.9E-07	NA	3.0E-01	NA		9.8E-07	<1%
Benzo[a]anthracene	3.2E-01	0.5	9.4E-07	2.0E-06	7.3E-01	NA	6.8E-07	7%	NA	
Benzo[a]pyrene	3.0E-01	0.5	8.8E-07	1.9E-06	7.3E+00	NA	6.4E-06	67%	NA	
Benzo[b]fluoranthene	3.9E-01	0.5	1.1E-06	2.5E-06	7.3E-01	NA	8.3E-07	9%	NA	
Benzo(g,h,i)perylene	1.9E-01	0.5	1.0E-07	1.2E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-02	NA	3.4E-08	<1%	NA	
Chrysene	3.9E-01	0.5	1.1E-06	2.5E-06	7.3E-03	NA	8.3E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	0.5	1.7E-07	3.6E-07	7.3E+00	NA	1.2E-06	13%	NA	
Fluoranthene	6.1E-01	0.5	3.3E-07	3.9E-06	NA	4.0E-02	NA		9.7E-05	23%
Fluorene	1.5E-02	0.5	8.2E-09	9.6E-08	NA	4.0E-02	NA		2.4E-06	<1%
Indeno[1,2,3-cd]pyrene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-01	NA	3.4E-07	4%	NA	
Naphthalene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	2.0E-02	NA		3.5E-06	<1%
Phenanthrene	2.6E-01	0.5	1.4E-07	1.7E-06	NA	NA	NA		NA	
Pyrene	4.9E-01	0.5	2.7E-07	3.1E-06	NA	3.0E-02	NA		1.0E-04	24%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	1.0E-01	1	1.1E-07	1.3E-06	2.1E-03	6.0E-03	2.3E-10	<1%	2.2E-04	51%
Trichloroethene	ND									
						Total Cancer Risk:	9.5E-06	**Hazard Index:**	4.3E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.8E-07	7%
Benzo[a]pyrene	7.3E-06	67%
Benzo[b]fluoranthene	9.5E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.9E-08	<1%
Chrysene	9.5E-09	<1%
Dibenz(a,h)anthracene	1.4E-06	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.9E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	3.4E-10	<1%
Trichloroethene		
Total Cancer Risk:	1.1E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.21 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **118 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.3E-02	1.3E-01	3.2E-09	9.2E-09	NA	6.0E-02	NA		1.5E-07	<1%
Acenaphthylene	ND									
Anthracene	4.6E-02	1.3E-01	1.1E-08	3.3E-08	NA	3.0E-01	NA		1.1E-07	<1%
Benzo[a]anthracene	3.2E-01	1.3E-01	1.4E-07	2.3E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo[a]pyrene	3.0E-01	1.3E-01	1.3E-07	2.1E-07	7.3E+00	NA	9.8E-07	67%	NA	
Benzo[b]fluoranthene	3.9E-01	1.3E-01	1.7E-07	2.8E-07	7.3E-01	NA	1.3E-07	9%	NA	
Benzo(g,h,i)perylene	1.9E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-02	NA	5.2E-09	<1%	NA	
Chrysene	3.9E-01	1.3E-01	1.7E-07	2.8E-07	7.3E-03	NA	1.3E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	1.3E-01	2.5E-08	4.1E-08	7.3E+00	NA	1.9E-07	13%	NA	
Fluoranthene	6.1E-01	1.3E-01	1.5E-07	4.3E-07	NA	4.0E-02	NA		1.1E-05	46%
Fluorene	1.5E-02	1.3E-01	3.7E-09	1.1E-08	NA	4.0E-02	NA		2.7E-07	1%
Indeno[1,2,3-cd]pyrene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-01	NA	5.2E-08	4%	NA	
Naphthalene	1.1E-02	1.3E-01	2.7E-09	7.8E-09	NA	2.0E-02	NA		3.9E-07	2%
Phenanthrene	2.6E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.9E-01	1.3E-01	1.2E-07	3.5E-07	NA	3.0E-02	NA		1.2E-05	50%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.0E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.5E-06	**Hazard Index:**	2.3E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.3E-02	1.3E-01	5.2E-09	6.1E-08	NA	6.0E-02	NA		1.0E-06	<1%
Acenaphthylene	ND									
Anthracene	4.6E-02	1.3E-01	1.8E-08	2.1E-07	NA	3.0E-01	NA		7.1E-07	<1%
Benzo[a]anthracene	3.2E-01	1.3E-01	6.8E-07	1.5E-06	7.3E-01	NA	5.0E-07	7%	NA	
Benzo[a]pyrene	3.0E-01	1.3E-01	6.4E-07	1.4E-06	7.3E+00	NA	4.7E-06	67%	NA	
Benzo[b]fluoranthene	3.9E-01	1.3E-01	8.3E-07	1.8E-06	7.3E-01	NA	6.1E-07	9%	NA	
Benzo(g,h,i)perylene	1.9E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-02	NA	2.5E-08	<1%	NA	
Chrysene	3.9E-01	1.3E-01	8.3E-07	1.8E-06	7.3E-03	NA	6.1E-09	<1%	NA	
Dibenz(a,h)anthracene	5.7E-02	1.3E-01	1.2E-07	2.7E-07	7.3E+00	NA	8.9E-07	13%	NA	
Fluoranthene	6.1E-01	1.3E-01	2.4E-07	2.8E-06	NA	4.0E-02	NA		7.1E-05	46%
Fluorene	1.5E-02	1.3E-01	6.0E-09	7.0E-08	NA	4.0E-02	NA		1.7E-06	1%
Indeno[1,2,3-cd]pyrene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-01	NA	2.5E-07	4%	NA	
Naphthalene	1.1E-02	1.3E-01	4.4E-09	5.1E-08	NA	2.0E-02	NA		2.6E-06	2%
Phenanthrene	2.6E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.9E-01	1.3E-01	2.0E-07	2.3E-06	NA	3.0E-02	NA		7.6E-05	50%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.0E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	6.9E-06	**Hazard Index:**	1.5E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	6.0E-07	7%
Benzo[a]pyrene	5.6E-06	67%
Benzo[b]fluoranthene	7.3E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.0E-08	<1%
Chrysene	7.3E-09	<1%
Dibenz(a,h)anthracene	1.1E-06	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.0E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	8.4E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.22 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **118 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.2E+00	7.1E-01	2.1E-03	2.6E-07	4.0E-02	1.8E-07	100%	5.2E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	1.8E-07	**Hazard Index:**	5.2E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR^a$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.2E+00	1.8E-01	2.1E-03	2.6E-07	4.0E-02	4.6E-08	100%	5.2E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	4.6E-08	**Hazard Index:**	5.2E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	2.3E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	2.3E-07	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.23 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **126 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.3E-02	0.5	7.7E-09	2.3E-08	2.9E-02	7.0E-02	2.2E-10	<1%	3.2E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.2E-02	0.5	5.2E-09	1.5E-08	NA	3.0E-01	NA		5.0E-08	<1%
Benzo[a]anthracene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-01	NA	4.1E-08	7%	NA	
Benzo[a]pyrene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E+00	NA	3.8E-07	66%	NA	
Benzo[b]fluoranthene	1.8E-01	0.5	7.7E-08	1.2E-07	7.3E-01	NA	5.7E-08	10%	NA	
Benzo(g,h,i)perylene	8.5E-02	0.5	2.0E-08	5.8E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	0.5	2.6E-08	4.2E-08	7.3E-02	NA	1.9E-09	<1%	NA	
Chrysene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-03	NA	4.7E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	9.5E-09	1.5E-08	7.3E+00	NA	6.9E-08	12%	NA	
Fluoranthene	2.9E-01	0.5	6.8E-08	2.0E-07	NA	4.0E-02	NA		5.0E-06	15%
Fluorene	8.5E-03	0.5	2.0E-09	5.8E-09	NA	4.0E-02	NA		1.5E-07	<1%
Indeno[1,2,3-cd]pyrene	7.4E-02	0.5	3.2E-08	5.1E-08	7.3E-01	NA	2.3E-08	4%	NA	
Naphthalene	2.0E-02	0.5	4.7E-09	1.4E-08	NA	2.0E-02	NA		6.8E-07	2%
Phenanthrene	1.4E-01	0.5	3.3E-08	9.6E-08	NA	NA	NA		NA	
Pyrene	2.2E-01	0.5	5.2E-08	1.5E-07	NA	3.0E-02	NA		5.0E-06	15%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.9E-02	1	4.6E-08	1.4E-07	2.1E-03	6.0E-03	9.7E-11	<1%	2.3E-05	67%
Trichloroethene	ND									
						Total Cancer Risk:	5.7E-07	**Hazard Index:**	3.4E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.3E-02	0.5	1.8E-08	2.1E-07	2.9E-02	7.0E-02	5.2E-10	<1%	3.0E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.2E-02	0.5	1.2E-08	1.4E-07	NA	3.0E-01	NA		4.7E-07	<1%
Benzo[a]anthracene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-01	NA	2.8E-07	7%	NA	
Benzo[a]pyrene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E+00	NA	2.6E-06	66%	NA	
Benzo[b]fluoranthene	1.8E-01	0.5	5.3E-07	1.2E-06	7.3E-01	NA	3.8E-07	10%	NA	
Benzo(g,h,i)perylene	8.5E-02	0.5	4.7E-08	5.4E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	0.5	1.8E-07	3.9E-07	7.3E-02	NA	1.3E-08	<1%	NA	
Chrysene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-03	NA	3.2E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	6.4E-08	1.4E-07	7.3E+00	NA	4.7E-07	12%	NA	
Fluoranthene	2.9E-01	0.5	1.6E-07	1.9E-06	NA	4.0E-02	NA		4.6E-05	15%
Fluorene	8.5E-03	0.5	4.7E-09	5.4E-08	NA	4.0E-02	NA		1.4E-06	<1%
Indeno[1,2,3-cd]pyrene	7.4E-02	0.5	2.2E-07	4.7E-07	7.3E-01	NA	1.6E-07	4%	NA	
Naphthalene	2.0E-02	0.5	1.1E-08	1.3E-07	NA	2.0E-02	NA		6.4E-06	2%
Phenanthrene	1.4E-01	0.5	7.7E-08	8.9E-07	NA	NA	NA		NA	
Pyrene	2.2E-01	0.5	1.2E-07	1.4E-06	NA	3.0E-02	NA		4.7E-05	15%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	9.9E-02	1	1.1E-07	1.3E-06	2.1E-03	6.0E-03	2.3E-10	<1%	2.1E-04	67%
Trichloroethene	ND									
						Total Cancer Risk:	3.9E-06	**Hazard Index:**	3.1E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	7.5E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.2E-07	7%
Benzo[a]pyrene	2.9E-06	66%
Benzo[b]fluoranthene	4.4E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.5E-08	<1%
Chrysene	3.7E-09	<1%
Dibenz(a,h)anthracene	5.4E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	3.2E-10	<1%
Trichloroethene		
Total Cancer Risk:	4.4E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.24 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **126 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.3E-02	1.3E-01	8.0E-09	2.3E-08	2.9E-02	7.0E-02	2.3E-10	<1%	3.3E-07	3%
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.2E-02	1.3E-01	5.4E-09	1.6E-08	NA	3.0E-01	NA		5.2E-08	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-01	NA	4.2E-08	7%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E+00	NA	3.9E-07	66%	NA	
Benzo[b]fluoranthene	1.8E-01	1.3E-01	8.0E-08	1.3E-07	7.3E-01	NA	5.9E-08	10%	NA	
Benzo(g,h,i)perylene	8.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	1.3E-01	2.7E-08	4.3E-08	7.3E-02	NA	2.0E-09	<1%	NA	
Chrysene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-03	NA	4.9E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	9.8E-09	1.6E-08	7.3E+00	NA	7.2E-08	12%	NA	
Fluoranthene	2.9E-01	1.3E-01	7.1E-08	2.1E-07	NA	4.0E-02	NA		5.2E-06	44%
Fluorene	8.5E-03	1.3E-01	2.1E-09	6.0E-09	NA	4.0E-02	NA		1.5E-07	1%
Indeno[1,2,3-cd]pyrene	7.4E-02	1.3E-01	3.3E-08	5.3E-08	7.3E-01	NA	2.4E-08	4%	NA	
Naphthalene	2.0E-02	1.3E-01	4.9E-09	1.4E-08	NA	2.0E-02	NA		7.1E-07	6%
Phenanthrene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.2E-01	1.3E-01	5.4E-08	1.6E-07	NA	3.0E-02	NA		5.2E-06	45%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.9E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.9E-07	**Hazard Index:**	1.2E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.3E-02	1.3E-01	1.3E-08	1.5E-07	2.9E-02	7.0E-02	3.8E-10	<1%	2.2E-06	3%
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.2E-02	1.3E-01	8.8E-09	1.0E-07	NA	3.0E-01	NA		3.4E-07	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-01	NA	2.0E-07	7%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E+00	NA	1.9E-06	66%	NA	
Benzo[b]fluoranthene	1.8E-01	1.3E-01	3.8E-07	8.4E-07	7.3E-01	NA	2.8E-07	10%	NA	
Benzo(g,h,i)perylene	8.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	1.3E-01	1.3E-07	2.8E-07	7.3E-02	NA	9.5E-09	<1%	NA	
Chrysene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-03	NA	2.3E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	4.7E-08	1.0E-07	7.3E+00	NA	3.4E-07	12%	NA	
Fluoranthene	2.9E-01	1.3E-01	1.2E-07	1.3E-06	NA	4.0E-02	NA		3.4E-05	44%
Fluorene	8.5E-03	1.3E-01	3.4E-09	4.0E-08	NA	4.0E-02	NA		9.9E-07	1%
Indeno[1,2,3-cd]pyrene	7.4E-02	1.3E-01	1.6E-07	3.4E-07	7.3E-01	NA	1.1E-07	4%	NA	
Naphthalene	2.0E-02	1.3E-01	8.0E-09	9.3E-08	NA	2.0E-02	NA		4.7E-06	6%
Phenanthrene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.2E-01	1.3E-01	8.8E-08	1.0E-06	NA	3.0E-02	NA		3.4E-05	45%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.9E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.8E-06	**Hazard Index:**	7.6E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	6.1E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.4E-07	7%
Benzo[a]pyrene	2.3E-06	66%
Benzo[b]fluoranthene	3.4E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.1E-08	<1%
Chrysene	2.8E-09	<1%
Dibenz(a,h)anthracene	4.1E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.4E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	3.4E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.25 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **126 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.1E-01	1.0E-01	3.0E-04	2.6E-07	4.0E-02	2.7E-08	100%	7.5E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	2.7E-08	**Hazard Index:**	7.5E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.1E-01	2.6E-02	3.0E-04	2.6E-07	4.0E-02	6.7E-09	100%	7.5E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	6.7E-09	**Hazard Index:**	7.5E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	3.3E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	3.3E-08	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.26 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: 128 S. Marquette

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.8E-02	0.5	4.2E-09	1.2E-08	NA	3.0E-01	NA		4.1E-08	<1%
Benzo[a]anthracene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	7%	NA	
Benzo[a]pyrene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E+00	NA	3.5E-07	70%	NA	
Benzo[b]fluoranthene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-01	NA	4.1E-08	8%	NA	
Benzo(g,h,i)perylene	7.7E-02	0.5	1.8E-08	5.3E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.7E-02	0.5	3.7E-08	6.0E-08	7.3E-02	NA	2.7E-09	<1%	NA	
Chrysene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-03	NA	4.1E-10	<1%	NA	
Dibenz(a,h)anthracene	1.5E-02	0.5	6.5E-09	1.0E-08	7.3E+00	NA	4.7E-08	10%	NA	
Fluoranthene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	4.0E-02	NA		3.4E-06	4%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.9E-02	0.5	3.0E-08	4.7E-08	7.3E-01	NA	2.2E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	8.8E-02	0.5	2.1E-08	6.0E-08	NA	NA	NA		NA	
Pyrene	1.7E-01	0.5	4.0E-08	1.2E-07	NA	3.0E-02	NA		3.9E-06	4%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E-01	1	1.7E-07	4.9E-07	2.1E-03	6.0E-03	3.6E-10	<1%	8.2E-05	92%
Trichloroethene	ND									
						Total Cancer Risk:	4.9E-07	**Hazard Index:**	9.0E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.8E-02	0.5	9.9E-09	1.2E-07	NA	3.0E-01	NA		3.8E-07	<1%
Benzo[a]anthracene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	7%	NA	
Benzo[a]pyrene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E+00	NA	2.3E-06	70%	NA	
Benzo[b]fluoranthene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-01	NA	2.8E-07	8%	NA	
Benzo(g,h,i)perylene	7.7E-02	0.5	4.2E-08	4.9E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.7E-02	0.5	2.5E-07	5.6E-07	7.3E-02	NA	1.9E-08	<1%	NA	
Chrysene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-03	NA	2.8E-09	<1%	NA	
Dibenz(a,h)anthracene	1.5E-02	0.5	4.4E-08	9.6E-08	7.3E+00	NA	3.2E-07	10%	NA	
Fluoranthene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	4.0E-02	NA		3.2E-05	4%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.9E-02	0.5	2.0E-07	4.4E-07	7.3E-01	NA	1.5E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	8.8E-02	0.5	4.8E-08	5.6E-07	NA	NA	NA		NA	
Pyrene	1.7E-01	0.5	9.3E-08	1.1E-06	NA	3.0E-02	NA		3.6E-05	4%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	3.6E-01	1	3.9E-07	4.6E-06	2.1E-03	6.0E-03	8.3E-10	<1%	7.7E-04	92%
Trichloroethene	ND									
						Total Cancer Risk:	3.3E-06	**Hazard Index:**	8.4E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.7E-07	7%
Benzo[a]pyrene	2.7E-06	70%
Benzo[b]fluoranthene	3.2E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.1E-08	<1%
Chrysene	3.2E-09	<1%
Dibenz(a,h)anthracene	3.7E-07	10%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.7E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.2E-09	<1%
Trichloroethene		
Total Cancer Risk:	3.8E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.27 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **128 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.8E-02	1.3E-01	4.4E-09	1.3E-08	NA	3.0E-01	NA		4.3E-08	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	7%	NA	
Benzo[a]pyrene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E+00	NA	3.6E-07	70%	NA	
Benzo[b]fluoranthene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-01	NA	4.2E-08	8%	NA	
Benzo(g,h,i)perylene	7.7E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.7E-02	1.3E-01	3.9E-08	6.2E-08	7.3E-02	NA	2.8E-09	<1%	NA	
Chrysene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-03	NA	4.2E-10	<1%	NA	
Dibenz(a,h)anthracene	1.5E-02	1.3E-01	6.7E-09	1.1E-08	7.3E+00	NA	4.9E-08	10%	NA	
Fluoranthene	2.0E-01	1.3E-01	4.9E-08	1.4E-07	NA	4.0E-02	NA		3.6E-06	47%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.9E-02	1.3E-01	3.1E-08	4.9E-08	7.3E-01	NA	2.2E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	8.8E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.7E-01	1.3E-01	4.1E-08	1.2E-07	NA	3.0E-02	NA		4.0E-06	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.1E-07	**Hazard Index:**	7.6E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.8E-02	1.3E-01	7.2E-09	8.4E-08	NA	3.0E-01	NA		2.8E-07	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	7%	NA	
Benzo[a]pyrene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E+00	NA	1.7E-06	70%	NA	
Benzo[b]fluoranthene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-01	NA	2.0E-07	8%	NA	
Benzo(g,h,i)perylene	7.7E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.7E-02	1.3E-01	1.9E-07	4.0E-07	7.3E-02	NA	1.4E-08	<1%	NA	
Chrysene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-03	NA	2.0E-09	<1%	NA	
Dibenz(a,h)anthracene	1.5E-02	1.3E-01	3.2E-08	7.0E-08	7.3E+00	NA	2.3E-07	10%	NA	
Fluoranthene	2.0E-01	1.3E-01	8.0E-08	9.3E-07	NA	4.0E-02	NA		2.3E-05	47%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.9E-02	1.3E-01	1.5E-07	3.2E-07	7.3E-01	NA	1.1E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	8.8E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.7E-01	1.3E-01	6.8E-08	7.9E-07	NA	3.0E-02	NA		2.6E-05	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.6E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.4E-06	**Hazard Index:**	5.0E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.1E-07	7%
Benzo[a]pyrene	2.1E-06	70%
Benzo[b]fluoranthene	2.4E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.6E-08	<1%
Chrysene	2.4E-09	<1%
Dibenz(a,h)anthracene	2.8E-07	10%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.3E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.9E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.28 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **128 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.29 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **130 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.7E-02	0.5	2.0E-08	3.2E-08	7.3E-01	NA	1.5E-08	7%	NA	
Benzo[a]pyrene	5.0E-02	0.5	2.2E-08	3.4E-08	7.3E+00	NA	1.6E-07	77%	NA	
Benzo[b]fluoranthene	6.6E-02	0.5	2.8E-08	4.5E-08	7.3E-01	NA	2.1E-08	10%	NA	
Benzo(g,h,i)perylene	4.0E-02	0.5	9.4E-09	2.7E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.1E-02	0.5	1.3E-08	2.1E-08	7.3E-02	NA	9.7E-10	<1%	NA	
Chrysene	5.6E-02	0.5	2.4E-08	3.8E-08	7.3E-03	NA	1.8E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.2E-02	0.5	2.2E-08	6.3E-08	NA	4.0E-02	NA		1.6E-06	10%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.2E-02	0.5	1.4E-08	2.2E-08	7.3E-01	NA	1.0E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	3.4E-02	0.5	8.0E-09	2.3E-08	NA	NA	NA		NA	
Pyrene	8.2E-02	0.5	1.9E-08	5.6E-08	NA	3.0E-02	NA		1.9E-06	12%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	1	2.5E-08	7.2E-08	2.1E-03	6.0E-03	5.2E-11	<1%	1.2E-05	78%
Trichloroethene	ND									
						Total Cancer Risk:	2.0E-07	**Hazard Index:**	1.5E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.7E-02	0.5	1.4E-07	3.0E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo[a]pyrene	5.0E-02	0.5	1.5E-07	3.2E-07	7.3E+00	NA	1.1E-06	77%	NA	
Benzo[b]fluoranthene	6.6E-02	0.5	1.9E-07	4.2E-07	7.3E-01	NA	1.4E-07	10%	NA	
Benzo(g,h,i)perylene	4.0E-02	0.5	2.2E-08	2.6E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.1E-02	0.5	9.1E-08	2.0E-07	7.3E-02	NA	6.6E-09	<1%	NA	
Chrysene	5.6E-02	0.5	1.6E-07	3.6E-07	7.3E-03	NA	1.2E-09	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.2E-02	0.5	5.0E-08	5.9E-07	NA	4.0E-02	NA		1.5E-05	10%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.2E-02	0.5	9.4E-08	2.0E-07	7.3E-01	NA	6.8E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	3.4E-02	0.5	1.9E-08	2.2E-07	NA	NA	NA		NA	
Pyrene	8.2E-02	0.5	4.5E-08	5.2E-07	NA	3.0E-02	NA		1.7E-05	12%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	5.2E-02	1	5.7E-08	6.7E-07	2.1E-03	6.0E-03	1.2E-10	<1%	1.1E-04	78%
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	1.4E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a] 0-2 yrs	Mutagens[a] 2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.2E-07	7%
Benzo[a]pyrene	1.2E-06	77%
Benzo[b]fluoranthene	1.6E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	7.6E-09	<1%
Chrysene	1.4E-09	<1%
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	7.8E-08	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.7E-10	<1%
Trichloroethene		
Total Cancer Risk:	1.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.30 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **130 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.7E-02	1.3E-01	2.1E-08	3.3E-08	7.3E-01	NA	1.5E-08	7%	NA	
Benzo[a]pyrene	5.0E-02	1.3E-01	2.2E-08	3.6E-08	7.3E+00	NA	1.6E-07	77%	NA	
Benzo[b]fluoranthene	6.6E-02	1.3E-01	2.9E-08	4.7E-08	7.3E-01	NA	2.2E-08	10%	NA	
Benzo(g,h,i)perylene	4.0E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.1E-02	1.3E-01	1.4E-08	2.2E-08	7.3E-02	NA	1.0E-09	<1%	NA	
Chrysene	5.6E-02	1.3E-01	2.5E-08	4.0E-08	7.3E-03	NA	1.8E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.2E-02	1.3E-01	2.2E-08	6.5E-08	NA	4.0E-02	NA		1.6E-06	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.2E-02	1.3E-01	1.4E-08	2.3E-08	7.3E-01	NA	1.0E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	3.4E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.2E-02	1.3E-01	2.0E-08	5.8E-08	NA	3.0E-02	NA		1.9E-06	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.1E-07	**Hazard Index:**	3.6E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.7E-02	1.3E-01	1.0E-07	2.2E-07	7.3E-01	NA	7.3E-08	7%	NA	
Benzo[a]pyrene	5.0E-02	1.3E-01	1.1E-07	2.3E-07	7.3E+00	NA	7.8E-07	77%	NA	
Benzo[b]fluoranthene	6.6E-02	1.3E-01	1.4E-07	3.1E-07	7.3E-01	NA	1.0E-07	10%	NA	
Benzo(g,h,i)perylene	4.0E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.1E-02	1.3E-01	6.6E-08	1.4E-07	7.3E-02	NA	4.8E-09	<1%	NA	
Chrysene	5.6E-02	1.3E-01	1.2E-07	2.6E-07	7.3E-03	NA	8.7E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.2E-02	1.3E-01	3.7E-08	4.3E-07	NA	4.0E-02	NA		1.1E-05	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.2E-02	1.3E-01	6.8E-08	1.5E-07	7.3E-01	NA	5.0E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	3.4E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.2E-02	1.3E-01	3.3E-08	3.8E-07	NA	3.0E-02	NA		1.3E-05	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.0E-06	**Hazard Index:**	2.3E-05	

Notes:

Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	8.8E-08	7%
Benzo[a]pyrene	9.4E-07	77%
Benzo[b]fluoranthene	1.2E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	5.8E-09	<1%
Chrysene	1.1E-09	<1%
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	6.0E-08	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.2E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.31 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **130 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.4E-01	8.0E-02	2.3E-04	2.6E-07	4.0E-02	2.1E-08	100%	5.9E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	2.1E-08	**Hazard Index:**	5.9E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.4E-01	2.0E-02	2.3E-04	2.6E-07	4.0E-02	5.2E-09	100%	5.9E-03	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	5.2E-09	**Hazard Index:**	5.9E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	2.6E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	2.6E-08	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.32 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **134 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	NA	NA		NA	
Anthracene	3.0E-02	0.5	7.0E-09	2.1E-08	NA	3.0E-01	NA		6.8E-08	<1%
Benzo[a]anthracene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	6%	NA	
Benzo[a]pyrene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E+00	NA	3.8E-07	68%	NA	
Benzo[b]fluoranthene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-01	NA	5.0E-08	9%	NA	
Benzo(g,h,i)perylene	8.5E-02	0.5	2.0E-08	5.8E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	0.5	2.6E-08	4.2E-08	7.3E-02	NA	1.9E-09	<1%	NA	
Chrysene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E-03	NA	4.4E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	9.5E-09	1.5E-08	7.3E+00	NA	6.9E-08	12%	NA	
Fluoranthene	2.6E-01	0.5	6.1E-08	1.8E-07	NA	4.0E-02	NA		4.5E-06	13%
Fluorene	9.4E-03	0.5	2.2E-09	6.4E-09	NA	4.0E-02	NA		1.6E-07	<1%
Indeno[1,2,3-cd]pyrene	7.2E-02	0.5	3.1E-08	4.9E-08	7.3E-01	NA	2.3E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	NA	NA		NA	
Pyrene	1.9E-01	0.5	4.5E-08	1.3E-07	NA	3.0E-02	NA		4.3E-06	13%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.1E-01	1	5.2E-08	1.5E-07	2.1E-03	6.0E-03	1.1E-10	<1%	2.5E-05	74%
Trichloroethene	ND									
						Total Cancer Risk:	5.6E-07	**Hazard Index:**	3.4E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	NA	NA		NA	
Anthracene	3.0E-02	0.5	1.6E-08	1.9E-07	NA	3.0E-01	NA		6.4E-07	<1%
Benzo[a]anthracene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	6%	NA	
Benzo[a]pyrene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E+00	NA	2.6E-06	68%	NA	
Benzo[b]fluoranthene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-01	NA	3.4E-07	9%	NA	
Benzo(g,h,i)perylene	8.5E-02	0.5	4.7E-08	5.4E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	0.5	1.8E-07	3.9E-07	7.3E-02	NA	1.3E-08	<1%	NA	
Chrysene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E-03	NA	3.0E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	6.4E-08	1.4E-07	7.3E+00	NA	4.7E-07	12%	NA	
Fluoranthene	2.6E-01	0.5	1.4E-07	1.7E-06	NA	4.0E-02	NA		4.2E-05	13%
Fluorene	9.4E-03	0.5	5.2E-09	6.0E-08	NA	4.0E-02	NA		1.5E-06	<1%
Indeno[1,2,3-cd]pyrene	7.2E-02	0.5	2.1E-07	4.6E-07	7.3E-01	NA	1.5E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	NA	NA		NA	
Pyrene	1.9E-01	0.5	1.0E-07	1.2E-06	NA	3.0E-02	NA		4.0E-05	13%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	1.1E-01	1	1.2E-07	1.4E-06	2.1E-03	6.0E-03	2.5E-10	<1%	2.3E-04	74%
Trichloroethene	ND									
						Total Cancer Risk:	3.8E-06	**Hazard Index:**	3.2E-04	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.7E-07	6%
Benzo[a]pyrene	2.9E-06	68%
Benzo[b]fluoranthene	3.9E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.5E-08	<1%
Chrysene	3.4E-09	<1%
Dibenz(a,h)anthracene	5.4E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	3.6E-10	<1%
Trichloroethene		
Total Cancer Risk:	4.3E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.33 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **134 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	1.1E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.0E-02	1.3E-01	7.3E-09	2.1E-08	NA	3.0E-01	NA		7.1E-08	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	6%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E+00	NA	3.9E-07	68%	NA	
Benzo[b]fluoranthene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-01	NA	5.2E-08	9%	NA	
Benzo(g,h,i)perylene	8.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	1.3E-01	2.7E-08	4.3E-08	7.3E-02	NA	2.0E-09	<1%	NA	
Chrysene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E-03	NA	4.6E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	9.8E-09	1.6E-08	7.3E+00	NA	7.2E-08	12%	NA	
Fluoranthene	2.6E-01	1.3E-01	6.3E-08	1.8E-07	NA	4.0E-02	NA		4.6E-06	49%
Fluorene	9.4E-03	1.3E-01	2.3E-09	6.7E-09	NA	4.0E-02	NA		1.7E-07	2%
Indeno[1,2,3-cd]pyrene	7.2E-02	1.3E-01	3.2E-08	5.1E-08	7.3E-01	NA	2.3E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.9E-01	1.3E-01	4.6E-08	1.4E-07	NA	3.0E-02	NA		4.5E-06	48%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.1E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.8E-07	**Hazard Index:**	9.4E-06	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	1.1E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.0E-02	1.3E-01	1.2E-08	1.4E-07	NA	3.0E-01	NA		4.7E-07	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	6%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E+00	NA	1.9E-06	68%	NA	
Benzo[b]fluoranthene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-01	NA	2.5E-07	9%	NA	
Benzo(g,h,i)perylene	8.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.1E-02	1.3E-01	1.3E-07	2.8E-07	7.3E-02	NA	9.5E-09	<1%	NA	
Chrysene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E-03	NA	2.2E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	4.7E-08	1.0E-07	7.3E+00	NA	3.4E-07	12%	NA	
Fluoranthene	2.6E-01	1.3E-01	1.0E-07	1.2E-06	NA	4.0E-02	NA		3.0E-05	49%
Fluorene	9.4E-03	1.3E-01	3.7E-09	4.4E-08	NA	4.0E-02	NA		1.1E-06	2%
Indeno[1,2,3-cd]pyrene	7.2E-02	1.3E-01	1.5E-07	3.4E-07	7.3E-01	NA	1.1E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.9E-01	1.3E-01	7.6E-08	8.8E-07	NA	3.0E-02	NA		2.9E-05	48%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.1E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.7E-06	**Hazard Index:**	6.1E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.1E-07	6%
Benzo[a]pyrene	2.3E-06	68%
Benzo[b]fluoranthene	3.0E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.1E-08	<1%
Chrysene	2.6E-09	<1%
Dibenz(a,h)anthracene	4.1E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.4E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	3.3E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.34 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **134 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	9.5E-01	3.1E-01	9.1E-04	2.6E-07	4.0E-02	8.1E-08	100%	2.3E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	8.1E-08	**Hazard Index:**	2.3E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	9.5E-01	7.8E-02	9.1E-04	2.6E-07	4.0E-02	2.0E-08	100%	2.3E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	2.0E-08	**Hazard Index:**	2.3E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	1.0E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	1.0E-07	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.35 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **138 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.4E-02	0.5	3.3E-09	9.6E-09	NA	3.0E-01	NA		3.2E-08	<1%
Benzo[a]anthracene	7.7E-02	0.5	3.3E-08	5.3E-08	7.3E-01	NA	2.4E-08	5%	NA	
Benzo[a]pyrene	7.6E-02	0.5	3.3E-08	5.2E-08	7.3E+00	NA	2.4E-07	52%	NA	
Benzo[b]fluoranthene	9.3E-02	0.5	4.0E-08	6.4E-08	7.3E-01	NA	2.9E-08	6%	NA	
Benzo(g,h,i)perylene	7.5E-02	0.5	1.8E-08	5.1E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.2E-02	0.5	2.2E-08	3.6E-08	7.3E-02	NA	1.6E-09	<1%	NA	
Chrysene	8.3E-02	0.5	3.6E-08	5.7E-08	7.3E-03	NA	2.6E-10	<1%	NA	
Dibenz(a,h)anthracene	2.4E-02	0.5	1.0E-08	1.6E-08	7.3E+00	NA	7.5E-08	16%	NA	
Fluoranthene	1.6E-01	0.5	3.8E-08	1.1E-07	NA	4.0E-02	NA		2.7E-06	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.3E-02	0.5	2.7E-08	4.3E-08	7.3E-01	NA	2.0E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	7.9E-02	0.5	1.9E-08	5.4E-08	NA	NA	NA		NA	
Pyrene	1.2E-01	0.5	2.8E-08	8.2E-08	NA	3.0E-02	NA		2.7E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.2E-02	1	3.4E-08	9.9E-08	2.0E+00	2.0E-05	6.8E-08	15%	4.9E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.0E-01	1	9.4E-08	2.7E-07	2.1E-03	6.0E-03	2.0E-10	<1%	4.6E-05	<1%
Trichloroethene	ND									
						Total Cancer Risk:	4.6E-07	**Hazard Index:**	5.0E-03	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.4E-02	0.5	7.7E-09	8.9E-08	NA	3.0E-01	NA		3.0E-07	<1%
Benzo[a]anthracene	7.7E-02	0.5	2.3E-07	4.9E-07	7.3E-01	NA	1.6E-07	6%	NA	
Benzo[a]pyrene	7.6E-02	0.5	2.2E-07	4.9E-07	7.3E+00	NA	1.6E-06	58%	NA	
Benzo[b]fluoranthene	9.3E-02	0.5	2.7E-07	5.9E-07	7.3E-01	NA	2.0E-07	7%	NA	
Benzo(g,h,i)perylene	7.5E-02	0.5	4.1E-08	4.8E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.2E-02	0.5	1.5E-07	3.3E-07	7.3E-02	NA	1.1E-08	<1%	NA	
Chrysene	8.3E-02	0.5	2.4E-07	5.3E-07	7.3E-03	NA	1.8E-09	<1%	NA	
Dibenz(a,h)anthracene	2.4E-02	0.5	7.0E-08	1.5E-07	7.3E+00	NA	5.1E-07	18%	NA	
Fluoranthene	1.6E-01	0.5	8.8E-08	1.0E-06	NA	4.0E-02	NA		2.6E-05	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.3E-02	0.5	1.8E-07	4.0E-07	7.3E-01	NA	1.3E-07	5%	NA	
Naphthalene	ND									
Phenanthrene	7.9E-02	0.5	4.3E-08	5.1E-07	NA	NA	NA		NA	
Pyrene	1.2E-01	0.5	6.6E-08	7.7E-07	NA	3.0E-02	NA		2.6E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.2E-02	1	7.9E-08	9.2E-07	2.0E+00	2.0E-05	1.6E-07	6%	4.6E-02	99%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	2.0E-01	1	2.2E-07	2.6E-06	2.1E-03	6.0E-03	4.6E-10	<1%	4.3E-04	<1%
Trichloroethene	ND									
						Total Cancer Risk:	2.8E-06	**Hazard Index:**	4.7E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.9E-07	6%
Benzo[a]pyrene	1.9E-06	57%
Benzo[b]fluoranthene	2.3E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.3E-08	<1%
Chrysene	2.0E-09	<1%
Dibenz(a,h)anthracene	5.9E-07	18%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.5E-07	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	2.3E-07	7%
Aroclor-1260		
VOC		
Tetrachloroethene	6.6E-10	<1%
Trichloroethene		
Total Cancer Risk:	3.3E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.36 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **138 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.4E-02	1.3E-01	3.4E-09	9.9E-09	NA	3.0E-01	NA		3.3E-08	<1%
Benzo[a]anthracene	7.7E-02	1.3E-01	3.4E-08	5.5E-08	7.3E-01	NA	2.5E-08	6%	NA	
Benzo[a]pyrene	7.6E-02	1.3E-01	3.4E-08	5.4E-08	7.3E+00	NA	2.5E-07	56%	NA	
Benzo[b]fluoranthene	9.3E-02	1.3E-01	4.2E-08	6.6E-08	7.3E-01	NA	3.0E-08	7%	NA	
Benzo(g,h,i)perylene	7.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.2E-02	1.3E-01	2.3E-08	3.7E-08	7.3E-02	NA	1.7E-09	<1%	NA	
Chrysene	8.3E-02	1.3E-01	3.7E-08	5.9E-08	7.3E-03	NA	2.7E-10	<1%	NA	
Dibenz(a,h)anthracene	2.4E-02	1.3E-01	1.1E-08	1.7E-08	7.3E+00	NA	7.8E-08	18%	NA	
Fluoranthene	1.6E-01	1.3E-01	3.9E-08	1.1E-07	NA	4.0E-02	NA		2.8E-06	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.3E-02	1.3E-01	2.8E-08	4.5E-08	7.3E-01	NA	2.1E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	7.9E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.2E-01	1.3E-01	2.9E-08	8.5E-08	NA	3.0E-02	NA		2.8E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.2E-02	1.4E-01	1.9E-08	5.5E-08	2.0E+00	2.0E-05	3.8E-08	9%	2.8E-03	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.0E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	4.4E-07	**Hazard Index:**	2.8E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.4E-02	1.3E-01	5.6E-09	6.5E-08	NA	3.0E-01	NA		2.2E-07	<1%
Benzo[a]anthracene	7.7E-02	1.3E-01	1.6E-07	3.6E-07	7.3E-01	NA	1.2E-07	6%	NA	
Benzo[a]pyrene	7.6E-02	1.3E-01	1.6E-07	3.5E-07	7.3E+00	NA	1.2E-06	59%	NA	
Benzo[b]fluoranthene	9.3E-02	1.3E-01	2.0E-07	4.3E-07	7.3E-01	NA	1.4E-07	7%	NA	
Benzo(g,h,i)perylene	7.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.2E-02	1.3E-01	1.1E-07	2.4E-07	7.3E-02	NA	8.1E-09	<1%	NA	
Chrysene	8.3E-02	1.3E-01	1.8E-07	3.9E-07	7.3E-03	NA	1.3E-09	<1%	NA	
Dibenz(a,h)anthracene	2.4E-02	1.3E-01	5.1E-08	1.1E-07	7.3E+00	NA	3.7E-07	19%	NA	
Fluoranthene	1.6E-01	1.3E-01	6.4E-08	7.4E-07	NA	4.0E-02	NA		1.9E-05	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	6.3E-02	1.3E-01	1.3E-07	2.9E-07	7.3E-01	NA	9.8E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	7.9E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.2E-01	1.3E-01	4.8E-08	5.6E-07	NA	3.0E-02	NA		1.9E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.2E-02	1.4E-01	3.1E-08	3.6E-07	2.0E+00	2.0E-05	6.2E-08	3%	1.8E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	2.0E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.0E-06	**Hazard Index:**	1.8E-02	

Notes:

			Non-Mutagens		Mutagens[1]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.4E-07	6%
Benzo[a]pyrene	1.4E-06	59%
Benzo[b]fluoranthene	1.7E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	9.8E-09	<1%
Chrysene	1.6E-09	<1%
Dibenz(a,h)anthracene	4.5E-07	19%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.2E-07	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	1.0E-07	4%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.4E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.37 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **138 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET} \times \text{EF} \times \text{ED} \times \text{CF} \times (1\text{day}/24\text{h}) \times \text{TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.38 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **142 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.6E-02	0.5	6.1E-09	1.8E-08	NA	3.0E-01	NA		5.9E-08	<1%
Benzo[a]anthracene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-01	NA	4.1E-08	4%	NA	
Benzo[a]pyrene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E+00	NA	5.3E-07	46%	NA	
Benzo[b]fluoranthene	1.9E-01	0.5	8.2E-08	1.3E-07	7.3E-01	NA	6.0E-08	5%	NA	
Benzo(g,h,i)perylene	3.5E-01	0.5	8.2E-08	2.4E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	9.1E-02	0.5	3.9E-08	6.2E-08	7.3E-02	NA	2.9E-09	<1%	NA	
Chrysene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E-03	NA	5.3E-10	<1%	NA	
Dibenz(a,h)anthracene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E+00	NA	4.4E-07	38%	NA	
Fluoranthene	2.8E-01	0.5	6.6E-08	1.9E-07	NA	4.0E-02	NA		4.8E-06	<1%
Fluorene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	4.0E-02	NA		1.9E-07	<1%
Indeno[1,2,3-cd]pyrene	1.8E-01	0.5	7.7E-08	1.2E-07	7.3E-01	NA	5.7E-08	5%	NA	
Naphthalene	7.9E-03	0.5	1.9E-09	5.4E-09	NA	2.0E-02	NA		2.7E-07	<1%
Phenanthrene	1.5E-01	0.5	3.5E-08	1.0E-07	NA	NA	NA		NA	
Pyrene	2.4E-01	0.5	5.6E-08	1.6E-07	NA	3.0E-02	NA		5.5E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.6E-02	1	7.5E-09	2.2E-08	2.0E+00	2.0E-05	1.5E-08	1%	1.1E-03	97%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.2E-02	1	4.3E-08	1.3E-07	2.1E-03	6.0E-03	9.1E-11	<1%	2.1E-05	2%
Trichloroethene	ND									
						Total Cancer Risk:	1.1E-06	**Hazard Index:**	1.1E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.6E-02	0.5	1.4E-08	1.7E-07	NA	3.0E-01	NA		5.5E-07	<1%
Benzo[a]anthracene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-01	NA	2.8E-07	4%	NA	
Benzo[a]pyrene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E+00	NA	3.6E-06	47%	NA	
Benzo[b]fluoranthene	1.9E-01	0.5	5.6E-07	1.2E-06	7.3E-01	NA	4.1E-07	5%	NA	
Benzo(g,h,i)perylene	3.5E-01	0.5	1.9E-07	2.2E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	9.1E-02	0.5	2.7E-07	5.8E-07	7.3E-02	NA	1.9E-08	<1%	NA	
Chrysene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E-03	NA	3.6E-09	<1%	NA	
Dibenz(a,h)anthracene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E+00	NA	3.0E-06	39%	NA	
Fluoranthene	2.8E-01	0.5	1.5E-07	1.8E-06	NA	4.0E-02	NA		4.5E-05	<1%
Fluorene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	4.0E-02	NA		1.8E-06	<1%
Indeno[1,2,3-cd]pyrene	1.8E-01	0.5	5.3E-07	1.2E-06	7.3E-01	NA	3.8E-07	5%	NA	
Naphthalene	7.9E-03	0.5	4.3E-09	5.1E-08	NA	2.0E-02	NA		2.5E-06	<1%
Phenanthrene	1.5E-01	0.5	8.2E-08	9.6E-07	NA	NA	NA		NA	
Pyrene	2.4E-01	0.5	1.3E-07	1.5E-06	NA	3.0E-02	NA		5.1E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.6E-02	1	1.8E-08	2.0E-07	2.0E+00	2.0E-05	3.5E-08	<1%	1.0E-02	97%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	9.2E-02	1	1.0E-07	1.2E-06	2.1E-03	6.0E-03	2.1E-10	<1%	2.0E-04	2%
Trichloroethene	ND									
						Total Cancer Risk:	7.7E-06	**Hazard Index:**	1.1E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.2E-07	4%
Benzo[a]pyrene	4.2E-06	47%
Benzo[b]fluoranthene	4.7E-07	5%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.2E-08	<1%
Chrysene	4.2E-09	<1%
Dibenz(a,h)anthracene	3.4E-06	39%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	4.4E-07	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	5.0E-08	<1%
Aroclor-1260		
VOC		
Tetrachloroethene	3.0E-10	<1%
Trichloroethene		
Total Cancer Risk:	8.9E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.39 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **142 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.6E-02	1.3E-01	6.3E-09	1.8E-08	NA	3.0E-01	NA		6.2E-08	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-01	NA	4.2E-08	4%	NA	
Benzo[a]pyrene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E+00	NA	5.5E-07	47%	NA	
Benzo[b]fluoranthene	1.9E-01	1.3E-01	8.5E-08	1.4E-07	7.3E-01	NA	6.2E-08	5%	NA	
Benzo(g,h,i)perylene	3.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	9.1E-02	1.3E-01	4.1E-08	6.5E-08	7.3E-02	NA	3.0E-09	<1%	NA	
Chrysene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E-03	NA	5.5E-10	<1%	NA	
Dibenz(a,h)anthracene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E+00	NA	4.6E-07	38%	NA	
Fluoranthene	2.8E-01	1.3E-01	6.8E-08	2.0E-07	NA	4.0E-02	NA		5.0E-06	<1%
Fluorene	1.1E-02	1.3E-01	2.7E-09	7.8E-09	NA	4.0E-02	NA		2.0E-07	<1%
Indeno[1,2,3-cd]pyrene	1.8E-01	1.3E-01	8.0E-08	1.3E-07	7.3E-01	NA	5.9E-08	5%	NA	
Naphthalene	7.9E-03	1.3E-01	1.9E-09	5.6E-09	NA	2.0E-02	NA		2.8E-07	<1%
Phenanthrene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.4E-01	1.3E-01	5.8E-08	1.7E-07	NA	3.0E-02	NA		5.7E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.6E-02	1.4E-01	4.2E-09	1.2E-08	2.0E+00	2.0E-05	8.4E-09	<1%	6.1E-04	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.2E-06	**Hazard Index:**	6.2E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{SA x AF x EF x ED x CF x TAF}}{\text{BW x AT}} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.6E-02	1.3E-01	1.0E-08	1.2E-07	NA	3.0E-01	NA		4.0E-07	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-01	NA	2.0E-07	4%	NA	
Benzo[a]pyrene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E+00	NA	2.6E-06	47%	NA	
Benzo[b]fluoranthene	1.9E-01	1.3E-01	4.0E-07	8.8E-07	7.3E-01	NA	3.0E-07	5%	NA	
Benzo(g,h,i)perylene	3.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	9.1E-02	1.3E-01	1.9E-07	4.2E-07	7.3E-02	NA	1.4E-08	<1%	NA	
Chrysene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E-03	NA	2.6E-09	<1%	NA	
Dibenz(a,h)anthracene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E+00	NA	2.2E-06	39%	NA	
Fluoranthene	2.8E-01	1.3E-01	1.1E-07	1.3E-06	NA	4.0E-02	NA		3.3E-05	<1%
Fluorene	1.1E-02	1.3E-01	4.4E-09	5.1E-08	NA	4.0E-02	NA		1.3E-06	<1%
Indeno[1,2,3-cd]pyrene	1.8E-01	1.3E-01	3.8E-07	8.4E-07	7.3E-01	NA	2.8E-07	5%	NA	
Naphthalene	7.9E-03	1.3E-01	3.2E-09	3.7E-08	NA	2.0E-02	NA		1.8E-06	<1%
Phenanthrene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.4E-01	1.3E-01	9.6E-08	1.1E-06	NA	3.0E-02	NA		3.7E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.6E-02	1.4E-01	6.9E-09	8.0E-08	2.0E+00	2.0E-05	1.4E-08	<1%	4.0E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	9.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.6E-06	**Hazard Index:**	4.1E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.4E-07	4%
Benzo[a]pyrene	3.2E-06	47%
Benzo[b]fluoranthene	3.6E-07	5%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.7E-08	<1%
Chrysene	3.2E-09	<1%
Dibenz(a,h)anthracene	2.6E-06	39%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.4E-07	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	2.2E-08	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	6.8E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.40 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **142 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

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Tab Name	Address	Table Title	Exposure Pathway (when applicable)
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Risk summary		Table D.42 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents	
H1_Ing	146 S. Marquette	Table D.43 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H1_Derm	146 S. Marquette	Table D.44 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H1_Inh	146 S. Marquette	Table D.45 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H2_Ing	150 S. Marquette	Table D.46 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H2_Derm	150 S. Marquette	Table D.47 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H2_Inh	150 S. Marquette	Table D.48 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H3_Ing	154 S. Marquette	Table D.49 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H3_Derm	154 S. Marquette	Table D.50 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H3_Inh	154 S. Marquette	Table D.51 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H4_Ing	162 S. Marquette	Table D.52 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H4_Derm	162 S. Marquette	Table D.53 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H4_Inh	162 S. Marquette	Table D.54 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H5_Ing	166 S. Marquette	Table D.55 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H5_Derm	166 S. Marquette	Table D.56 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H5_Inh	166 S. Marquette	Table D.57 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H6_Ing	202 S. Marquette	Table D.58 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H6_Derm	202 S. Marquette	Table D.59 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H6_Inh	202 S. Marquette	Table D.60 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H7_Ing	206 S. Marquette	Table D.61 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H7_Derm	206 S. Marquette	Table D.62 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H7_Inh	206 S. Marquette	Table D.63 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H8_Ing	210 S. Marquette	Table D.64 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H8_Derm	210 S. Marquette	Table D.65 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H8_Inh	210 S. Marquette	Table D.66 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H9_Ing	214 S. Marquette	Table D.67 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H9_Derm	214 S. Marquette	Table D.68 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H9_Inh	214 S. Marquette	Table D.69 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H10_Ing	222 S. Marquette	Table D.70 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H10_Derm	222 S. Marquette	Table D.71 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H10_Inh	222 S. Marquette	Table D.72 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H11_Ing	226 S. Marquette	Table D.73 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H11_Derm	226 S. Marquette	Table D.74 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H11_Inh	226 S. Marquette	Table D.75 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H12_Ing	230 S. Marquette	Table D.76 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H12_Derm	230 S. Marquette	Table D.77 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H12_Inh	230 S. Marquette	Table D.78 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure

Table D.41 Summary of Total Cancer and Non-Cancer Risks by Property

Property Address	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard Adult	Non-Cancer Hazard Child
146 S. Marquette	3E-06	1E-02	1E-01
150 S. Marquette	8E-06	9E-03	7E-02
154 S. Marquette	1E-05	1E-01	1E-01
162 S. Marquette	2E-06	1E-05	1E-04
166 S. Marquette	5E-06	3E-02	3E-02
202 S. Marquette	5E-05	2E-04	1E-03
206 S. Marquette	2E-05	4E-01	4E-01
210 S. Marquette	1E-05	5E-05	4E-04
214 S. Marquette	1E-05	5E-05	4E-04
222 S. Marquette	8E-06	2E-05	2E-04
226 S. Marquette	2E-05	4E-01	4E-01
230 S. Marquette	NA	NA	NA

Notes:

Values that exceed a Total Excess Lifetime Cancer Risk of 1×10^{-4} or a Hazard Quotient of 1 are highlighted in bold.

Table D.42 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Receptors

	146 S. Marquette				150 S. Marquette				154 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	8E-03	65%	Aroclor-1254	98%	6E-03	65%	Aroclor-1254	98%	1E-03	1%	Aroclor-1254	90%
Dermal Contact with Soil	4E-03	35%	Aroclor-1254	99.9%	3E-03	35%	Aroclor-1254	99.7%	7E-04	<1%	Aroclor-1254	99%
Inhalation of Indoor Air	NA				NA				1E-01	98%	Tetrachloroethene	100%
Total Hazard:	**1E-02**	Air: ND			**9E-03**	Air: ND			**1E-01**			
Child Resident												
Incidental Ingestion of Soil	7E-02	72%	Aroclor-1254	98%	5E-02	72%	Aroclor-1254	98%	1E-02	11%	Aroclor-1254	90%
Dermal Contact with Soil	3E-02	28%	Aroclor-1254	99.9%	2E-02	28%	Aroclor-1254	99.7%	5E-03	4%	Aroclor-1254	99%
Inhalation of Indoor Air	NA				NA				1E-01	86%	Tetrachloroethene	100%
Total Hazard:	**1E-01**	Air: ND			**7E-02**	Air: ND			**1E-01**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	2E-06	59%	Benzo[a]pyrene	47%	5E-06	58%	Benzo[a]pyrene	59%	7E-06	54%	Benzo[a]pyrene	68%
Dermal Contact with Soil	1E-06	41%	Benzo[a]pyrene	51%	3E-06	42%	Benzo[a]pyrene	62%	5E-06	42%	Benzo[a]pyrene	68%
Inhalation of Indoor Air	NA				NA				5E-07	4%	Tetrachloroethene	100%
Total Risk:	**3E-06**	Air: ND			**8E-06**	Air: ND			**1E-05**			

Table D.42 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Receptors

	162 S. Marquette				166 S. Marquette				202 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	1E-05	75%	Tetrachloroethene	69%	6E-06	<1%	Pyrene	53%	9E-05	54%	Fluoranthene	38%
Dermal Contact with Soil	4E-06	25%	Pyrene	55%	6E-06	<1%	Pyrene	53%	8E-05	46%	Pyrene	46%
Inhalation of Indoor Air	NA				3E-02	99.96%	Tetrachloroethene	100%	NA			
Total Hazard:	**1E-05**	Air: ND			**3E-02**				**2E-04**	Air: ND		
Child Resident												
Incidental Ingestion of Soil	1E-04	81%	Tetrachloroethene	69%	5E-05	<1%	Pyrene	53%	8E-04	62%	Fluoranthene	38%
Dermal Contact with Soil	2E-05	19%	Pyrene	55%	4E-05	<1%	Pyrene	53%	5E-04	38%	Pyrene	46%
Inhalation of Indoor Air	NA				3E-02	99.7%	Tetrachloroethene	100%	NA			
Total Hazard:	**1E-04**	Air: ND			**3E-02**				**1E-03**	Air: ND		
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	1E-06	57%	Benzo[a]pyrene	77%	3E-06	55%	Benzo[a]pyrene	63%	3E-05	57%	Benzo[a]pyrene	66%
Dermal Contact with Soil	1E-06	43%	Benzo[a]pyrene	77%	2E-06	42%	Benzo[a]pyrene	63%	2E-05	43%	Benzo[a]pyrene	66%
Inhalation of Indoor Air	NA				1E-07	3%	Tetrachloroethene	100%	NA			
Total Risk:	**2E-06**	Air: ND			**5E-06**				**5E-05**	Air: ND		

Table D.42 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Receptors

	206 S. Marquette				210 S. Marquette				214 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	2E-03	<1%	Aroclor-1254	98%	3E-05	58%	Pyrene	35%	2E-05	49%	Pyrene	49%
Dermal Contact with Soil	9E-04	<1%	Aroclor-1254	97%	2E-05	42%	Pyrene	49%	2E-05	51%	Pyrene	49%
Inhalation of Indoor Air	4E-01	99%	Trichloroethene	80%	NA				NA			
Total Hazard:	**4E-01**				**5E-05**	Air: ND			**5E-05**	AIR:NS		
Child Resident												
Incidental Ingestion of Soil	2E-02	4%	Aroclor-1254	98%	3E-04	66%	Pyrene	35%	2E-04	58%	Pyrene	49%
Dermal Contact with Soil	6E-03	1%	Aroclor-1254	97%	1E-04	34%	Pyrene	49%	2E-04	42%	Pyrene	49%
Inhalation of Indoor Air	4E-01	95%	Trichloroethene	80%	NA				NA			
Total Hazard:	**4E-01**				**4E-04**	Air: ND			**4E-04**	AIR:NS		
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	1E-05	48%	Benzo[a]pyrene	65%	7E-06	57%	Benzo[a]pyrene	59%	8E-06	57%	Benzo[a]pyrene	60%
Dermal Contact with Soil	8E-06	37%	Benzo[a]pyrene	65%	5E-06	43%	Benzo[a]pyrene	59%	6E-06	43%	Benzo[a]pyrene	60%
Inhalation of Indoor Air	3E-06	14%	Trichloroethene	89%	NA				NA			
Total Risk:	**2E-05**				**1E-05**	Air: ND			**1E-05**	AIR:NS		

Table D.42 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Receptors

	222 S. Marquette				226 S. Marquette				230 S. Marquette			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	1E-05	49%	Pyrene	43%	1E-05	<1%	Pyrene	49%	NA			
Dermal Contact with Soil	1E-05	51%	Pyrene	43%	1E-05	<1%	Pyrene	49%	NA			
Inhalation of Indoor Air	NA				4E-01	99.99%	Trichloroethene	100%	NA			
Total Hazard:	**2E-05**	Air: ND			**4E-01**				**NA**	Soil: NS; Air: ND		
Child Resident												
Incidental Ingestion of Soil	1E-04	58%	Pyrene	43%	1E-04	<1%	Pyrene	49%	NA			
Dermal Contact with Soil	8E-05	42%	Pyrene	43%	8E-05	<1%	Pyrene	49%	NA			
Inhalation of Indoor Air	NA				4E-01	99.95%	Trichloroethene	100%	NA			
Total Hazard:	**2E-04**	Air: ND			**4E-01**				**NA**	Soil: NS; Air: ND		
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	5E-06	57%	Benzo[a]pyrene	69%	7E-06	45%	Benzo[a]pyrene	68%	NA			
Dermal Contact with Soil	4E-06	43%	Benzo[a]pyrene	69%	5E-06	34%	Benzo[a]pyrene	69%	NA			
Inhalation of Indoor Air	NA				3E-06	21%	Trichloroethene	100%	NA			
Total Risk:	**8E-06**	Air: ND			**2E-05**				**NA**	Soil: NS; Air: ND		

Notes:

NA - Risks or hazards were not calculated because no relevant chemicals were detected or sampled at the site.

ND - Not detected.

NS - Not sampled.

Blank - Values are not relevant because the risks could not be calculated.

COPC - Compound of Potential Concern.

Table D.43 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **146 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	3.1E-02	0.5	1.3E-08	2.1E-08	7.3E-01	NA	9.7E-09	4%	NA	
Benzo[a]pyrene	3.1E-02	0.5	1.3E-08	2.1E-08	7.3E+00	NA	9.7E-08	36%	NA	
Benzo[b]fluoranthene	4.5E-02	0.5	1.9E-08	3.1E-08	7.3E-01	NA	1.4E-08	5%	NA	
Benzo(g,h,i)perylene	3.2E-02	0.5	7.5E-09	2.2E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-02	0.5	7.3E-09	1.2E-08	7.3E-02	NA	5.3E-10	<1%	NA	
Chrysene	3.9E-02	0.5	1.7E-08	2.7E-08	7.3E-03	NA	1.2E-10	<1%	NA	
Dibenz(a,h)anthracene	1.1E-02	0.5	4.7E-09	7.5E-09	7.3E+00	NA	3.5E-08	13%	NA	
Fluoranthene	5.6E-02	0.5	1.3E-08	3.8E-08	NA	4.0E-02	NA		9.6E-07	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.6E-02	0.5	1.1E-08	1.8E-08	7.3E-01	NA	8.2E-09	3%	NA	
Naphthalene	ND									
Phenanthrene	3.5E-02	0.5	8.2E-09	2.4E-08	NA	NA	NA		NA	
Pyrene	5.2E-02	0.5	1.2E-08	3.6E-08	NA	3.0E-02	NA		1.2E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.1E-01	1	5.2E-08	1.5E-07	2.0E+00	2.0E-05	1.0E-07	38%	7.5E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.3E-01	1	3.9E-07	1.1E-06	2.1E-03	6.0E-03	8.2E-10	<1%	1.9E-04	2%
Trichloroethene	ND									
						Total Cancer Risk:	2.7E-07	**Hazard Index:**	7.7E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	3.1E-02	0.5	9.1E-08	2.0E-07	7.3E-01	NA	6.6E-08	5%	NA	
Benzo[a]pyrene	3.1E-02	0.5	9.1E-08	2.0E-07	7.3E+00	NA	6.6E-07	49%	NA	
Benzo[b]fluoranthene	4.5E-02	0.5	1.3E-07	2.9E-07	7.3E-01	NA	9.6E-08	7%	NA	
Benzo(g,h,i)perylene	3.2E-02	0.5	1.8E-08	2.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-02	0.5	5.0E-08	1.1E-07	7.3E-02	NA	3.6E-09	<1%	NA	
Chrysene	3.9E-02	0.5	1.1E-07	2.5E-07	7.3E-03	NA	8.3E-10	<1%	NA	
Dibenz(a,h)anthracene	1.1E-02	0.5	3.2E-08	7.0E-08	7.3E+00	NA	2.3E-07	17%	NA	
Fluoranthene	5.6E-02	0.5	3.1E-08	3.6E-07	NA	4.0E-02	NA		8.9E-06	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.6E-02	0.5	7.6E-08	1.7E-07	7.3E-01	NA	5.5E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	3.5E-02	0.5	1.9E-08	2.2E-07	NA	NA	NA		NA	
Pyrene	5.2E-02	0.5	2.8E-08	3.3E-07	NA	3.0E-02	NA		1.1E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.1E-01	1	1.2E-07	1.4E-06	2.0E+00	2.0E-05	2.4E-07	18%	7.0E-02	98%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	8.3E-01	1	9.1E-07	1.1E-05	2.1E-03	6.0E-03	1.9E-09	<1%	1.8E-03	2%
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	7.2E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.6E-08	5%
Benzo[a]pyrene	7.6E-07	47%
Benzo[b]fluoranthene	1.1E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	4.2E-09	<1%
Chrysene	9.5E-10	<1%
Dibenz(a,h)anthracene	2.7E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	6.4E-08	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	3.4E-07	21%
Aroclor-1260		
VOC		
Tetrachloroethene	2.7E-09	<1%
Trichloroethene		
Total Cancer Risk:	1.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.44 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **146 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	3.1E-02	1.3E-01	1.4E-08	2.2E-08	7.3E-01	NA	1.0E-08	4%	NA	
Benzo[a]pyrene	3.1E-02	1.3E-01	1.4E-08	2.2E-08	7.3E+00	NA	1.0E-07	44%	NA	
Benzo[b]fluoranthene	4.5E-02	1.3E-01	2.0E-08	3.2E-08	7.3E-01	NA	1.5E-08	6%	NA	
Benzo(g,h,i)perylene	3.2E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-02	1.3E-01	7.6E-09	1.2E-08	7.3E-02	NA	5.5E-10	<1%	NA	
Chrysene	3.9E-02	1.3E-01	1.7E-08	2.8E-08	7.3E-03	NA	1.3E-10	<1%	NA	
Dibenz(a,h)anthracene	1.1E-02	1.3E-01	4.9E-09	7.8E-09	7.3E+00	NA	3.6E-08	16%	NA	
Fluoranthene	5.6E-02	1.3E-01	1.4E-08	4.0E-08	NA	4.0E-02	NA		9.9E-07	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.6E-02	1.3E-01	1.2E-08	1.8E-08	7.3E-01	NA	8.5E-09	4%	NA	
Naphthalene	ND									
Phenanthrene	3.5E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.2E-02	1.3E-01	1.3E-08	3.7E-08	NA	3.0E-02	NA		1.2E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.1E-01	1.4E-01	2.9E-08	8.4E-08	2.0E+00	2.0E-05	5.8E-08	25%	4.2E-03	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.3E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.3E-07	**Hazard Index:**	4.2E-03	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	3.1E-02	1.3E-01	6.6E-08	1.4E-07	7.3E-01	NA	4.8E-08	5%	NA	
Benzo[a]pyrene	3.1E-02	1.3E-01	6.6E-08	1.4E-07	7.3E+00	NA	4.8E-07	53%	NA	
Benzo[b]fluoranthene	4.5E-02	1.3E-01	9.6E-08	2.1E-07	7.3E-01	NA	7.0E-08	8%	NA	
Benzo(g,h,i)perylene	3.2E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-02	1.3E-01	3.6E-08	7.9E-08	7.3E-02	NA	2.6E-09	<1%	NA	
Chrysene	3.9E-02	1.3E-01	8.3E-08	1.8E-07	7.3E-03	NA	6.1E-10	<1%	NA	
Dibenz(a,h)anthracene	1.1E-02	1.3E-01	2.3E-08	5.1E-08	7.3E+00	NA	1.7E-07	19%	NA	
Fluoranthene	5.6E-02	1.3E-01	2.2E-08	2.6E-07	NA	4.0E-02	NA		6.5E-06	<1%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.6E-02	1.3E-01	5.5E-08	1.2E-07	7.3E-01	NA	4.0E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	3.5E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.2E-02	1.3E-01	2.1E-08	2.4E-07	NA	3.0E-02	NA		8.1E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.1E-01	1.4E-01	4.7E-08	5.5E-07	2.0E+00	2.0E-05	9.5E-08	10%	2.8E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.3E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	9.1E-07	**Hazard Index:**	2.8E-02	

Notes:

			Non-Mutagens		Mutagens[1]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.8E-08	5%
Benzo[a]pyrene	5.8E-07	51%
Benzo[b]fluoranthene	8.5E-08	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.2E-09	<1%
Chrysene	7.3E-10	<1%
Dibenz(a,h)anthracene	2.1E-07	18%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	4.9E-08	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	1.5E-07	13%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.1E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.45 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **146 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.46 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **150 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	2.8E-09	8.2E-09	NA	6.0E-02	NA		1.4E-07	<1%
Acenaphthylene	8.3E-03	0.5	1.9E-09	5.7E-09	NA	NA	NA		NA	
Anthracene	2.8E-02	0.5	6.6E-09	1.9E-08	NA	3.0E-01	NA		6.4E-08	<1%
Benzo[a]anthracene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	5%	NA	
Benzo[a]pyrene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E+00	NA	3.5E-07	51%	NA	
Benzo[b]fluoranthene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-01	NA	4.7E-08	7%	NA	
Benzo(g,h,i)perylene	7.6E-02	0.5	1.8E-08	5.2E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	0.5	2.5E-08	4.0E-08	7.3E-02	NA	1.8E-09	<1%	NA	
Chrysene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E-03	NA	3.8E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	9.5E-09	1.5E-08	7.3E+00	NA	6.9E-08	10%	NA	
Fluoranthene	2.4E-01	0.5	5.6E-08	1.6E-07	NA	4.0E-02	NA		4.1E-06	<1%
Fluorene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	4.0E-02	NA		1.9E-07	<1%
Indeno[1,2,3-cd]pyrene	6.4E-02	0.5	2.8E-08	4.4E-08	7.3E-01	NA	2.0E-08	3%	NA	
Naphthalene	7.2E-03	0.5	1.7E-09	4.9E-09	NA	2.0E-02	NA		2.5E-07	<1%
Phenanthrene	1.4E-01	0.5	3.3E-08	9.6E-08	NA	NA	NA		NA	
Pyrene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	3.0E-02	NA		4.6E-06	<1%
PCBs										
Aroclor-1242	9.4E-02	1	4.4E-08	1.3E-07	2.0E+00	NA	8.8E-08	13%	NA	
Aroclor-1248	ND									
Aroclor-1254	7.9E-02	1	3.7E-08	1.1E-07	2.0E+00	2.0E-05	7.4E-08	11%	5.4E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	4.5E-01	1	2.1E-07	6.2E-07	2.1E-03	6.0E-03	4.4E-10	<1%	1.0E-04	2%
Trichloroethene	ND									
						Total Cancer Risk:	6.8E-07	**Hazard Index:**	5.5E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	6.6E-09	7.7E-08	NA	6.0E-02	NA		1.3E-06	<1%
Acenaphthylene	8.3E-03	0.5	4.5E-09	5.3E-08	NA	NA	NA		NA	
Anthracene	2.8E-02	0.5	1.5E-08	1.8E-07	NA	3.0E-01	NA		6.0E-07	<1%
Benzo[a]anthracene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	6%	NA	
Benzo[a]pyrene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E+00	NA	2.3E-06	60%	NA	
Benzo[b]fluoranthene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-01	NA	3.2E-07	8%	NA	
Benzo(g,h,i)perylene	7.6E-02	0.5	4.2E-08	4.9E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	0.5	1.7E-07	3.7E-07	7.3E-02	NA	1.2E-08	<1%	NA	
Chrysene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E-03	NA	2.6E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	0.5	6.4E-08	1.4E-07	7.3E+00	NA	4.7E-07	12%	NA	
Fluoranthene	2.4E-01	0.5	1.3E-07	1.5E-06	NA	4.0E-02	NA		3.8E-05	<1%
Fluorene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	4.0E-02	NA		1.8E-06	<1%
Indeno[1,2,3-cd]pyrene	6.4E-02	0.5	1.9E-07	4.1E-07	7.3E-01	NA	1.4E-07	3%	NA	
Naphthalene	7.2E-03	0.5	3.9E-09	4.6E-08	NA	2.0E-02	NA		2.3E-06	<1%
Phenanthrene	1.4E-01	0.5	7.7E-08	8.9E-07	NA	NA	NA		NA	
Pyrene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	3.0E-02	NA		4.3E-05	<1%
PCBs										
Aroclor-1242	9.4E-02	1	1.0E-07	1.2E-06	2.0E+00	NA	2.1E-07	5%	NA	
Aroclor-1248	ND									
Aroclor-1254	7.9E-02	1	8.7E-08	1.0E-06	2.0E+00	2.0E-05	1.7E-07	4%	5.1E-02	98%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	4.5E-01	1	4.9E-07	5.8E-06	2.1E-03	6.0E-03	1.0E-09	<1%	9.6E-04	2%
Trichloroethene	ND									
						Total Cancer Risk:	3.9E-06	**Hazard Index:**	5.2E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.7E-07	6%
Benzo[a]pyrene	2.7E-06	59%
Benzo[b]fluoranthene	3.7E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.4E-08	<1%
Chrysene	2.9E-09	<1%
Dibenz(a,h)anthracene	5.4E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.6E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242	2.9E-07	6%
Aroclor-1248		
Aroclor-1254	2.5E-07	5%
Aroclor-1260		
VOC		
Tetrachloroethene	1.5E-09	<1%
Trichloroethene		
Total Cancer Risk:	4.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.47 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **150 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	2.9E-09	8.5E-09	NA	6.0E-02	NA		1.4E-07	<1%
Acenaphthylene	8.3E-03	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.8E-02	1.3E-01	6.8E-09	2.0E-08	NA	3.0E-01	NA		6.6E-08	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	6%	NA	
Benzo[a]pyrene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E+00	NA	3.6E-07	57%	NA	
Benzo[b]fluoranthene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-01	NA	4.9E-08	8%	NA	
Benzo(g,h,i)perylene	7.6E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	1.3E-01	2.6E-08	4.1E-08	7.3E-02	NA	1.9E-09	<1%	NA	
Chrysene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E-03	NA	3.9E-10	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	9.8E-09	1.6E-08	7.3E+00	NA	7.2E-08	11%	NA	
Fluoranthene	2.4E-01	1.3E-01	5.8E-08	1.7E-07	NA	4.0E-02	NA		4.3E-06	<1%
Fluorene	1.1E-02	1.3E-01	2.7E-09	7.8E-09	NA	4.0E-02	NA		2.0E-07	<1%
Indeno[1,2,3-cd]pyrene	6.4E-02	1.3E-01	2.9E-08	4.5E-08	7.3E-01	NA	2.1E-08	3%	NA	
Naphthalene	7.2E-03	1.3E-01	1.8E-09	5.1E-09	NA	2.0E-02	NA		2.6E-07	<1%
Phenanthrene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.0E-01	1.3E-01	4.9E-08	1.4E-07	NA	3.0E-02	NA		4.7E-06	<1%
PCBs										
Aroclor-1242	9.4E-02	1.4E-01	2.5E-08	7.2E-08	2.0E+00	NA	4.9E-08	8%	NA	
Aroclor-1248	ND									
Aroclor-1254	7.9E-02	1.4E-01	2.1E-08	6.0E-08	2.0E+00	2.0E-05	4.1E-08	7%	3.0E-03	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	4.5E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	6.3E-07	**Hazard Index:**	3.0E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	4.8E-09	5.6E-08	NA	6.0E-02	NA		9.3E-07	<1%
Acenaphthylene	8.3E-03	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.8E-02	1.3E-01	1.1E-08	1.3E-07	NA	3.0E-01	NA		4.3E-07	<1%
Benzo[a]anthracene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	6%	NA	
Benzo[a]pyrene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E+00	NA	1.7E-06	63%	NA	
Benzo[b]fluoranthene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	9%	NA	
Benzo(g,h,i)perylene	7.6E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	1.3E-01	1.2E-07	2.7E-07	7.3E-02	NA	9.0E-09	<1%	NA	
Chrysene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E-03	NA	1.9E-09	<1%	NA	
Dibenz(a,h)anthracene	2.2E-02	1.3E-01	4.7E-08	1.0E-07	7.3E+00	NA	3.4E-07	13%	NA	
Fluoranthene	2.4E-01	1.3E-01	9.6E-08	1.1E-06	NA	4.0E-02	NA		2.8E-05	<1%
Fluorene	1.1E-02	1.3E-01	4.4E-09	5.1E-08	NA	4.0E-02	NA		1.3E-06	<1%
Indeno[1,2,3-cd]pyrene	6.4E-02	1.3E-01	1.4E-07	3.0E-07	7.3E-01	NA	9.9E-08	4%	NA	
Naphthalene	7.2E-03	1.3E-01	2.9E-09	3.4E-08	NA	2.0E-02	NA		1.7E-06	<1%
Phenanthrene	1.4E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.0E-01	1.3E-01	8.0E-08	9.3E-07	NA	3.0E-02	NA		3.1E-05	<1%
PCBs										
Aroclor-1242	9.4E-02	1.4E-01	4.0E-08	4.7E-07	2.0E+00	NA	8.1E-08	3%	NA	
Aroclor-1248	ND									
Aroclor-1254	7.9E-02	1.4E-01	3.4E-08	4.0E-07	2.0E+00	2.0E-05	6.8E-08	3%	2.0E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	4.5E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.7E-06	**Hazard Index:**	2.0E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.1E-07	6%
Benzo[a]pyrene	2.1E-06	62%
Benzo[b]fluoranthene	2.8E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.1E-08	<1%
Chrysene	2.3E-09	<1%
Dibenz(a,h)anthracene	4.1E-07	12%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.2E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242	1.3E-07	4%
Aroclor-1248		
Aroclor-1254	1.1E-07	3%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	3.3E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.48 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **150 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR^a$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.49 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **154 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	7.5E-02	0.5	1.8E-08	5.1E-08	NA	NA	NA		NA	
Anthracene	3.3E-02	0.5	7.7E-09	2.3E-08	NA	3.0E-01	NA		7.5E-08	<1%
Benzo[a]anthracene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-01	NA	4.1E-08	5%	NA	
Benzo[a]pyrene	1.8E-01	0.5	7.7E-08	1.2E-07	7.3E+00	NA	5.7E-07	67%	NA	
Benzo[b]fluoranthene	2.1E-01	0.5	9.0E-08	1.4E-07	7.3E-01	NA	6.6E-08	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	3.5E-08	1.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.5E-02	0.5	2.8E-08	4.5E-08	7.3E-02	NA	2.0E-09	<1%	NA	
Chrysene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-03	NA	5.0E-10	<1%	NA	
Dibenz(a,h)anthracene	3.8E-02	0.5	1.6E-08	2.6E-08	7.3E+00	NA	1.2E-07	14%	NA	
Fluoranthene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	4.0E-02	NA		3.4E-06	<1%
Fluorene	1.4E-02	0.5	3.3E-09	9.6E-09	NA	4.0E-02	NA		2.4E-07	<1%
Indeno[1,2,3-cd]pyrene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	4%	NA	
Naphthalene	8.8E-03	0.5	2.1E-09	6.0E-09	NA	2.0E-02	NA		3.0E-07	<1%
Phenanthrene	1.0E-01	0.5	2.3E-08	6.8E-08	NA	NA	NA		NA	
Pyrene	2.1E-01	0.5	4.9E-08	1.4E-07	NA	3.0E-02	NA		4.8E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.9E-02	1	8.9E-09	2.6E-08	2.0E+00	2.0E-05	1.8E-08	2%	1.3E-03	90%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.1E-01	1	2.9E-07	8.4E-07	2.1E-03	6.0E-03	6.0E-10	<1%	1.4E-04	10%
Trichloroethene	ND									
						Total Cancer Risk:	8.5E-07	**Hazard Index:**	1.4E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a] 6-16 yrs	Mutagens[a] 16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
	IR	Ingestion Rate (mg/day)	100	100	100	100
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	7.5E-02	0.5	4.1E-08	4.8E-07	NA	NA	NA		NA	
Anthracene	3.3E-02	0.5	1.8E-08	2.1E-07	NA	3.0E-01	NA		7.0E-07	<1%
Benzo[a]anthracene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-01	NA	2.8E-07	5%	NA	
Benzo[a]pyrene	1.8E-01	0.5	5.3E-07	1.2E-06	7.3E+00	NA	3.8E-06	68%	NA	
Benzo[b]fluoranthene	2.1E-01	0.5	6.1E-07	1.3E-06	7.3E-01	NA	4.5E-07	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	8.2E-08	9.6E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.5E-02	0.5	1.9E-07	4.2E-07	7.3E-02	NA	1.4E-08	<1%	NA	
Chrysene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-03	NA	3.4E-09	<1%	NA	
Dibenz(a,h)anthracene	3.8E-02	0.5	1.1E-07	2.4E-07	7.3E+00	NA	8.1E-07	14%	NA	
Fluoranthene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	4.0E-02	NA		3.2E-05	<1%
Fluorene	1.4E-02	0.5	7.7E-09	8.9E-08	NA	4.0E-02	NA		2.2E-06	<1%
Indeno[1,2,3-cd]pyrene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	4%	NA	
Naphthalene	8.8E-03	0.5	4.8E-09	5.6E-08	NA	2.0E-02	NA		2.8E-06	<1%
Phenanthrene	1.0E-01	0.5	5.5E-08	6.4E-07	NA	NA	NA		NA	
Pyrene	2.1E-01	0.5	1.2E-07	1.3E-06	NA	3.0E-02	NA		4.5E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.9E-02	1	2.1E-08	2.4E-07	2.0E+00	2.0E-05	4.2E-08	<1%	1.2E-02	90%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	6.1E-01	1	6.7E-07	7.8E-06	2.1E-03	6.0E-03	1.4E-09	<1%	1.3E-03	10%
Trichloroethene	ND									
						Total Cancer Risk:	5.7E-06	**Hazard Index:**	1.4E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.2E-07	5%
Benzo[a]pyrene	4.4E-06	68%
Benzo[b]fluoranthene	5.1E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.6E-08	<1%
Chrysene	3.9E-09	<1%
Dibenz(a,h)anthracene	9.3E-07	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.7E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	5.9E-08	<1%
Aroclor-1260		
VOC		
Tetrachloroethene	2.0E-09	<1%
Trichloroethene		
Total Cancer Risk:	6.5E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.50 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **154 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	7.5E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.3E-02	1.3E-01	8.0E-09	2.3E-08	NA	3.0E-01	NA		7.8E-08	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-01	NA	4.2E-08	5%	NA	
Benzo[a]pyrene	1.8E-01	1.3E-01	8.0E-08	1.3E-07	7.3E+00	NA	5.9E-07	67%	NA	
Benzo[b]fluoranthene	2.1E-01	1.3E-01	9.4E-08	1.5E-07	7.3E-01	NA	6.8E-08	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.5E-02	1.3E-01	2.9E-08	4.6E-08	7.3E-02	NA	2.1E-09	<1%	NA	
Chrysene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-03	NA	5.2E-10	<1%	NA	
Dibenz(a,h)anthracene	3.8E-02	1.3E-01	1.7E-08	2.7E-08	7.3E+00	NA	1.2E-07	14%	NA	
Fluoranthene	2.0E-01	1.3E-01	4.9E-08	1.4E-07	NA	4.0E-02	NA		3.6E-06	<1%
Fluorene	1.4E-02	1.3E-01	3.4E-09	9.9E-09	NA	4.0E-02	NA		2.5E-07	<1%
Indeno[1,2,3-cd]pyrene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	4%	NA	
Naphthalene	8.8E-03	1.3E-01	2.1E-09	6.3E-09	NA	2.0E-02	NA		3.1E-07	<1%
Phenanthrene	1.0E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.1E-01	1.3E-01	5.1E-08	1.5E-07	NA	3.0E-02	NA		5.0E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.9E-02	1.4E-01	5.0E-09	1.5E-08	2.0E+00	2.0E-05	1.0E-08	1%	7.3E-04	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.1E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	8.7E-07	**Hazard Index:**	7.4E-04	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	7.5E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.3E-02	1.3E-01	1.3E-08	1.5E-07	NA	3.0E-01	NA		5.1E-07	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-01	NA	2.0E-07	5%	NA	
Benzo[a]pyrene	1.8E-01	1.3E-01	3.8E-07	8.4E-07	7.3E+00	NA	2.8E-06	68%	NA	
Benzo[b]fluoranthene	2.1E-01	1.3E-01	4.5E-07	9.8E-07	7.3E-01	NA	3.3E-07	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.5E-02	1.3E-01	1.4E-07	3.0E-07	7.3E-02	NA	1.0E-08	<1%	NA	
Chrysene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-03	NA	2.5E-09	<1%	NA	
Dibenz(a,h)anthracene	3.8E-02	1.3E-01	8.1E-08	1.8E-07	7.3E+00	NA	5.9E-07	14%	NA	
Fluoranthene	2.0E-01	1.3E-01	8.0E-08	9.3E-07	NA	4.0E-02	NA		2.3E-05	<1%
Fluorene	1.4E-02	1.3E-01	5.6E-09	6.5E-08	NA	4.0E-02	NA		1.6E-06	<1%
Indeno[1,2,3-cd]pyrene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	4%	NA	
Naphthalene	8.8E-03	1.3E-01	3.5E-09	4.1E-08	NA	2.0E-02	NA		2.0E-06	<1%
Phenanthrene	1.0E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.1E-01	1.3E-01	8.4E-08	9.8E-07	NA	3.0E-02	NA		3.3E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	1.9E-02	1.4E-01	8.2E-09	9.5E-08	2.0E+00	2.0E-05	1.6E-08	<1%	4.8E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.1E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	4.1E-06	**Hazard Index:**	4.8E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.4E-07	5%
Benzo[a]pyrene	3.4E-06	68%
Benzo[b]fluoranthene	3.9E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.2E-08	<1%
Chrysene	3.0E-09	<1%
Dibenz(a,h)anthracene	7.1E-07	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.1E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	2.6E-08	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	5.0E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.51 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **154 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.5E+00	1.5E+00	4.3E-03	2.6E-07	4.0E-02	3.9E-07	100%	1.1E-01	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	3.9E-07	**Hazard Index:**	1.1E-01	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.5E+00	3.7E-01	4.3E-03	2.6E-07	4.0E-02	9.7E-08	100%	1.1E-01	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	9.7E-08	**Hazard Index:**	1.1E-01	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	4.8E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	4.8E-07	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.52 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **162 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.1E-02	0.5	1.8E-08	2.8E-08	7.3E-01	NA	1.3E-08	8%	NA	
Benzo[a]pyrene	4.1E-02	0.5	1.8E-08	2.8E-08	7.3E+00	NA	1.3E-07	77%	NA	
Benzo[b]fluoranthene	5.2E-02	0.5	2.2E-08	3.6E-08	7.3E-01	NA	1.6E-08	10%	NA	
Benzo(g,h,i)perylene	3.5E-02	0.5	8.2E-09	2.4E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.7E-02	0.5	1.2E-08	1.8E-08	7.3E-02	NA	8.5E-10	<1%	NA	
Chrysene	4.7E-02	0.5	2.0E-08	3.2E-08	7.3E-03	NA	1.5E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.0E-02	0.5	2.1E-08	6.2E-08	NA	4.0E-02	NA		1.5E-06	14%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.7E-02	0.5	1.2E-08	1.8E-08	7.3E-01	NA	8.5E-09	5%	NA	
Naphthalene	ND									
Phenanthrene	5.2E-02	0.5	1.2E-08	3.6E-08	NA	NA	NA		NA	
Pyrene	8.4E-02	0.5	2.0E-08	5.8E-08	NA	3.0E-02	NA		1.9E-06	17%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.3E-02	1	1.5E-08	4.5E-08	2.1E-03	6.0E-03	3.3E-11	<1%	7.5E-06	69%
Trichloroethene	ND									
						Total Cancer Risk:	1.7E-07	**Hazard Index:**	1.1E-05	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
	IR	Ingestion Rate (mg/day)	100	100	100	100
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.1E-02	0.5	1.2E-07	2.6E-07	7.3E-01	NA	8.7E-08	8%	NA	
Benzo[a]pyrene	4.1E-02	0.5	1.2E-07	2.6E-07	7.3E+00	NA	8.7E-07	77%	NA	
Benzo[b]fluoranthene	5.2E-02	0.5	1.5E-07	3.3E-07	7.3E-01	NA	1.1E-07	10%	NA	
Benzo(g,h,i)perylene	3.5E-02	0.5	1.9E-08	2.2E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.7E-02	0.5	7.9E-08	1.7E-07	7.3E-02	NA	5.8E-09	<1%	NA	
Chrysene	4.7E-02	0.5	1.4E-07	3.0E-07	7.3E-03	NA	1.0E-09	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.0E-02	0.5	4.9E-08	5.8E-07	NA	4.0E-02	NA		1.4E-05	14%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.7E-02	0.5	7.9E-08	1.7E-07	7.3E-01	NA	5.8E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	5.2E-02	0.5	2.8E-08	3.3E-07	NA	NA	NA		NA	
Pyrene	8.4E-02	0.5	4.6E-08	5.4E-07	NA	3.0E-02	NA		1.8E-05	17%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	3.3E-02	1	3.6E-08	4.2E-07	2.1E-03	6.0E-03	7.6E-11	<1%	7.0E-05	69%
Trichloroethene	ND									
						Total Cancer Risk:	1.1E-06	**Hazard Index:**	1.0E-04	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.0E-07	8%
Benzo[a]pyrene	1.0E-06	77%
Benzo[b]fluoranthene	1.3E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	6.6E-09	<1%
Chrysene	1.2E-09	<1%
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	6.6E-08	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.1E-10	<1%
Trichloroethene		
Total Cancer Risk:	1.3E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.53 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **162 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.1E-02	1.3E-01	1.8E-08	2.9E-08	7.3E-01	NA	1.3E-08	8%	NA	
Benzo[a]pyrene	4.1E-02	1.3E-01	1.8E-08	2.9E-08	7.3E+00	NA	1.3E-07	77%	NA	
Benzo[b]fluoranthene	5.2E-02	1.3E-01	2.3E-08	3.7E-08	7.3E-01	NA	1.7E-08	10%	NA	
Benzo(g,h,i)perylene	3.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.7E-02	1.3E-01	1.2E-08	1.9E-08	7.3E-02	NA	8.8E-10	<1%	NA	
Chrysene	4.7E-02	1.3E-01	2.1E-08	3.3E-08	7.3E-03	NA	1.5E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.0E-02	1.3E-01	2.2E-08	6.4E-08	NA	4.0E-02	NA		1.6E-06	45%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.7E-02	1.3E-01	1.2E-08	1.9E-08	7.3E-01	NA	8.8E-09	5%	NA	
Naphthalene	ND									
Phenanthrene	5.2E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.4E-02	1.3E-01	2.0E-08	6.0E-08	NA	3.0E-02	NA		2.0E-06	55%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.3E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.7E-07	**Hazard Index:**	3.6E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	ND									
Benzo[a]anthracene	4.1E-02	1.3E-01	8.7E-08	1.9E-07	7.3E-01	NA	6.4E-08	8%	NA	
Benzo[a]pyrene	4.1E-02	1.3E-01	8.7E-08	1.9E-07	7.3E+00	NA	6.4E-07	77%	NA	
Benzo[b]fluoranthene	5.2E-02	1.3E-01	1.1E-07	2.4E-07	7.3E-01	NA	8.1E-08	10%	NA	
Benzo(g,h,i)perylene	3.5E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.7E-02	1.3E-01	5.7E-08	1.3E-07	7.3E-02	NA	4.2E-09	<1%	NA	
Chrysene	4.7E-02	1.3E-01	1.0E-07	2.2E-07	7.3E-03	NA	7.3E-10	<1%	NA	
Dibenz(a,h)anthracene	ND									
Fluoranthene	9.0E-02	1.3E-01	3.6E-08	4.2E-07	NA	4.0E-02	NA		1.0E-05	45%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	2.7E-02	1.3E-01	5.7E-08	1.3E-07	7.3E-01	NA	4.2E-08	5%	NA	
Naphthalene	ND									
Phenanthrene	5.2E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.4E-02	1.3E-01	3.4E-08	3.9E-07	NA	3.0E-02	NA		1.3E-05	55%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.3E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	8.3E-07	**Hazard Index:**	2.4E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.7E-08	8%
Benzo[a]pyrene	7.7E-07	77%
Benzo[b]fluoranthene	9.8E-08	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	5.1E-09	<1%
Chrysene	8.8E-10	<1%
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	5.1E-08	5%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.0E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.54 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **162 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET} \times \text{EF} \times \text{ED} \times \text{CF} \times (1\text{day}/24\text{h}) \times \text{TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.55 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **166 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.9E-02	0.5	4.5E-09	1.3E-08	NA	3.0E-01	NA		4.3E-08	<1%
Benzo[a]anthracene	7.1E-02	0.5	3.1E-08	4.9E-08	7.3E-01	NA	2.2E-08	7%	NA	
Benzo[a]pyrene	6.7E-02	0.5	2.9E-08	4.6E-08	7.3E+00	NA	2.1E-07	63%	NA	
Benzo[b]fluoranthene	1.0E-01	0.5	4.3E-08	6.8E-08	7.3E-01	NA	3.1E-08	9%	NA	
Benzo(g,h,i)perylene	5.1E-02	0.5	1.2E-08	3.5E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	0.5	2.5E-08	4.0E-08	7.3E-02	NA	1.8E-09	<1%	NA	
Chrysene	8.3E-02	0.5	3.6E-08	5.7E-08	7.3E-03	NA	2.6E-10	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	0.5	7.7E-09	1.2E-08	7.3E+00	NA	5.7E-08	17%	NA	
Fluoranthene	1.5E-01	0.5	3.5E-08	1.0E-07	NA	4.0E-02	NA		2.6E-06	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	4.3E-02	0.5	1.9E-08	2.9E-08	7.3E-01	NA	1.4E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	NA	NA		NA	
Pyrene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	3.0E-02	NA		3.0E-06	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	3.4E-07	**Hazard Index:**	5.6E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.9E-02	0.5	1.0E-08	1.2E-07	NA	3.0E-01	NA		4.0E-07	<1%
Benzo[a]anthracene	7.1E-02	0.5	2.1E-07	4.5E-07	7.3E-01	NA	1.5E-07	7%	NA	
Benzo[a]pyrene	6.7E-02	0.5	2.0E-07	4.3E-07	7.3E+00	NA	1.4E-06	63%	NA	
Benzo[b]fluoranthene	1.0E-01	0.5	2.9E-07	6.4E-07	7.3E-01	NA	2.1E-07	9%	NA	
Benzo(g,h,i)perylene	5.1E-02	0.5	2.8E-08	3.3E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	0.5	1.7E-07	3.7E-07	7.3E-02	NA	1.2E-08	<1%	NA	
Chrysene	8.3E-02	0.5	2.4E-07	5.3E-07	7.3E-03	NA	1.8E-09	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	0.5	5.3E-08	1.2E-07	7.3E+00	NA	3.8E-07	17%	NA	
Fluoranthene	1.5E-01	0.5	8.2E-08	9.6E-07	NA	4.0E-02	NA		2.4E-05	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	4.3E-02	0.5	1.3E-07	2.7E-07	7.3E-01	NA	9.2E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	NA	NA		NA	
Pyrene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	3.0E-02	NA		2.8E-05	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	2.3E-06	**Hazard Index:**	5.2E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.7E-07	7%
Benzo[a]pyrene	1.6E-06	63%
Benzo[b]fluoranthene	2.4E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.4E-08	<1%
Chrysene	2.0E-09	<1%
Dibenz(a,h)anthracene	4.4E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.1E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.56 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **166 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.9E-02	1.3E-01	4.6E-09	1.4E-08	NA	3.0E-01	NA		4.5E-08	<1%
Benzo[a]anthracene	7.1E-02	1.3E-01	3.2E-08	5.0E-08	7.3E-01	NA	2.3E-08	7%	NA	
Benzo[a]pyrene	6.7E-02	1.3E-01	3.0E-08	4.8E-08	7.3E+00	NA	2.2E-07	63%	NA	
Benzo[b]fluoranthene	1.0E-01	1.3E-01	4.5E-08	7.1E-08	7.3E-01	NA	3.3E-08	9%	NA	
Benzo(g,h,i)perylene	5.1E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	1.3E-01	2.6E-08	4.1E-08	7.3E-02	NA	1.9E-09	<1%	NA	
Chrysene	8.3E-02	1.3E-01	3.7E-08	5.9E-08	7.3E-03	NA	2.7E-10	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	1.3E-01	8.0E-09	1.3E-08	7.3E+00	NA	5.9E-08	17%	NA	
Fluoranthene	1.5E-01	1.3E-01	3.7E-08	1.1E-07	NA	4.0E-02	NA		2.7E-06	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	4.3E-02	1.3E-01	1.9E-08	3.1E-08	7.3E-01	NA	1.4E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.3E-01	1.3E-01	3.2E-08	9.2E-08	NA	3.0E-02	NA		3.1E-06	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	3.5E-07	**Hazard Index:**	5.8E-06	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.9E-02	1.3E-01	7.6E-09	8.8E-08	NA	3.0E-01	NA		2.9E-07	<1%
Benzo[a]anthracene	7.1E-02	1.3E-01	1.5E-07	3.3E-07	7.3E-01	NA	1.1E-07	7%	NA	
Benzo[a]pyrene	6.7E-02	1.3E-01	1.4E-07	3.1E-07	7.3E+00	NA	1.0E-06	63%	NA	
Benzo[b]fluoranthene	1.0E-01	1.3E-01	2.1E-07	4.7E-07	7.3E-01	NA	1.6E-07	9%	NA	
Benzo(g,h,i)perylene	5.1E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	5.8E-02	1.3E-01	1.2E-07	2.7E-07	7.3E-02	NA	9.0E-09	<1%	NA	
Chrysene	8.3E-02	1.3E-01	1.8E-07	3.9E-07	7.3E-03	NA	1.3E-09	<1%	NA	
Dibenz(a,h)anthracene	1.8E-02	1.3E-01	3.8E-08	8.4E-08	7.3E+00	NA	2.8E-07	17%	NA	
Fluoranthene	1.5E-01	1.3E-01	6.0E-08	7.0E-07	NA	4.0E-02	NA		1.7E-05	46%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	4.3E-02	1.3E-01	9.1E-08	2.0E-07	7.3E-01	NA	6.7E-08	4%	NA	
Naphthalene	ND									
Phenanthrene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.3E-01	1.3E-01	5.2E-08	6.1E-07	NA	3.0E-02	NA		2.0E-05	53%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.7E-06	**Hazard Index:**	3.8E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.3E-07	7%
Benzo[a]pyrene	1.3E-06	63%
Benzo[b]fluoranthene	1.9E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.1E-08	<1%
Chrysene	1.6E-09	<1%
Dibenz(a,h)anthracene	3.4E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	8.1E-08	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.0E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.57 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **166 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	1.2E+00	3.8E-01	1.1E-03	2.6E-07	4.0E-02	9.9E-08	100%	2.8E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	9.9E-08	**Hazard Index:**	2.8E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	1.2E+00	9.5E-02	1.1E-03	2.6E-07	4.0E-02	2.5E-08	100%	2.8E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	2.5E-08	**Hazard Index:**	2.8E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	1.2E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	1.2E-07	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.58 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **202 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.0E-02	0.5	7.0E-09	2.1E-08	2.9E-02	7.0E-02	2.0E-10	<1%	2.9E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	1.0E-01	0.5	2.3E-08	6.8E-08	NA	6.0E-02	NA		1.1E-06	1%
Acenaphthylene	1.2E-01	0.5	2.8E-08	8.2E-08	NA	NA	NA		NA	
Anthracene	2.7E-01	0.5	6.3E-08	1.8E-07	NA	3.0E-01	NA		6.2E-07	<1%
Benzo[a]anthracene	7.9E-01	0.5	3.4E-07	5.4E-07	7.3E-01	NA	2.5E-07	6%	NA	
Benzo[a]pyrene	8.2E-01	0.5	3.5E-07	5.6E-07	7.3E+00	NA	2.6E-06	66%	NA	
Benzo[b]fluoranthene	1.1E+00	0.5	4.7E-07	7.5E-07	7.3E-01	NA	3.5E-07	9%	NA	
Benzo(g,h,i)perylene	5.8E-01	0.5	1.4E-07	4.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.8E-01	0.5	2.1E-07	3.3E-07	7.3E-02	NA	1.5E-08	<1%	NA	
Chrysene	9.6E-01	0.5	4.1E-07	6.6E-07	7.3E-03	NA	3.0E-09	<1%	NA	
Dibenz(a,h)anthracene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E+00	NA	5.3E-07	14%	NA	
Fluoranthene	2.0E+00	0.5	4.7E-07	1.4E-06	NA	4.0E-02	NA		3.4E-05	38%
Fluorene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	4.0E-02	NA		2.2E-06	3%
Indeno[1,2,3-cd]pyrene	5.0E-01	0.5	2.2E-07	3.4E-07	7.3E-01	NA	1.6E-07	4%	NA	
Naphthalene	4.0E-02	0.5	9.4E-09	2.7E-08	NA	2.0E-02	NA		1.4E-06	2%
Phenanthrene	1.3E+00	0.5	3.1E-07	8.9E-07	NA	NA	NA		NA	
Pyrene	1.5E+00	0.5	3.5E-07	1.0E-06	NA	3.0E-02	NA		3.4E-05	38%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.5E-02	1	3.1E-08	8.9E-08	2.1E-03	6.0E-03	6.4E-11	<1%	1.5E-05	17%
Trichloroethene	ND									
						Total Cancer Risk:	3.9E-06	**Hazard Index:**	8.9E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.0E-02	0.5	1.6E-08	1.9E-07	2.9E-02	7.0E-02	4.8E-10	<1%	2.7E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	1.0E-01	0.5	5.5E-08	6.4E-07	NA	6.0E-02	NA		1.1E-05	1%
Acenaphthylene	1.2E-01	0.5	6.6E-08	7.7E-07	NA	NA	NA		NA	
Anthracene	2.7E-01	0.5	1.5E-07	1.7E-06	NA	3.0E-01	NA		5.8E-06	<1%
Benzo[a]anthracene	7.9E-01	0.5	2.3E-06	5.1E-06	7.3E-01	NA	1.7E-06	6%	NA	
Benzo[a]pyrene	8.2E-01	0.5	2.4E-06	5.2E-06	7.3E+00	NA	1.7E-05	66%	NA	
Benzo[b]fluoranthene	1.1E+00	0.5	3.2E-06	7.0E-06	7.3E-01	NA	2.3E-06	9%	NA	
Benzo(g,h,i)perylene	5.8E-01	0.5	3.2E-07	3.7E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.8E-01	0.5	1.4E-06	3.1E-06	7.3E-02	NA	1.0E-07	<1%	NA	
Chrysene	9.6E-01	0.5	2.8E-06	6.1E-06	7.3E-03	NA	2.0E-08	<1%	NA	
Dibenz(a,h)anthracene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E+00	NA	3.6E-06	14%	NA	
Fluoranthene	2.0E+00	0.5	1.1E-06	1.3E-05	NA	4.0E-02	NA		3.2E-04	38%
Fluorene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	4.0E-02	NA		2.1E-05	3%
Indeno[1,2,3-cd]pyrene	5.0E-01	0.5	1.5E-06	3.2E-06	7.3E-01	NA	1.1E-06	4%	NA	
Naphthalene	4.0E-02	0.5	2.2E-08	2.6E-07	NA	2.0E-02	NA		1.3E-05	2%
Phenanthrene	1.3E+00	0.5	7.1E-07	8.3E-06	NA	NA	NA		NA	
Pyrene	1.5E+00	0.5	8.2E-07	9.6E-06	NA	3.0E-02	NA		3.2E-04	38%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	6.5E-02	1	7.1E-08	8.3E-07	2.1E-03	6.0E-03	1.5E-10	<1%	1.4E-04	17%
Trichloroethene	ND									
						Total Cancer Risk:	2.6E-05	**Hazard Index:**	8.3E-04	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	6.8E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.9E-06	6%
Benzo[a]pyrene	2.0E-05	66%
Benzo[b]fluoranthene	2.7E-06	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.2E-07	<1%
Chrysene	2.3E-08	<1%
Dibenz(a,h)anthracene	4.2E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.2E-06	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	2.1E-10	<1%
Trichloroethene		
Total Cancer Risk:	3.0E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.59 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: 202 S. Marquette

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.0E-02	1.3E-01	7.3E-09	2.1E-08	2.9E-02	7.0E-02	2.1E-10	<1%	3.0E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	1.0E-01	1.3E-01	2.4E-08	7.1E-08	NA	6.0E-02	NA		1.2E-06	2%
Acenaphthylene	1.2E-01	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.7E-01	1.3E-01	6.6E-08	1.9E-07	NA	3.0E-01	NA		6.4E-07	<1%
Benzo[a]anthracene	7.9E-01	1.3E-01	3.5E-07	5.6E-07	7.3E-01	NA	2.6E-07	6%	NA	
Benzo[a]pyrene	8.2E-01	1.3E-01	3.7E-07	5.8E-07	7.3E+00	NA	2.7E-06	66%	NA	
Benzo[b]fluoranthene	1.1E+00	1.3E-01	4.9E-07	7.8E-07	7.3E-01	NA	3.6E-07	9%	NA	
Benzo(g,h,i)perylene	5.8E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.8E-01	1.3E-01	2.1E-07	3.4E-07	7.3E-02	NA	1.6E-08	<1%	NA	
Chrysene	9.6E-01	1.3E-01	4.3E-07	6.8E-07	7.3E-03	NA	3.1E-09	<1%	NA	
Dibenz(a,h)anthracene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E+00	NA	5.5E-07	14%	NA	
Fluoranthene	2.0E+00	1.3E-01	4.9E-07	1.4E-06	NA	4.0E-02	NA		3.6E-05	46%
Fluorene	1.3E-01	1.3E-01	3.2E-08	9.2E-08	NA	4.0E-02	NA		2.3E-06	3%
Indeno[1,2,3-cd]pyrene	5.0E-01	1.3E-01	2.2E-07	3.6E-07	7.3E-01	NA	1.6E-07	4%	NA	
Naphthalene	4.0E-02	1.3E-01	9.7E-09	2.8E-08	NA	2.0E-02	NA		1.4E-06	2%
Phenanthrene	1.3E+00	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.5E+00	1.3E-01	3.7E-07	1.1E-06	NA	3.0E-02	NA		3.6E-05	46%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.5E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	4.0E-06	**Hazard Index:**	7.7E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{SA x AF x EF x ED x CF x TAF}}{\text{BW x AT}} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	3.0E-02	1.3E-01	1.2E-08	1.4E-07	2.9E-02	7.0E-02	3.5E-10	<1%	2.0E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	1.0E-01	1.3E-01	4.0E-08	4.7E-07	NA	6.0E-02	NA		7.8E-06	2%
Acenaphthylene	1.2E-01	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.7E-01	1.3E-01	1.1E-07	1.3E-06	NA	3.0E-01	NA		4.2E-06	<1%
Benzo[a]anthracene	7.9E-01	1.3E-01	1.7E-06	3.7E-06	7.3E-01	NA	1.2E-06	6%	NA	
Benzo[a]pyrene	8.2E-01	1.3E-01	1.7E-06	3.8E-06	7.3E+00	NA	1.3E-05	66%	NA	
Benzo[b]fluoranthene	1.1E+00	1.3E-01	2.3E-06	5.1E-06	7.3E-01	NA	1.7E-06	9%	NA	
Benzo(g,h,i)perylene	5.8E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	4.8E-01	1.3E-01	1.0E-06	2.2E-06	7.3E-02	NA	7.5E-08	<1%	NA	
Chrysene	9.6E-01	1.3E-01	2.0E-06	4.5E-06	7.3E-03	NA	1.5E-08	<1%	NA	
Dibenz(a,h)anthracene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E+00	NA	2.6E-06	14%	NA	
Fluoranthene	2.0E+00	1.3E-01	8.0E-07	9.3E-06	NA	4.0E-02	NA		2.3E-04	46%
Fluorene	1.3E-01	1.3E-01	5.2E-08	6.1E-07	NA	4.0E-02	NA		1.5E-05	3%
Indeno[1,2,3-cd]pyrene	5.0E-01	1.3E-01	1.1E-06	2.3E-06	7.3E-01	NA	7.8E-07	4%	NA	
Naphthalene	4.0E-02	1.3E-01	1.6E-08	1.9E-07	NA	2.0E-02	NA		9.3E-06	2%
Phenanthrene	1.3E+00	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.5E+00	1.3E-01	6.0E-07	7.0E-06	NA	3.0E-02	NA		2.3E-04	46%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.5E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.9E-05	**Hazard Index:**	5.0E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	5.6E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.5E-06	6%
Benzo[a]pyrene	1.5E-05	66%
Benzo[b]fluoranthene	2.1E-06	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	9.0E-08	<1%
Chrysene	1.8E-08	<1%
Dibenz(a,h)anthracene	3.2E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	9.4E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.3E-05	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.60 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **202 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.61 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: 206 S. Marquette

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	0.5	4.5E-09	1.3E-08	2.9E-02	7.0E-02	1.3E-10	<1%	1.9E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	4.8E-02	0.5	1.1E-08	3.3E-08	NA	6.0E-02	NA		5.5E-07	<1%
Acenaphthylene	ND									
Anthracene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	3.0E-01	NA		4.6E-07	<1%
Benzo[a]anthracene	3.2E-01	0.5	1.4E-07	2.2E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo[a]pyrene	2.8E-01	0.5	1.2E-07	1.9E-07	7.3E+00	NA	8.8E-07	64%	NA	
Benzo[b]fluoranthene	3.1E-01	0.5	1.3E-07	2.1E-07	7.3E-01	NA	9.7E-08	7%	NA	
Benzo(g,h,i)perylene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-02	NA	4.7E-09	<1%	NA	
Chrysene	3.7E-01	0.5	1.6E-07	2.5E-07	7.3E-03	NA	1.2E-09	<1%	NA	
Dibenz(a,h)anthracene	7.3E-02	0.5	3.1E-08	5.0E-08	7.3E+00	NA	2.3E-07	17%	NA	
Fluoranthene	6.9E-01	0.5	1.6E-07	4.7E-07	NA	4.0E-02	NA		1.2E-05	<1%
Fluorene	6.0E-02	0.5	1.4E-08	4.1E-08	NA	4.0E-02	NA		1.0E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E-01	NA	3.8E-08	3%	NA	
Naphthalene	6.4E-02	0.5	1.5E-08	4.4E-08	NA	2.0E-02	NA		2.2E-06	<1%
Phenanthrene	6.1E-01	0.5	1.4E-07	4.2E-07	NA	NA	NA		NA	
Pyrene	6.0E-01	0.5	1.4E-07	4.1E-07	NA	3.0E-02	NA		1.4E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	2.4E-02	1	1.1E-08	3.3E-08	2.0E+00	2.0E-05	2.3E-08	2%	1.6E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	1.7E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	0.5	1.0E-08	1.2E-07	2.9E-02	7.0E-02	3.0E-10	<1%	1.7E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	4.8E-02	0.5	2.6E-08	3.1E-07	NA	6.0E-02	NA		5.1E-06	<1%
Acenaphthylene	ND									
Anthracene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	3.0E-01	NA		4.3E-06	<1%
Benzo[a]anthracene	3.2E-01	0.5	9.4E-07	2.0E-06	7.3E-01	NA	6.8E-07	7%	NA	
Benzo[a]pyrene	2.8E-01	0.5	8.2E-07	1.8E-06	7.3E+00	NA	6.0E-06	65%	NA	
Benzo[b]fluoranthene	3.1E-01	0.5	9.1E-07	2.0E-06	7.3E-01	NA	6.6E-07	7%	NA	
Benzo(g,h,i)perylene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-02	NA	3.2E-08	<1%	NA	
Chrysene	3.7E-01	0.5	1.1E-06	2.4E-06	7.3E-03	NA	7.9E-09	<1%	NA	
Dibenz(a,h)anthracene	7.3E-02	0.5	2.1E-07	4.7E-07	7.3E+00	NA	1.6E-06	17%	NA	
Fluoranthene	6.9E-01	0.5	3.8E-07	4.4E-06	NA	4.0E-02	NA		1.1E-04	<1%
Fluorene	6.0E-02	0.5	3.3E-08	3.8E-07	NA	4.0E-02	NA		9.6E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E-01	NA	2.6E-07	3%	NA	
Naphthalene	6.4E-02	0.5	3.5E-08	4.1E-07	NA	2.0E-02	NA		2.0E-05	<1%
Phenanthrene	6.1E-01	0.5	3.3E-07	3.9E-06	NA	NA	NA		NA	
Pyrene	6.0E-01	0.5	3.3E-07	3.8E-06	NA	3.0E-02	NA		1.3E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	2.4E-02	1	2.6E-08	3.1E-07	2.0E+00	2.0E-05	5.3E-08	<1%	1.5E-02	98%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	9.2E-06	**Hazard Index:**	1.6E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a] 0-2 yrs	Mutagens[a] 2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer
PAHs		
1-Methylnaphthalene	4.3E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.8E-07	7%
Benzo[a]pyrene	6.9E-06	65%
Benzo[b]fluoranthene	7.6E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.7E-08	<1%
Chrysene	9.1E-09	<1%
Dibenz(a,h)anthracene	1.8E-06	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.9E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	7.5E-08	<1%
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.1E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.62 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: 206 S. Marquette

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	1.3E-01	4.6E-09	1.4E-08	2.9E-02	7.0E-02	1.3E-10	<1%	1.9E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	4.8E-02	1.3E-01	1.2E-08	3.4E-08	NA	6.0E-02	NA		5.7E-07	<1%
Acenaphthylene	ND									
Anthracene	2.0E-01	1.3E-01	4.9E-08	1.4E-07	NA	3.0E-01	NA		4.7E-07	<1%
Benzo[a]anthracene	3.2E-01	1.3E-01	1.4E-07	2.3E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo[a]pyrene	2.8E-01	1.3E-01	1.3E-07	2.0E-07	7.3E+00	NA	9.1E-07	65%	NA	
Benzo[b]fluoranthene	3.1E-01	1.3E-01	1.4E-07	2.2E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo(g,h,i)perylene	1.3E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-02	NA	4.9E-09	<1%	NA	
Chrysene	3.7E-01	1.3E-01	1.7E-07	2.6E-07	7.3E-03	NA	1.2E-09	<1%	NA	
Dibenz(a,h)anthracene	7.3E-02	1.3E-01	3.3E-08	5.2E-08	7.3E+00	NA	2.4E-07	17%	NA	
Fluoranthene	6.9E-01	1.3E-01	1.7E-07	4.9E-07	NA	4.0E-02	NA		1.2E-05	1%
Fluorene	6.0E-02	1.3E-01	1.5E-08	4.3E-08	NA	4.0E-02	NA		1.1E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E-01	NA	3.9E-08	3%	NA	
Naphthalene	6.4E-02	1.3E-01	1.6E-08	4.5E-08	NA	2.0E-02	NA		2.3E-06	<1%
Phenanthrene	6.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	6.0E-01	1.3E-01	1.5E-07	4.3E-07	NA	3.0E-02	NA		1.4E-05	1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	2.4E-02	1.4E-01	6.3E-09	1.8E-08	2.0E+00	2.0E-05	1.3E-08	<1%	9.2E-04	97%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	9.5E-04	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	1.3E-01	7.6E-09	8.8E-08	2.9E-02	7.0E-02	2.2E-10	<1%	1.3E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	4.8E-02	1.3E-01	1.9E-08	2.2E-07	NA	6.0E-02	NA		3.7E-06	<1%
Acenaphthylene	ND									
Anthracene	2.0E-01	1.3E-01	8.0E-08	9.3E-07	NA	3.0E-01	NA		3.1E-06	<1%
Benzo[a]anthracene	3.2E-01	1.3E-01	6.8E-07	1.5E-06	7.3E-01	NA	5.0E-07	7%	NA	
Benzo[a]pyrene	2.8E-01	1.3E-01	6.0E-07	1.3E-06	7.3E+00	NA	4.3E-06	65%	NA	
Benzo[b]fluoranthene	3.1E-01	1.3E-01	6.6E-07	1.4E-06	7.3E-01	NA	4.8E-07	7%	NA	
Benzo(g,h,i)perylene	1.3E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-02	NA	2.3E-08	<1%	NA	
Chrysene	3.7E-01	1.3E-01	7.9E-07	1.7E-06	7.3E-03	NA	5.7E-09	<1%	NA	
Dibenz(a,h)anthracene	7.3E-02	1.3E-01	1.6E-07	3.4E-07	7.3E+00	NA	1.1E-06	17%	NA	
Fluoranthene	6.9E-01	1.3E-01	2.8E-07	3.2E-06	NA	4.0E-02	NA		8.0E-05	1%
Fluorene	6.0E-02	1.3E-01	2.4E-08	2.8E-07	NA	4.0E-02	NA		7.0E-06	<1%
Indeno[1,2,3-cd]pyrene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E-01	NA	1.9E-07	3%	NA	
Naphthalene	6.4E-02	1.3E-01	2.6E-08	3.0E-07	NA	2.0E-02	NA		1.5E-05	<1%
Phenanthrene	6.1E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	6.0E-01	1.3E-01	2.4E-07	2.8E-06	NA	3.0E-02	NA		9.3E-05	1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	2.4E-02	1.4E-01	1.0E-08	1.2E-07	2.0E+00	2.0E-05	2.1E-08	<1%	6.0E-03	97%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	6.7E-06	**Hazard Index:**	6.2E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	3.5E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	6.0E-07	7%
Benzo[a]pyrene	5.3E-06	65%
Benzo[b]fluoranthene	5.8E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.8E-08	<1%
Chrysene	7.0E-09	<1%
Dibenz(a,h)anthracene	1.4E-06	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.3E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	3.3E-08	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	8.1E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.63 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **206 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.3E+00	1.1E+00	3.1E-03	2.6E-07	4.0E-02	2.8E-07	15%	7.8E-02	20%
Trichloroethene	6.6E-01	4.0E-01	6.3E-04	4.1E-06	2.0E-03	1.6E-06	85%	3.2E-01	80%
Vinyl Chloride	ND								
					Total Cancer Risk:	1.9E-06	**Hazard Index:**	4.0E-01	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.3E+00	2.7E-01	3.1E-03	2.6E-07	4.0E-02	7.0E-08	6%	7.8E-02	20%
Trichloroethene	6.6E-01	2.9E-01	6.3E-04	4.1E-06	2.0E-03	1.2E-06	94%	3.2E-01	80%
Vinyl Chloride	ND								
					Total Cancer Risk:	1.3E-06	**Hazard Index:**	4.0E-01	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	3.5E-07	11%
Trichloroethene	2.8E-06	89%
Vinyl Chloride		
Total Cancer Risk:	3.2E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.64 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **210 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.2E-02	0.5	5.2E-09	1.5E-08	2.9E-02	7.0E-02	1.5E-10	<1%	2.2E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	2.8E-02	0.5	6.6E-09	1.9E-08	NA	6.0E-02	NA		3.2E-07	1%
Acenaphthylene	1.0E-02	0.5	2.3E-09	6.8E-09	NA	NA	NA		NA	
Anthracene	7.3E-02	0.5	1.7E-08	5.0E-08	NA	3.0E-01	NA		1.7E-07	<1%
Benzo[a]anthracene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E-01	NA	7.2E-08	8%	NA	
Benzo[a]pyrene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E+00	NA	5.0E-07	59%	NA	
Benzo[b]fluoranthene	2.7E-01	0.5	1.2E-07	1.8E-07	7.3E-01	NA	8.5E-08	10%	NA	
Benzo(g,h,i)perylene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.6E-01	0.5	1.1E-07	1.8E-07	7.3E-02	NA	8.2E-09	<1%	NA	
Chrysene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E-03	NA	7.2E-10	<1%	NA	
Dibenz(a,h)anthracene	5.0E-02	0.5	2.2E-08	3.4E-08	7.3E+00	NA	1.6E-07	18%	NA	
Fluoranthene	4.9E-01	0.5	1.2E-07	3.4E-07	NA	4.0E-02	NA		8.4E-06	28%
Fluorene	4.5E-02	0.5	1.1E-08	3.1E-08	NA	4.0E-02	NA		7.7E-07	3%
Indeno[1,2,3-cd]pyrene	9.0E-02	0.5	3.9E-08	6.2E-08	7.3E-01	NA	2.8E-08	3%	NA	
Naphthalene	2.7E-02	0.5	6.3E-09	1.8E-08	NA	2.0E-02	NA		9.2E-07	3%
Phenanthrene	5.2E-01	0.5	1.2E-07	3.6E-07	NA	NA	NA		NA	
Pyrene	4.6E-01	0.5	1.1E-07	3.2E-07	NA	3.0E-02	NA		1.1E-05	35%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.8E-02	1	1.8E-08	5.2E-08	2.1E-03	6.0E-03	3.7E-11	<1%	8.7E-06	29%
Trichloroethene	ND									
						Total Cancer Risk:	8.5E-07	**Hazard Index:**	3.0E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.2E-02	0.5	1.2E-08	1.4E-07	2.9E-02	7.0E-02	3.5E-10	<1%	2.0E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	2.8E-02	0.5	1.5E-08	1.8E-07	NA	6.0E-02	NA		3.0E-06	1%
Acenaphthylene	1.0E-02	0.5	5.5E-09	6.4E-08	NA	NA	NA		NA	
Anthracene	7.3E-02	0.5	4.0E-08	4.7E-07	NA	3.0E-01	NA		1.6E-06	<1%
Benzo[a]anthracene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E-01	NA	4.9E-07	8%	NA	
Benzo[a]pyrene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E+00	NA	3.4E-06	59%	NA	
Benzo[b]fluoranthene	2.7E-01	0.5	7.9E-07	1.7E-06	7.3E-01	NA	5.8E-07	10%	NA	
Benzo(g,h,i)perylene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.6E-01	0.5	7.6E-07	1.7E-06	7.3E-02	NA	5.5E-08	<1%	NA	
Chrysene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E-03	NA	4.9E-09	<1%	NA	
Dibenz(a,h)anthracene	5.0E-02	0.5	1.5E-07	3.2E-07	7.3E+00	NA	1.1E-06	18%	NA	
Fluoranthene	4.9E-01	0.5	2.7E-07	3.1E-06	NA	4.0E-02	NA		7.8E-05	28%
Fluorene	4.5E-02	0.5	2.5E-08	2.9E-07	NA	4.0E-02	NA		7.2E-06	3%
Indeno[1,2,3-cd]pyrene	9.0E-02	0.5	2.6E-07	5.8E-07	7.3E-01	NA	1.9E-07	3%	NA	
Naphthalene	2.7E-02	0.5	1.5E-08	1.7E-07	NA	2.0E-02	NA		8.6E-06	3%
Phenanthrene	5.2E-01	0.5	2.8E-07	3.3E-06	NA	NA	NA		NA	
Pyrene	4.6E-01	0.5	2.5E-07	2.9E-06	NA	3.0E-02	NA		9.8E-05	35%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	3.8E-02	1	4.2E-08	4.9E-07	2.1E-03	6.0E-03	8.7E-11	<1%	8.1E-05	29%
Trichloroethene	ND									
						Total Cancer Risk:	5.8E-06	**Hazard Index:**	2.8E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	5.0E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.6E-07	8%
Benzo[a]pyrene	3.9E-06	59%
Benzo[b]fluoranthene	6.6E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	6.4E-08	<1%
Chrysene	5.6E-09	<1%
Dibenz(a,h)anthracene	1.2E-06	18%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.2E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.2E-10	<1%
Trichloroethene		
Total Cancer Risk:	6.7E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.65 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **210 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.2E-02	1.3E-01	5.4E-09	1.6E-08	2.9E-02	7.0E-02	1.6E-10	<1%	2.2E-07	1%
2-Methylnaphthalene	ND									
Acenaphthene	2.8E-02	1.3E-01	6.8E-09	2.0E-08	NA	6.0E-02	NA		3.3E-07	2%
Acenaphthylene	1.0E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	7.3E-02	1.3E-01	1.8E-08	5.2E-08	NA	3.0E-01	NA		1.7E-07	<1%
Benzo[a]anthracene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E-01	NA	7.5E-08	8%	NA	
Benzo[a]pyrene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E+00	NA	5.2E-07	59%	NA	
Benzo[b]fluoranthene	2.7E-01	1.3E-01	1.2E-07	1.9E-07	7.3E-01	NA	8.8E-08	10%	NA	
Benzo(g,h,i)perylene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.6E-01	1.3E-01	1.2E-07	1.8E-07	7.3E-02	NA	8.5E-09	<1%	NA	
Chrysene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E-03	NA	7.5E-10	<1%	NA	
Dibenz(a,h)anthracene	5.0E-02	1.3E-01	2.2E-08	3.6E-08	7.3E+00	NA	1.6E-07	18%	NA	
Fluoranthene	4.9E-01	1.3E-01	1.2E-07	3.5E-07	NA	4.0E-02	NA		8.7E-06	39%
Fluorene	4.5E-02	1.3E-01	1.1E-08	3.2E-08	NA	4.0E-02	NA		8.0E-07	4%
Indeno[1,2,3-cd]pyrene	9.0E-02	1.3E-01	4.0E-08	6.4E-08	7.3E-01	NA	2.9E-08	3%	NA	
Naphthalene	2.7E-02	1.3E-01	6.6E-09	1.9E-08	NA	2.0E-02	NA		9.6E-07	4%
Phenanthrene	5.2E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.6E-01	1.3E-01	1.1E-07	3.3E-07	NA	3.0E-02	NA		1.1E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.8E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	8.9E-07	**Hazard Index:**	2.2E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.2E-02	1.3E-01	8.8E-09	1.0E-07	2.9E-02	7.0E-02	2.5E-10	<1%	1.5E-06	1%
2-Methylnaphthalene	ND									
Acenaphthene	2.8E-02	1.3E-01	1.1E-08	1.3E-07	NA	6.0E-02	NA		2.2E-06	2%
Acenaphthylene	1.0E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	7.3E-02	1.3E-01	2.9E-08	3.4E-07	NA	3.0E-01	NA		1.1E-06	<1%
Benzo[a]anthracene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E-01	NA	3.6E-07	8%	NA	
Benzo[a]pyrene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E+00	NA	2.5E-06	59%	NA	
Benzo[b]fluoranthene	2.7E-01	1.3E-01	5.7E-07	1.3E-06	7.3E-01	NA	4.2E-07	10%	NA	
Benzo(g,h,i)perylene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.6E-01	1.3E-01	5.5E-07	1.2E-06	7.3E-02	NA	4.0E-08	<1%	NA	
Chrysene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E-03	NA	3.6E-09	<1%	NA	
Dibenz(a,h)anthracene	5.0E-02	1.3E-01	1.1E-07	2.3E-07	7.3E+00	NA	7.8E-07	18%	NA	
Fluoranthene	4.9E-01	1.3E-01	2.0E-07	2.3E-06	NA	4.0E-02	NA		5.7E-05	39%
Fluorene	4.5E-02	1.3E-01	1.8E-08	2.1E-07	NA	4.0E-02	NA		5.2E-06	4%
Indeno[1,2,3-cd]pyrene	9.0E-02	1.3E-01	1.9E-07	4.2E-07	7.3E-01	NA	1.4E-07	3%	NA	
Naphthalene	2.7E-02	1.3E-01	1.1E-08	1.3E-07	NA	2.0E-02	NA		6.3E-06	4%
Phenanthrene	5.2E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.6E-01	1.3E-01	1.8E-07	2.1E-06	NA	3.0E-02	NA		7.1E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	3.8E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	4.2E-06	**Hazard Index:**	1.4E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	4.1E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	4.3E-07	8%
Benzo[a]pyrene	3.0E-06	59%
Benzo[b]fluoranthene	5.1E-07	10%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	4.9E-08	<1%
Chrysene	4.3E-09	<1%
Dibenz(a,h)anthracene	9.4E-07	18%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.7E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	5.1E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.66 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **210 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.67 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **214 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.0E-02	0.5	4.7E-09	1.4E-08	2.9E-02	7.0E-02	1.4E-10	<1%	2.0E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	3.0E-02	0.5	7.0E-09	2.1E-08	NA	6.0E-02	NA		3.4E-07	1%
Acenaphthylene	9.1E-03	0.5	2.1E-09	6.2E-09	NA	NA	NA		NA	
Anthracene	8.2E-02	0.5	1.9E-08	5.6E-08	NA	3.0E-01	NA		1.9E-07	<1%
Benzo[a]anthracene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E-01	NA	9.1E-08	9%	NA	
Benzo[a]pyrene	2.0E-01	0.5	8.6E-08	1.4E-07	7.3E+00	NA	6.3E-07	60%	NA	
Benzo[b]fluoranthene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E-01	NA	7.2E-08	7%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	3.5E-08	1.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-02	NA	4.7E-09	<1%	NA	
Chrysene	2.8E-01	0.5	1.2E-07	1.9E-07	7.3E-03	NA	8.8E-10	<1%	NA	
Dibenz(a,h)anthracene	6.7E-02	0.5	2.9E-08	4.6E-08	7.3E+00	NA	2.1E-07	20%	NA	
Fluoranthene	5.8E-01	0.5	1.4E-07	4.0E-07	NA	4.0E-02	NA		9.9E-06	42%
Fluorene	4.4E-02	0.5	1.0E-08	3.0E-08	NA	4.0E-02	NA		7.5E-07	3%
Indeno[1,2,3-cd]pyrene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E-01	NA	3.5E-08	3%	NA	
Naphthalene	1.6E-02	0.5	3.8E-09	1.1E-08	NA	2.0E-02	NA		5.5E-07	2%
Phenanthrene	4.5E-01	0.5	1.1E-07	3.1E-07	NA	NA	NA		NA	
Pyrene	5.0E-01	0.5	1.2E-07	3.4E-07	NA	3.0E-02	NA		1.1E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.0E-06	**Hazard Index:**	2.3E-05	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
	IR	Ingestion Rate (mg/day)	100	100	100	100
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.0E-02	0.5	1.1E-08	1.3E-07	2.9E-02	7.0E-02	3.2E-10	<1%	1.8E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	3.0E-02	0.5	1.6E-08	1.9E-07	NA	6.0E-02	NA		3.2E-06	1%
Acenaphthylene	9.1E-03	0.5	5.0E-09	5.8E-08	NA	NA	NA		NA	
Anthracene	8.2E-02	0.5	4.5E-08	5.2E-07	NA	3.0E-01	NA		1.7E-06	<1%
Benzo[a]anthracene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E-01	NA	6.2E-07	9%	NA	
Benzo[a]pyrene	2.0E-01	0.5	5.8E-07	1.3E-06	7.3E+00	NA	4.3E-06	60%	NA	
Benzo[b]fluoranthene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E-01	NA	4.9E-07	7%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	8.2E-08	9.6E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-02	NA	3.2E-08	<1%	NA	
Chrysene	2.8E-01	0.5	8.2E-07	1.8E-06	7.3E-03	NA	6.0E-09	<1%	NA	
Dibenz(a,h)anthracene	6.7E-02	0.5	2.0E-07	4.3E-07	7.3E+00	NA	1.4E-06	20%	NA	
Fluoranthene	5.8E-01	0.5	3.2E-07	3.7E-06	NA	4.0E-02	NA		9.3E-05	42%
Fluorene	4.4E-02	0.5	2.4E-08	2.8E-07	NA	4.0E-02	NA		7.0E-06	3%
Indeno[1,2,3-cd]pyrene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	3%	NA	
Naphthalene	1.6E-02	0.5	8.8E-09	1.0E-07	NA	2.0E-02	NA		5.1E-06	2%
Phenanthrene	4.5E-01	0.5	2.5E-07	2.9E-06	NA	NA	NA		NA	
Pyrene	5.0E-01	0.5	2.7E-07	3.2E-06	NA	3.0E-02	NA		1.1E-04	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	7.1E-06	**Hazard Index:**	2.2E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	4.5E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.1E-07	9%
Benzo[a]pyrene	4.9E-06	60%
Benzo[b]fluoranthene	5.6E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.7E-08	<1%
Chrysene	6.9E-09	<1%
Dibenz(a,h)anthracene	1.6E-06	20%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.7E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	8.1E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.68 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **214 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.0E-02	1.3E-01	4.9E-09	1.4E-08	2.9E-02	7.0E-02	1.4E-10	<1%	2.0E-07	<1%
2-Methylnaphthalene	ND									
Acenaphthene	3.0E-02	1.3E-01	7.3E-09	2.1E-08	NA	6.0E-02	NA		3.6E-07	1%
Acenaphthylene	9.1E-03	NA	NA	NA	NA	NA	NA		NA	
Anthracene	8.2E-02	1.3E-01	2.0E-08	5.8E-08	NA	3.0E-01	NA		1.9E-07	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E-01	NA	9.5E-08	9%	NA	
Benzo[a]pyrene	2.0E-01	1.3E-01	8.9E-08	1.4E-07	7.3E+00	NA	6.5E-07	60%	NA	
Benzo[b]fluoranthene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E-01	NA	7.5E-08	7%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-02	NA	4.9E-09	<1%	NA	
Chrysene	2.8E-01	1.3E-01	1.3E-07	2.0E-07	7.3E-03	NA	9.1E-10	<1%	NA	
Dibenz(a,h)anthracene	6.7E-02	1.3E-01	3.0E-08	4.8E-08	7.3E+00	NA	2.2E-07	20%	NA	
Fluoranthene	5.8E-01	1.3E-01	1.4E-07	4.1E-07	NA	4.0E-02	NA		1.0E-05	42%
Fluorene	4.4E-02	1.3E-01	1.1E-08	3.1E-08	NA	4.0E-02	NA		7.8E-07	3%
Indeno[1,2,3-cd]pyrene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E-01	NA	3.6E-08	3%	NA	
Naphthalene	1.6E-02	1.3E-01	3.9E-09	1.1E-08	NA	2.0E-02	NA		5.7E-07	2%
Phenanthrene	4.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.0E-01	1.3E-01	1.2E-07	3.6E-07	NA	3.0E-02	NA		1.2E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.1E-06	**Hazard Index:**	2.4E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	2.0E-02	1.3E-01	8.0E-09	9.3E-08	2.9E-02	7.0E-02	2.3E-10	<1%	1.3E-06	<1%
2-Methylnaphthalene	ND									
Acenaphthene	3.0E-02	1.3E-01	1.2E-08	1.4E-07	NA	6.0E-02	NA		2.3E-06	1%
Acenaphthylene	9.1E-03	NA	NA	NA	NA	NA	NA		NA	
Anthracene	8.2E-02	1.3E-01	3.3E-08	3.8E-07	NA	3.0E-01	NA		1.3E-06	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E-01	NA	4.5E-07	9%	NA	
Benzo[a]pyrene	2.0E-01	1.3E-01	4.3E-07	9.3E-07	7.3E+00	NA	3.1E-06	60%	NA	
Benzo[b]fluoranthene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E-01	NA	3.6E-07	7%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-02	NA	2.3E-08	<1%	NA	
Chrysene	2.8E-01	1.3E-01	6.0E-07	1.3E-06	7.3E-03	NA	4.3E-09	<1%	NA	
Dibenz(a,h)anthracene	6.7E-02	1.3E-01	1.4E-07	3.1E-07	7.3E+00	NA	1.0E-06	20%	NA	
Fluoranthene	5.8E-01	1.3E-01	2.3E-07	2.7E-06	NA	4.0E-02	NA		6.7E-05	42%
Fluorene	4.4E-02	1.3E-01	1.8E-08	2.0E-07	NA	4.0E-02	NA		5.1E-06	3%
Indeno[1,2,3-cd]pyrene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	3%	NA	
Naphthalene	1.6E-02	1.3E-01	6.4E-09	7.4E-08	NA	2.0E-02	NA		3.7E-06	2%
Phenanthrene	4.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.0E-01	1.3E-01	2.0E-07	2.3E-06	NA	3.0E-02	NA		7.8E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	5.2E-06	**Hazard Index:**	1.6E-04	

Notes:

Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =		Non-Mutagens		Mutagens[1] 0-2 yrs	Mutagens[1] 2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	3.7E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.4E-07	9%
Benzo[a]pyrene	3.8E-06	60%
Benzo[b]fluoranthene	4.3E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.8E-08	<1%
Chrysene	5.3E-09	<1%
Dibenz(a,h)anthracene	1.3E-06	20%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.1E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	6.2E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.69 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **214 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET} \times \text{EF} \times \text{ED} \times \text{CF} \times (1\text{day}/24\text{h}) \times \text{TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

"-" = Not sampled.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.70 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **222 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	0.5	4.5E-09	1.3E-08	2.9E-02	7.0E-02	1.3E-10	<1%	1.9E-07	2%
2-Methylnaphthalene	ND									
Acenaphthene	2.2E-02	0.5	5.2E-09	1.5E-08	NA	6.0E-02	NA		2.5E-07	2%
Acenaphthylene	ND									
Anthracene	2.6E-02	0.5	6.1E-09	1.8E-08	NA	3.0E-01	NA		5.9E-08	<1%
Benzo[a]anthracene	8.2E-03	0.5	3.5E-09	5.6E-09	7.3E-01	NA	2.6E-09	<1%	NA	
Benzo[a]pyrene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E+00	NA	4.1E-07	69%	NA	
Benzo[b]fluoranthene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-01	NA	5.0E-08	9%	NA	
Benzo(g,h,i)perylene	1.0E-01	0.5	2.3E-08	6.8E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.4E-02	0.5	3.6E-08	5.8E-08	7.3E-02	NA	2.6E-09	<1%	NA	
Chrysene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-03	NA	4.7E-10	<1%	NA	
Dibenz(a,h)anthracene	3.2E-02	0.5	1.4E-08	2.2E-08	7.3E+00	NA	1.0E-07	17%	NA	
Fluoranthene	2.7E-01	0.5	6.3E-08	1.8E-07	NA	4.0E-02	NA		4.6E-06	41%
Fluorene	2.7E-02	0.5	6.3E-09	1.8E-08	NA	4.0E-02	NA		4.6E-07	4%
Indeno[1,2,3-cd]pyrene	7.8E-02	0.5	3.4E-08	5.3E-08	7.3E-01	NA	2.5E-08	4%	NA	
Naphthalene	2.6E-02	0.5	6.1E-09	1.8E-08	NA	2.0E-02	NA		8.9E-07	8%
Phenanthrene	2.2E-01	0.5	5.2E-08	1.5E-07	NA	NA	NA		NA	
Pyrene	2.1E-01	0.5	4.9E-08	1.4E-07	NA	3.0E-02	NA		4.8E-06	43%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	5.9E-07	**Hazard Index:**	1.1E-05	

Notes:

Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	0.5	1.0E-08	1.2E-07	2.9E-02	7.0E-02	3.0E-10	<1%	1.7E-06	2%
2-Methylnaphthalene	ND									
Acenaphthene	2.2E-02	0.5	1.2E-08	1.4E-07	NA	6.0E-02	NA		2.3E-06	2%
Acenaphthylene	ND									
Anthracene	2.6E-02	0.5	1.4E-08	1.7E-07	NA	3.0E-01	NA		5.5E-07	<1%
Benzo[a]anthracene	8.2E-03	0.5	2.4E-08	5.2E-08	7.3E-01	NA	1.7E-08	<1%	NA	
Benzo[a]pyrene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E+00	NA	2.8E-06	69%	NA	
Benzo[b]fluoranthene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-01	NA	3.4E-07	9%	NA	
Benzo(g,h,i)perylene	1.0E-01	0.5	5.5E-08	6.4E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.4E-02	0.5	2.5E-07	5.4E-07	7.3E-02	NA	1.8E-08	<1%	NA	
Chrysene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-03	NA	3.2E-09	<1%	NA	
Dibenz(a,h)anthracene	3.2E-02	0.5	9.4E-08	2.0E-07	7.3E+00	NA	6.8E-07	17%	NA	
Fluoranthene	2.7E-01	0.5	1.5E-07	1.7E-06	NA	4.0E-02	NA		4.3E-05	41%
Fluorene	2.7E-02	0.5	1.5E-08	1.7E-07	NA	4.0E-02	NA		4.3E-06	4%
Indeno[1,2,3-cd]pyrene	7.8E-02	0.5	2.3E-07	5.0E-07	7.3E-01	NA	1.7E-07	4%	NA	
Naphthalene	2.6E-02	0.5	1.4E-08	1.7E-07	NA	2.0E-02	NA		8.3E-06	8%
Phenanthrene	2.2E-01	0.5	1.2E-07	1.4E-06	NA	NA	NA		NA	
Pyrene	2.1E-01	0.5	1.2E-07	1.3E-06	NA	3.0E-02	NA		4.5E-05	43%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	4.0E-06	**Hazard Index:**	1.1E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	4.3E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.0E-08	<1%
Benzo[a]pyrene	3.2E-06	69%
Benzo[b]fluoranthene	3.9E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.1E-08	<1%
Chrysene	3.7E-09	<1%
Dibenz(a,h)anthracene	7.8E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.9E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	4.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.71 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **222 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	1.3E-01	4.6E-09	1.4E-08	2.9E-02	7.0E-02	1.3E-10	<1%	1.9E-07	2%
2-Methylnaphthalene	ND									
Acenaphthene	2.2E-02	1.3E-01	5.4E-09	1.6E-08	NA	6.0E-02	NA		2.6E-07	2%
Acenaphthylene	ND									
Anthracene	2.6E-02	1.3E-01	6.3E-09	1.8E-08	NA	3.0E-01	NA		6.2E-08	<1%
Benzo[a]anthracene	8.2E-03	1.3E-01	3.7E-09	5.8E-09	7.3E-01	NA	2.7E-09	<1%	NA	
Benzo[a]pyrene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E+00	NA	4.2E-07	69%	NA	
Benzo[b]fluoranthene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-01	NA	5.2E-08	9%	NA	
Benzo(g,h,i)perylene	1.0E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.4E-02	1.3E-01	3.8E-08	6.0E-08	7.3E-02	NA	2.7E-09	<1%	NA	
Chrysene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-03	NA	4.9E-10	<1%	NA	
Dibenz(a,h)anthracene	3.2E-02	1.3E-01	1.4E-08	2.3E-08	7.3E+00	NA	1.0E-07	17%	NA	
Fluoranthene	2.7E-01	1.3E-01	6.6E-08	1.9E-07	NA	4.0E-02	NA		4.8E-06	41%
Fluorene	2.7E-02	1.3E-01	6.6E-09	1.9E-08	NA	4.0E-02	NA		4.8E-07	4%
Indeno[1,2,3-cd]pyrene	7.8E-02	1.3E-01	3.5E-08	5.5E-08	7.3E-01	NA	2.5E-08	4%	NA	
Naphthalene	2.6E-02	1.3E-01	6.3E-09	1.8E-08	NA	2.0E-02	NA		9.2E-07	8%
Phenanthrene	2.2E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.1E-01	1.3E-01	5.1E-08	1.5E-07	NA	3.0E-02	NA		5.0E-06	43%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	6.1E-07	**Hazard Index:**	1.2E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.9E-02	1.3E-01	7.6E-09	8.8E-08	2.9E-02	7.0E-02	2.2E-10	<1%	1.3E-06	2%
2-Methylnaphthalene	ND									
Acenaphthene	2.2E-02	1.3E-01	8.8E-09	1.0E-07	NA	6.0E-02	NA		1.7E-06	2%
Acenaphthylene	ND									
Anthracene	2.6E-02	1.3E-01	1.0E-08	1.2E-07	NA	3.0E-01	NA		4.0E-07	<1%
Benzo[a]anthracene	8.2E-03	1.3E-01	1.7E-08	3.8E-08	7.3E-01	NA	1.3E-08	<1%	NA	
Benzo[a]pyrene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E+00	NA	2.0E-06	69%	NA	
Benzo[b]fluoranthene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-01	NA	2.5E-07	9%	NA	
Benzo(g,h,i)perylene	1.0E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.4E-02	1.3E-01	1.8E-07	3.9E-07	7.3E-02	NA	1.3E-08	<1%	NA	
Chrysene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-03	NA	2.3E-09	<1%	NA	
Dibenz(a,h)anthracene	3.2E-02	1.3E-01	6.8E-08	1.5E-07	7.3E+00	NA	5.0E-07	17%	NA	
Fluoranthene	2.7E-01	1.3E-01	1.1E-07	1.3E-06	NA	4.0E-02	NA		3.1E-05	41%
Fluorene	2.7E-02	1.3E-01	1.1E-08	1.3E-07	NA	4.0E-02	NA		3.1E-06	4%
Indeno[1,2,3-cd]pyrene	7.8E-02	1.3E-01	1.7E-07	3.6E-07	7.3E-01	NA	1.2E-07	4%	NA	
Naphthalene	2.6E-02	1.3E-01	1.0E-08	1.2E-07	NA	2.0E-02	NA		6.1E-06	8%
Phenanthrene	2.2E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.1E-01	1.3E-01	8.4E-08	9.8E-07	NA	3.0E-02	NA		3.3E-05	43%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	2.9E-06	**Hazard Index:**	7.7E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	3.5E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.5E-08	<1%
Benzo[a]pyrene	2.4E-06	69%
Benzo[b]fluoranthene	3.0E-07	9%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.6E-08	<1%
Chrysene	2.8E-09	<1%
Dibenz(a,h)anthracene	6.0E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.5E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	3.5E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.72 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **222 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.73 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **226 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.8E-02	0.5	4.2E-09	1.2E-08	2.9E-02	7.0E-02	1.2E-10	<1%	1.8E-07	2%
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	2.8E-09	8.2E-09	NA	6.0E-02	NA		1.4E-07	1%
Acenaphthylene	1.8E-02	0.5	4.2E-09	1.2E-08	NA	NA	NA		NA	
Anthracene	2.8E-02	0.5	6.6E-09	1.9E-08	NA	3.0E-01	NA		6.4E-08	<1%
Benzo[a]anthracene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-01	NA	4.1E-08	5%	NA	
Benzo[a]pyrene	1.9E-01	0.5	8.2E-08	1.3E-07	7.3E+00	NA	6.0E-07	67%	NA	
Benzo[b]fluoranthene	1.8E-01	0.5	7.7E-08	1.2E-07	7.3E-01	NA	5.7E-08	6%	NA	
Benzo(g,h,i)perylene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E-02	NA	4.4E-09	<1%	NA	
Chrysene	2.0E-01	0.5	8.6E-08	1.4E-07	7.3E-03	NA	6.3E-10	<1%	NA	
Dibenz(a,h)anthracene	4.4E-02	0.5	1.9E-08	3.0E-08	7.3E+00	NA	1.4E-07	16%	NA	
Fluoranthene	2.9E-01	0.5	6.8E-08	2.0E-07	NA	4.0E-02	NA		5.0E-06	42%
Fluorene	1.4E-02	0.5	3.3E-09	9.6E-09	NA	4.0E-02	NA		2.4E-07	2%
Indeno[1,2,3-cd]pyrene	8.7E-02	0.5	3.7E-08	6.0E-08	7.3E-01	NA	2.7E-08	3%	NA	
Naphthalene	1.2E-02	0.5	2.8E-09	8.2E-09	NA	2.0E-02	NA		4.1E-07	4%
Phenanthrene	1.7E-01	0.5	4.0E-08	1.2E-07	NA	NA	NA		NA	
Pyrene	2.5E-01	0.5	5.9E-08	1.7E-07	NA	3.0E-02	NA		5.7E-06	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	2.1E-02	1	9.9E-09	2.9E-08	2.0E+00	NA	2.0E-08	2%	NA	
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	8.9E-07	**Hazard Index:**	1.2E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.8E-02	0.5	9.9E-09	1.2E-07	2.9E-02	7.0E-02	2.9E-10	<1%	1.6E-06	2%
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	0.5	6.6E-09	7.7E-08	NA	6.0E-02	NA		1.3E-06	1%
Acenaphthylene	1.8E-02	0.5	9.9E-09	1.2E-07	NA	NA	NA		NA	
Anthracene	2.8E-02	0.5	1.5E-08	1.8E-07	NA	3.0E-01	NA		6.0E-07	<1%
Benzo[a]anthracene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-01	NA	2.8E-07	5%	NA	
Benzo[a]pyrene	1.9E-01	0.5	5.6E-07	1.2E-06	7.3E+00	NA	4.1E-06	68%	NA	
Benzo[b]fluoranthene	1.8E-01	0.5	5.3E-07	1.2E-06	7.3E-01	NA	3.8E-07	6%	NA	
Benzo(g,h,i)perylene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E-02	NA	3.0E-08	<1%	NA	
Chrysene	2.0E-01	0.5	5.8E-07	1.3E-06	7.3E-03	NA	4.3E-09	<1%	NA	
Dibenz(a,h)anthracene	4.4E-02	0.5	1.3E-07	2.8E-07	7.3E+00	NA	9.4E-07	16%	NA	
Fluoranthene	2.9E-01	0.5	1.6E-07	1.9E-06	NA	4.0E-02	NA		4.6E-05	42%
Fluorene	1.4E-02	0.5	7.7E-09	8.9E-08	NA	4.0E-02	NA		2.2E-06	2%
Indeno[1,2,3-cd]pyrene	8.7E-02	0.5	2.5E-07	5.6E-07	7.3E-01	NA	1.9E-07	3%	NA	
Naphthalene	1.2E-02	0.5	6.6E-09	7.7E-08	NA	2.0E-02	NA		3.8E-06	4%
Phenanthrene	1.7E-01	0.5	9.3E-08	1.1E-06	NA	NA	NA		NA	
Pyrene	2.5E-01	0.5	1.4E-07	1.6E-06	NA	3.0E-02	NA		5.3E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	2.1E-02	1	2.3E-08	2.7E-07	2.0E+00	NA	4.6E-08	<1%	NA	
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	5.9E-06	**Hazard Index:**	1.1E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	4.1E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.2E-07	5%
Benzo[a]pyrene	4.7E-06	68%
Benzo[b]fluoranthene	4.4E-07	6%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.4E-08	<1%
Chrysene	4.9E-09	<1%
Dibenz(a,h)anthracene	1.1E-06	16%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.1E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260	6.6E-08	<1%
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	6.8E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.74 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **226 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.8E-02	1.3E-01	4.4E-09	1.3E-08	2.9E-02	7.0E-02	1.3E-10	<1%	1.8E-07	2%
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	2.9E-09	8.5E-09	NA	6.0E-02	NA		1.4E-07	1%
Acenaphthylene	1.8E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.8E-02	1.3E-01	6.8E-09	2.0E-08	NA	3.0E-01	NA		6.6E-08	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-01	NA	4.2E-08	5%	NA	
Benzo[a]pyrene	1.9E-01	1.3E-01	8.5E-08	1.4E-07	7.3E+00	NA	6.2E-07	68%	NA	
Benzo[b]fluoranthene	1.8E-01	1.3E-01	8.0E-08	1.3E-07	7.3E-01	NA	5.9E-08	6%	NA	
Benzo(g,h,i)perylene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E-02	NA	4.6E-09	<1%	NA	
Chrysene	2.0E-01	1.3E-01	8.9E-08	1.4E-07	7.3E-03	NA	6.5E-10	<1%	NA	
Dibenz(a,h)anthracene	4.4E-02	1.3E-01	2.0E-08	3.1E-08	7.3E+00	NA	1.4E-07	16%	NA	
Fluoranthene	2.9E-01	1.3E-01	7.1E-08	2.1E-07	NA	4.0E-02	NA		5.2E-06	42%
Fluorene	1.4E-02	1.3E-01	3.4E-09	9.9E-09	NA	4.0E-02	NA		2.5E-07	2%
Indeno[1,2,3-cd]pyrene	8.7E-02	1.3E-01	3.9E-08	6.2E-08	7.3E-01	NA	2.8E-08	3%	NA	
Naphthalene	1.2E-02	1.3E-01	2.9E-09	8.5E-09	NA	2.0E-02	NA		4.3E-07	4%
Phenanthrene	1.7E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.5E-01	1.3E-01	6.1E-08	1.8E-07	NA	3.0E-02	NA		5.9E-06	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	2.1E-02	1.4E-01	5.5E-09	1.6E-08	2.0E+00	NA	1.1E-08	1%	NA	
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	9.1E-07	**Hazard Index:**	1.2E-05	

Notes:

Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	1.8E-02	1.3E-01	7.2E-09	8.4E-08	2.9E-02	7.0E-02	2.1E-10	<1%	1.2E-06	2%
2-Methylnaphthalene	ND									
Acenaphthene	1.2E-02	1.3E-01	4.8E-09	5.6E-08	NA	6.0E-02	NA		9.3E-07	1%
Acenaphthylene	1.8E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.8E-02	1.3E-01	1.1E-08	1.3E-07	NA	3.0E-01	NA		4.3E-07	<1%
Benzo[a]anthracene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-01	NA	2.0E-07	5%	NA	
Benzo[a]pyrene	1.9E-01	1.3E-01	4.0E-07	8.8E-07	7.3E+00	NA	3.0E-06	69%	NA	
Benzo[b]fluoranthene	1.8E-01	1.3E-01	3.8E-07	8.4E-07	7.3E-01	NA	2.8E-07	7%	NA	
Benzo(g,h,i)perylene	1.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E-02	NA	2.2E-08	<1%	NA	
Chrysene	2.0E-01	1.3E-01	4.3E-07	9.3E-07	7.3E-03	NA	3.1E-09	<1%	NA	
Dibenz(a,h)anthracene	4.4E-02	1.3E-01	9.4E-08	2.0E-07	7.3E+00	NA	6.8E-07	16%	NA	
Fluoranthene	2.9E-01	1.3E-01	1.2E-07	1.3E-06	NA	4.0E-02	NA		3.4E-05	42%
Fluorene	1.4E-02	1.3E-01	5.6E-09	6.5E-08	NA	4.0E-02	NA		1.6E-06	2%
Indeno[1,2,3-cd]pyrene	8.7E-02	1.3E-01	1.9E-07	4.0E-07	7.3E-01	NA	1.4E-07	3%	NA	
Naphthalene	1.2E-02	1.3E-01	4.8E-09	5.6E-08	NA	2.0E-02	NA		2.8E-06	4%
Phenanthrene	1.7E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.5E-01	1.3E-01	1.0E-07	1.2E-06	NA	3.0E-02	NA		3.9E-05	49%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	2.1E-02	1.4E-01	9.0E-09	1.1E-07	2.0E+00	NA	1.8E-08	<1%	NA	
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	4.3E-06	**Hazard Index:**	8.0E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	3.4E-10	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.4E-07	5%
Benzo[a]pyrene	3.6E-06	69%
Benzo[b]fluoranthene	3.4E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.6E-08	<1%
Chrysene	3.8E-09	<1%
Dibenz(a,h)anthracene	8.3E-07	16%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.6E-07	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260	2.9E-08	<1%
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	5.2E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.75 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **226 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	7.5E-01	4.5E-01	7.2E-04	4.1E-06	2.0E-03	1.9E-06	100%	3.6E-01	100%
Vinyl Chloride	ND								
					Total Cancer Risk:	1.9E-06	**Hazard Index:**	3.6E-01	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	7.5E-01	3.3E-01	7.2E-04	4.1E-06	2.0E-03	1.4E-06	100%	3.6E-01	100%
Vinyl Chloride	ND								
					Total Cancer Risk:	1.4E-06	**Hazard Index:**	3.6E-01	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene	3.2E-06	100%
Vinyl Chloride		
Total Cancer Risk:	3.2E-06	

Notes:

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.76 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **230 S. Marquette**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	-									
2-Methylnaphthalene	-									
Acenaphthene	-									
Acenaphthylene	-									
Anthracene	-									
Benzo[a]anthracene	-									
Benzo[a]pyrene	-									
Benzo[b]fluoranthene	-									
Benzo(g,h,i)perylene	-									
Benzo(k)fluoranthene	-									
Chrysene	-									
Dibenz(a,h)anthracene	-									
Fluoranthene	-									
Fluorene	-									
Indeno[1,2,3-cd]pyrene	-									
Naphthalene	-									
Phenanthrene	-									
Pyrene	-									
PCBs										
Aroclor-1242	-									
Aroclor-1248	-									
Aroclor-1254	-									
Aroclor-1260	-									
VOCs										
Tetrachloroethene	-									
Trichloroethene	-									
						Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	-									
2-Methylnaphthalene	-									
Acenaphthene	-									
Acenaphthylene	-									
Anthracene	-									
Benzo[a]anthracene	-									
Benzo[a]pyrene	-									
Benzo[b]fluoranthene	-									
Benzo(g,h,i)perylene	-									
Benzo(k)fluoranthene	-									
Chrysene	-									
Dibenz(a,h)anthracene	-									
Fluoranthene	-									
Fluorene	-									
Indeno[1,2,3-cd]pyrene	-									
Naphthalene	-									
Phenanthrene	-									
Pyrene	-									
PCBs										
Aroclor-1242	-									
Aroclor-1248	-									
Aroclor-1254	-									
Aroclor-1260	-									
VOC										
Tetrachloroethene	-									
Trichloroethene	-									
						Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene		
Benzo[a]pyrene		
Benzo[b]fluoranthene		
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene		
Chrysene		
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene		
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

"-" = Not sampled.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.77 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: 230 S. Marquette

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	-									
2-Methylnaphthalene	-									
Acenaphthene	-									
Acenaphthylene	-									
Anthracene	-									
Benzo[a]anthracene	-									
Benzo[a]pyrene	-									
Benzo[b]fluoranthene	-									
Benzo(g,h,i)perylene	-									
Benzo(k)fluoranthene	-									
Chrysene	-									
Dibenz(a,h)anthracene	-									
Fluoranthene	-									
Fluorene	-									
Indeno[1,2,3-cd]pyrene	-									
Naphthalene	-									
Phenanthrene	-									
Pyrene	-									
PCBs										
Aroclor-1242	-									
Aroclor-1248	-									
Aroclor-1254	-									
Aroclor-1260	-									
VOCs										
Tetrachloroethene	-									
Trichloroethene	-									
						Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	-									
2-Methylnaphthalene	-									
Acenaphthene	-									
Acenaphthylene	-									
Anthracene	-									
Benzo[a]anthracene	-									
Benzo[a]pyrene	-									
Benzo[b]fluoranthene	-									
Benzo(g,h,i)perylene	-									
Benzo(k)fluoranthene	-									
Chrysene	-									
Dibenz(a,h)anthracene	-									
Fluoranthene	-									
Fluorene	-									
Indeno[1,2,3-cd]pyrene	-									
Naphthalene	-									
Phenanthrene	-									
Pyrene	-									
PCBs										
Aroclor-1242	-									
Aroclor-1248	-									
Aroclor-1254	-									
Aroclor-1260	-									
VOCs										
Tetrachloroethene	-									
Trichloroethene	-									
						Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene		
Benzo[a]pyrene		
Benzo[b]fluoranthene		
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene		
Chrysene		
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene		
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	NA	

Notes:

NA = Not available.

"-" = Not sampled.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.78 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **230 S. Marquette**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

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Tab Name	Address	Sheet Name	Exposure Pathway (when applicable)
Master Summary		Table D.79 Summary of Total Cancer and Non-Cancer Risks by Property	
Risk summary		Table D.80 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents	
H1_Ing	233 Waubesa	Table D.81 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H1_Derm	233 Waubesa	Table D.82 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H1_Inh	233 Waubesa	Table D.83 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H2_Ing	241 Waubesa	Table D.84 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H2_Derm	241 Waubesa	Table D.85 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H2_Inh	241 Waubesa	Table D.86 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H3_Ing	245 Waubesa	Table D.87 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H3_Derm	245 Waubesa	Table D.88 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H3_Inh	245 Waubesa	Table D.89 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H4_Ing	249 Waubesa	Table D.90 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H4_Derm	249 Waubesa	Table D.91 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H4_Inh	249 Waubesa	Table D.92 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H5_Ing	253 Waubesa	Table D.93 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H5_Derm	253 Waubesa	Table D.94 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H5_Inh	253 Waubesa	Table D.95 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H6_Ing	257 Waubesa	Table D.96 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H6_Derm	257 Waubesa	Table D.97 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H6_Inh	257 Waubesa	Table D.98 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H7_Ing	261 Waubesa	Table D.99 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H7_Derm	261 Waubesa	Table D.100 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H7_Inh	261 Waubesa	Table D.101 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure
H8_Ing	265 Waubesa	Table D.102 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Incidental Ingestion of Soil
H8_Derm	265 Waubesa	Table D.103 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Dermal Contact with Soil
H8_Inh	265 Waubesa	Table D.104 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident	Indoor Air Exposure

Table D.79 Summary of Total Cancer and Non-Cancer Risks by Property

Property Address	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard Adult	Non-Cancer Hazard Child
233 Waubesa	3E-05	7E-02	1E-01
241 Waubesa	4E-05	7E-02	6E-01
245 Waubesa	1E-04	1E-01	2E-01
249 Waubesa	6E-05	**3E+00**	**3E+00**
253 Waubesa	1E-05	2E-02	6E-02
257 Waubesa	2E-05	2E-02	2E-02
261 Waubesa	5E-06	1E-05	9E-05
265 Waubesa	2E-05	5E-05	5E-04

Note: Values that exceed a Total Excess Lifetime Cancer Risk of 1×10^{-4} or a Hazard Quotient of 1 are highlighted in bold.

Table D.80 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	233 Waubesa				241 Waubesa				245 Waubesa			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	4E-03	7%	Aroclor-1254	98%	5E-02	64%	Aroclor-1254	100%	1E-02	10%	Aroclor-1254	99.3%
Dermal Contact with Soil	2E-03	4%	Aroclor-1254	98%	3E-02	36%	Aroclor-1254	100%	5E-03	5%	Aroclor-1254	99.8%
Inhalation of Indoor Air	6E-02	90%	Tetrachloroethene	100%	NA				9E-02	85%	Tetrachloroethene	100%
Total Hazard:	**7E-02**				**7E-02**	Air: ND			**1E-01**			
Child Resident												
Incidental Ingestion of Soil	4E-02	35%	Aroclor-1254	98%	4E-01	72%	Aroclor-1254	100%	9E-02	43%	Aroclor-1254	99.3%
Dermal Contact with Soil	2E-02	14%	Aroclor-1254	98%	2E-01	28%	Aroclor-1254	100%	4E-02	17%	Aroclor-1254	99.8%
Inhalation of Indoor Air	6E-02	51%	Tetrachloroethene	100%	NA				9E-02	40%	Tetrachloroethene	100%
Total Hazard:	**1E-01**				**6E-01**	Air: ND			**2E-01**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	2E-05	56%	Benzo[a]pyrene	65%	2E-05	58%	Benzo[a]pyrene	60%	8E-05	68%	Aroclor-1248	92%
Dermal Contact with Soil	1E-05	43%	Benzo[a]pyrene	66%	2E-05	42%	Benzo[a]pyrene	62%	4E-05	32%	Aroclor-1248	88%
Inhalation of Indoor Air	3E-07	<1%	Tetrachloroethene	100%	NA				4E-07	<1%	Tetrachloroethene	100%
Total Risk:	**3E-05**				**4E-05**	Air: ND			**1E-04**			

Table D.80 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	249 Waubesa				253 Waubesa				257 Waubesa			
Non-Cancer Hazard												
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident												
Incidental Ingestion of Soil	6E-03	<1%	Aroclor-1254	99%	3E-03	15%	Aroclor-1254	99%	4E-05	<1%	Pyrene	36%
Dermal Contact with Soil	3E-03	<1%	Aroclor-1254	98%	2E-03	8%	Aroclor-1254	99%	2E-05	<1%	Pyrene	54%
Inhalation of Indoor Air	3E+00	99.7%	Trichloroethene	66%	2E-02	76%	Tetrachloroethene	100%	2E-02	99.7%	Tetrachloroethene	100%
Total Hazard:	**3E+00**				**2E-02**				**2E-02**			
Child Resident												
Incidental Ingestion of Soil	5E-02	2%	Aroclor-1254	99%	3E-02	52%	Aroclor-1254	99%	3E-04	2%	Pyrene	36%
Dermal Contact with Soil	2E-02	<1%	Aroclor-1254	98%	1E-02	20%	Aroclor-1254	99%	2E-04	<1%	Pyrene	54%
Inhalation of Indoor Air	3E+00	97%	Trichloroethene	66%	2E-02	28%	Tetrachloroethene	100%	2E-02	97%	Tetrachloroethene	100%
Total Hazard:	**3E+00**				**6E-02**				**2E-02**			
Cancer Risk												
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident												
Incidental Ingestion of Soil	2E-05	35%	Benzo[a]pyrene	63%	6E-06	58%	Benzo[a]pyrene	53%	1E-05	57%	Benzo[a]pyrene	59%
Dermal Contact with Soil	1E-05	27%	Benzo[a]pyrene	64%	4E-06	41%	Benzo[a]pyrene	57%	1E-05	42%	Benzo[a]pyrene	61%
Inhalation of Indoor Air	2E-05	38%	Trichloroethene	80%	7E-08	<1%	Tetrachloroethene	100%	8E-08	<1%	Tetrachloroethene	100%
Total Risk:	**6E-05**				**1E-05**				**2E-05**			

Table D.80 Total Excess Lifetime Cancer Risk and Non-Cancer Hazard by Receptor and Pathway for Adult and Child Residents

	261 Waubesa				265 Waubesa			
Non-Cancer Hazard								
Receptor/Exposure Pathway	**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**		**Non Cancer Hazard**	**Percent Contribution**	**COPC Contributing Majority of Hazard by Receptor & Pathway (% contribution)**	
Adult Resident								
Incidental Ingestion of Soil	6E-06	49%	Pyrene	52%	4E-05	67%	Tetrachloroethene	54%
Dermal Contact with Soil	6E-06	51%	Pyrene	52%	2E-05	33%	Pyrene	54%
Inhalation of Indoor Air	NA				NA			
Total Hazard:	**1E-05**	Air: NS			**5E-05**	Air: NS		
Child Resident								
Incidental Ingestion of Soil	5E-05	58%	Pyrene	52%	3E-04	75%	Tetrachloroethene	54%
Dermal Contact with Soil	4E-05	42%	Pyrene	52%	1E-04	25%	Pyrene	54%
Inhalation of Indoor Air	NA				NA			
Total Hazard:	**9E-05**	Air: NS			**5E-04**	Air: NS		
Cancer Risk								
Receptor/Exposure Pathway	**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**		**Cancer Risk**	**Percent Contribution**	**COPC Contributing Majority of Risk by Receptor & Pathway (% contribution)**	
Adult and Child Resident								
Incidental Ingestion of Soil	3E-06	57%	Benzo[a]pyrene	71%	1E-05	57%	Benzo[a]pyrene	58%
Dermal Contact with Soil	2E-06	43%	Benzo[a]pyrene	71%	7E-06	43%	Benzo[a]pyrene	60%
Inhalation of Indoor Air	NA				NA			
Total Risk:	**5E-06**	Air: NS			**2E-05**	Air: NS		

Notes:

NA - Risks or hazards were not calculated because no relevant chemicals were detected or sampled at the site.

ND - Not detected.

NS - Not sampled.

Blank - Values are not relevant because the risks could not be calculated.

COPC - Compound of Potential Concern.

Table D.81 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **233 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	2.1E-02	0.5	4.9E-09	1.4E-08	NA	6.0E-02	NA		2.4E-07	<1%
Acenaphthylene	4.6E-02	0.5	1.1E-08	3.2E-08	NA	NA	NA		NA	
Anthracene	1.2E-01	0.5	2.8E-08	8.2E-08	NA	3.0E-01	NA		2.7E-07	<1%
Benzo[a]anthracene	5.0E-01	0.5	2.2E-07	3.4E-07	7.3E-01	NA	1.6E-07	7%	NA	
Benzo[a]pyrene	4.6E-01	0.5	2.0E-07	3.2E-07	7.3E+00	NA	1.4E-06	64%	NA	
Benzo[b]fluoranthene	5.8E-01	0.5	2.5E-07	4.0E-07	7.3E-01	NA	1.8E-07	8%	NA	
Benzo(g,h,i)perylene	3.2E-01	0.5	7.5E-08	2.2E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E-02	NA	9.1E-09	<1%	NA	
Chrysene	5.2E-01	0.5	2.2E-07	3.6E-07	7.3E-03	NA	1.6E-09	<1%	NA	
Dibenz(a,h)anthracene	9.9E-02	0.5	4.3E-08	6.8E-08	7.3E+00	NA	3.1E-07	14%	NA	
Fluoranthene	1.3E+00	0.5	3.1E-07	8.9E-07	NA	4.0E-02	NA		2.2E-05	<1%
Fluorene	2.7E-02	0.5	6.3E-09	1.8E-08	NA	4.0E-02	NA		4.6E-07	<1%
Indeno[1,2,3-cd]pyrene	2.7E-01	0.5	1.2E-07	1.8E-07	7.3E-01	NA	8.5E-08	4%	NA	
Naphthalene	1.0E-02	0.5	2.3E-09	6.8E-09	NA	2.0E-02	NA		3.4E-07	<1%
Phenanthrene	5.3E-01	0.5	1.2E-07	3.6E-07	NA	NA	NA		NA	
Pyrene	8.7E-01	0.5	2.0E-07	6.0E-07	NA	3.0E-02	NA		2.0E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	6.4E-02	1	3.0E-08	8.8E-08	2.0E+00	2.0E-05	6.0E-08	3%	4.4E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.4E-01	1	6.6E-08	1.9E-07	2.1E-03	6.0E-03	1.4E-10	<1%	3.2E-05	<1%
Trichloroethene	ND									
						Total Cancer Risk:	2.3E-06	**Hazard Index:**	4.5E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	2.1E-02	0.5	1.2E-08	1.3E-07	NA	6.0E-02	NA		2.2E-06	<1%
Acenaphthylene	4.6E-02	0.5	2.5E-08	2.9E-07	NA	NA	NA		NA	
Anthracene	1.2E-01	0.5	6.6E-08	7.7E-07	NA	3.0E-01	NA		2.6E-06	<1%
Benzo[a]anthracene	5.0E-01	0.5	1.5E-06	3.2E-06	7.3E-01	NA	1.1E-06	7%	NA	
Benzo[a]pyrene	4.6E-01	0.5	1.3E-06	2.9E-06	7.3E+00	NA	9.8E-06	65%	NA	
Benzo[b]fluoranthene	5.8E-01	0.5	1.7E-06	3.7E-06	7.3E-01	NA	1.2E-06	8%	NA	
Benzo(g,h,i)perylene	3.2E-01	0.5	1.8E-07	2.0E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E-02	NA	6.2E-08	<1%	NA	
Chrysene	5.2E-01	0.5	1.5E-06	3.3E-06	7.3E-03	NA	1.1E-08	<1%	NA	
Dibenz(a,h)anthracene	9.9E-02	0.5	2.9E-07	6.3E-07	7.3E+00	NA	2.1E-06	14%	NA	
Fluoranthene	1.3E+00	0.5	7.1E-07	8.3E-06	NA	4.0E-02	NA		2.1E-04	<1%
Fluorene	2.7E-02	0.5	1.5E-08	1.7E-07	NA	4.0E-02	NA		4.3E-06	<1%
Indeno[1,2,3-cd]pyrene	2.7E-01	0.5	7.9E-07	1.7E-06	7.3E-01	NA	5.8E-07	4%	NA	
Naphthalene	1.0E-02	0.5	5.5E-09	6.4E-08	NA	2.0E-02	NA		3.2E-06	<1%
Phenanthrene	5.3E-01	0.5	2.9E-07	3.4E-06	NA	NA	NA		NA	
Pyrene	8.7E-01	0.5	4.8E-07	5.6E-06	NA	3.0E-02	NA		1.9E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	6.4E-02	1	7.0E-08	8.2E-07	2.0E+00	2.0E-05	1.4E-07	<1%	4.1E-02	98%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	1.4E-01	1	1.5E-07	1.8E-06	2.1E-03	6.0E-03	3.2E-10	<1%	3.0E-04	<1%
Trichloroethene	ND									
						Total Cancer Risk:	1.5E-05	**Hazard Index:**	4.2E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.2E-06	7%
Benzo[a]pyrene	1.1E-05	65%
Benzo[b]fluoranthene	1.4E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	7.1E-08	<1%
Chrysene	1.3E-08	<1%
Dibenz(a,h)anthracene	2.4E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	6.6E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	2.0E-07	1%
Aroclor-1260		
VOC		
Tetrachloroethene	4.6E-10	<1%
Trichloroethene		
Total Cancer Risk:	1.7E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.82 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **233 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	2.1E-02	1.3E-01	5.1E-09	1.5E-08	NA	6.0E-02	NA		2.5E-07	<1%
Acenaphthylene	4.6E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	1.2E-01	1.3E-01	2.9E-08	8.5E-08	NA	3.0E-01	NA		2.8E-07	<1%
Benzo[a]anthracene	5.0E-01	1.3E-01	2.2E-07	3.6E-07	7.3E-01	NA	1.6E-07	7%	NA	
Benzo[a]pyrene	4.6E-01	1.3E-01	2.1E-07	3.3E-07	7.3E+00	NA	1.5E-06	65%	NA	
Benzo[b]fluoranthene	5.8E-01	1.3E-01	2.6E-07	4.1E-07	7.3E-01	NA	1.9E-07	8%	NA	
Benzo(g,h,i)perylene	3.2E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E-02	NA	9.5E-09	<1%	NA	
Chrysene	5.2E-01	1.3E-01	2.3E-07	3.7E-07	7.3E-03	NA	1.7E-09	<1%	NA	
Dibenz(a,h)anthracene	9.9E-02	1.3E-01	4.4E-08	7.0E-08	7.3E+00	NA	3.2E-07	14%	NA	
Fluoranthene	1.3E+00	1.3E-01	3.2E-07	9.2E-07	NA	4.0E-02	NA		2.3E-05	<1%
Fluorene	2.7E-02	1.3E-01	6.6E-09	1.9E-08	NA	4.0E-02	NA		4.8E-07	<1%
Indeno[1,2,3-cd]pyrene	2.7E-01	1.3E-01	1.2E-07	1.9E-07	7.3E-01	NA	8.8E-08	4%	NA	
Naphthalene	1.0E-02	1.3E-01	2.4E-09	7.1E-09	NA	2.0E-02	NA		3.6E-07	<1%
Phenanthrene	5.3E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.7E-01	1.3E-01	2.1E-07	6.2E-07	NA	3.0E-02	NA		2.1E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	6.4E-02	1.4E-01	1.7E-08	4.9E-08	2.0E+00	2.0E-05	3.4E-08	1%	2.4E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.4E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	2.3E-06	**Hazard Index:**	2.5E-03	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	2.1E-02	1.3E-01	8.4E-09	9.8E-08	NA	6.0E-02	NA		1.6E-06	<1%
Acenaphthylene	4.6E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	1.2E-01	1.3E-01	4.8E-08	5.6E-07	NA	3.0E-01	NA		1.9E-06	<1%
Benzo[a]anthracene	5.0E-01	1.3E-01	1.1E-06	2.3E-06	7.3E-01	NA	7.8E-07	7%	NA	
Benzo[a]pyrene	4.6E-01	1.3E-01	9.8E-07	2.1E-06	7.3E+00	NA	7.1E-06	66%	NA	
Benzo[b]fluoranthene	5.8E-01	1.3E-01	1.2E-06	2.7E-06	7.3E-01	NA	9.0E-07	8%	NA	
Benzo(g,h,i)perylene	3.2E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E-02	NA	4.5E-08	<1%	NA	
Chrysene	5.2E-01	1.3E-01	1.1E-06	2.4E-06	7.3E-03	NA	8.1E-09	<1%	NA	
Dibenz(a,h)anthracene	9.9E-02	1.3E-01	2.1E-07	4.6E-07	7.3E+00	NA	1.5E-06	14%	NA	
Fluoranthene	1.3E+00	1.3E-01	5.2E-07	6.1E-06	NA	4.0E-02	NA		1.5E-04	<1%
Fluorene	2.7E-02	1.3E-01	1.1E-08	1.3E-07	NA	4.0E-02	NA		3.1E-06	<1%
Indeno[1,2,3-cd]pyrene	2.7E-01	1.3E-01	5.7E-07	1.3E-06	7.3E-01	NA	4.2E-07	4%	NA	
Naphthalene	1.0E-02	1.3E-01	4.0E-09	4.7E-08	NA	2.0E-02	NA		2.3E-06	<1%
Phenanthrene	5.3E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	8.7E-01	1.3E-01	3.5E-07	4.0E-06	NA	3.0E-02	NA		1.3E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	6.4E-02	1.4E-01	2.7E-08	3.2E-07	2.0E+00	2.0E-05	5.5E-08	<1%	1.6E-02	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.4E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.1E-05	**Hazard Index:**	1.6E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	9.4E-07	7%
Benzo[a]pyrene	8.6E-06	66%
Benzo[b]fluoranthene	1.1E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	5.4E-08	<1%
Chrysene	9.8E-09	<1%
Dibenz(a,h)anthracene	1.9E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	5.1E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	8.9E-08	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.3E-05	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.83 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **233 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.5E+00	8.4E-01	2.4E-03	2.6E-07	4.0E-02	2.2E-07	100%	6.1E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	2.2E-07	**Hazard Index:**	6.1E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	2.5E+00	2.1E-01	2.4E-03	2.6E-07	4.0E-02	5.4E-08	100%	6.1E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	5.4E-08	**Hazard Index:**	6.1E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	2.7E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	2.7E-07	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.84 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: 241 Waubesa

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	6.3E-02	0.5	1.5E-08	4.3E-08	2.9E-02	7.0E-02	4.3E-10	<1%	6.2E-07	<1%
2-Methylnaphthalene	5.4E-02	0.5	1.3E-08	3.7E-08	NA	4.0E-03	NA		9.2E-06	<1%
Acenaphthene	1.1E-01	0.5	2.6E-08	7.5E-08	NA	6.0E-02	NA		1.3E-06	<1%
Acenaphthylene	1.7E-02	0.5	4.0E-09	1.2E-08	NA	NA	NA		NA	
Anthracene	2.5E-01	0.5	5.9E-08	1.7E-07	NA	3.0E-01	NA		5.7E-07	<1%
Benzo[a]anthracene	6.3E-01	0.5	2.7E-07	4.3E-07	7.3E-01	NA	2.0E-07	6%	NA	
Benzo[a]pyrene	5.9E-01	0.5	2.5E-07	4.0E-07	7.3E+00	NA	1.9E-06	53%	NA	
Benzo[b]fluoranthene	7.1E-01	0.5	3.1E-07	4.9E-07	7.3E-01	NA	2.2E-07	6%	NA	
Benzo(g,h,i)perylene	4.1E-01	0.5	9.6E-08	2.8E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.8E-01	0.5	1.6E-07	2.6E-07	7.3E-02	NA	1.2E-08	<1%	NA	
Chrysene	6.2E-01	0.5	2.7E-07	4.2E-07	7.3E-03	NA	1.9E-09	<1%	NA	
Dibenz(a,h)anthracene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E+00	NA	4.1E-07	12%	NA	
Fluoranthene	1.4E+00	0.5	3.3E-07	9.6E-07	NA	4.0E-02	NA		2.4E-05	<1%
Fluorene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	4.0E-02	NA		2.2E-06	<1%
Indeno[1,2,3-cd]pyrene	3.6E-01	0.5	1.5E-07	2.5E-07	7.3E-01	NA	1.1E-07	3%	NA	
Naphthalene	7.8E-02	0.5	1.8E-08	5.3E-08	NA	2.0E-02	NA		2.7E-06	<1%
Phenanthrene	1.0E+00	0.5	2.3E-07	6.8E-07	NA	NA	NA		NA	
Pyrene	1.1E+00	0.5	2.6E-07	7.5E-07	NA	3.0E-02	NA		2.5E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.0E-01	1	3.3E-07	9.6E-07	2.0E+00	2.0E-05	6.6E-07	19%	4.8E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.7E-02	1	3.1E-08	9.2E-08	2.1E-03	6.0E-03	6.6E-11	<1%	1.5E-05	<1%
Trichloroethene	ND									
						Total Cancer Risk:	3.5E-06	**Hazard Index:**	4.8E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	6.3E-02	0.5	3.5E-08	4.0E-07	2.9E-02	7.0E-02	1.0E-09	<1%	5.8E-06	<1%
2-Methylnaphthalene	5.4E-02	0.5	3.0E-08	3.5E-07	NA	4.0E-03	NA		8.6E-05	<1%
Acenaphthene	1.1E-01	0.5	6.0E-08	7.0E-07	NA	6.0E-02	NA		1.2E-05	<1%
Acenaphthylene	1.7E-02	0.5	9.3E-09	1.1E-07	NA	NA	NA		NA	
Anthracene	2.5E-01	0.5	1.4E-07	1.6E-06	NA	3.0E-01	NA		5.3E-06	<1%
Benzo[a]anthracene	6.3E-01	0.5	1.8E-06	4.0E-06	7.3E-01	NA	1.3E-06	7%	NA	
Benzo[a]pyrene	5.9E-01	0.5	1.7E-06	3.8E-06	7.3E+00	NA	1.3E-05	61%	NA	
Benzo[b]fluoranthene	7.1E-01	0.5	2.1E-06	4.5E-06	7.3E-01	NA	1.5E-06	7%	NA	
Benzo(g,h,i)perylene	4.1E-01	0.5	2.2E-07	2.6E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.8E-01	0.5	1.1E-06	2.4E-06	7.3E-02	NA	8.1E-08	<1%	NA	
Chrysene	6.2E-01	0.5	1.8E-06	4.0E-06	7.3E-03	NA	1.3E-08	<1%	NA	
Dibenz(a,h)anthracene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E+00	NA	2.8E-06	13%	NA	
Fluoranthene	1.4E+00	0.5	7.7E-07	8.9E-06	NA	4.0E-02	NA		2.2E-04	<1%
Fluorene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	4.0E-02	NA		2.1E-05	<1%
Indeno[1,2,3-cd]pyrene	3.6E-01	0.5	1.1E-06	2.3E-06	7.3E-01	NA	7.7E-07	4%	NA	
Naphthalene	7.8E-02	0.5	4.3E-08	5.0E-07	NA	2.0E-02	NA		2.5E-05	<1%
Phenanthrene	1.0E+00	0.5	5.5E-07	6.4E-06	NA	NA	NA		NA	
Pyrene	1.1E+00	0.5	6.0E-07	7.0E-06	NA	3.0E-02	NA		2.3E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.0E-01	1	7.7E-07	8.9E-06	2.0E+00	2.0E-05	1.5E-06	7%	4.5E-01	100%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	6.7E-02	1	7.3E-08	8.6E-07	2.1E-03	6.0E-03	1.5E-10	<1%	1.4E-04	<1%
Trichloroethene	ND									
						Total Cancer Risk:	2.1E-05	**Hazard Index:**	4.5E-01	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	1.4E-09	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.5E-06	6%
Benzo[a]pyrene	1.4E-05	60%
Benzo[b]fluoranthene	1.7E-06	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	9.3E-08	<1%
Chrysene	1.5E-08	<1%
Dibenz(a,h)anthracene	3.2E-06	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	8.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	2.2E-06	9%
Aroclor-1260		
VOC		
Tetrachloroethene	2.2E-10	<1%
Trichloroethene		
Total Cancer Risk:	2.4E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.85 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **241 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	6.3E-02	1.3E-01	1.5E-08	4.5E-08	2.9E-02	7.0E-02	4.5E-10	<1%	6.4E-07	<1%
2-Methylnaphthalene	5.4E-02	1.3E-01	1.3E-08	3.8E-08	NA	4.0E-03	NA		9.6E-06	<1%
Acenaphthene	1.1E-01	1.3E-01	2.7E-08	7.8E-08	NA	6.0E-02	NA		1.3E-06	<1%
Acenaphthylene	1.7E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.5E-01	1.3E-01	6.1E-08	1.8E-07	NA	3.0E-01	NA		5.9E-07	<1%
Benzo[a]anthracene	6.3E-01	1.3E-01	2.8E-07	4.5E-07	7.3E-01	NA	2.1E-07	6%	NA	
Benzo[a]pyrene	5.9E-01	1.3E-01	2.6E-07	4.2E-07	7.3E+00	NA	1.9E-06	59%	NA	
Benzo[b]fluoranthene	7.1E-01	1.3E-01	3.2E-07	5.0E-07	7.3E-01	NA	2.3E-07	7%	NA	
Benzo(g,h,i)perylene	4.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.8E-01	1.3E-01	1.7E-07	2.7E-07	7.3E-02	NA	1.2E-08	<1%	NA	
Chrysene	6.2E-01	1.3E-01	2.8E-07	4.4E-07	7.3E-03	NA	2.0E-09	<1%	NA	
Dibenz(a,h)anthracene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E+00	NA	4.2E-07	13%	NA	
Fluoranthene	1.4E+00	1.3E-01	3.4E-07	9.9E-07	NA	4.0E-02	NA		2.5E-05	<1%
Fluorene	1.3E-01	1.3E-01	3.2E-08	9.2E-08	NA	4.0E-02	NA		2.3E-06	<1%
Indeno[1,2,3-cd]pyrene	3.6E-01	1.3E-01	1.6E-07	2.6E-07	7.3E-01	NA	1.2E-07	4%	NA	
Naphthalene	7.8E-02	1.3E-01	1.9E-08	5.5E-08	NA	2.0E-02	NA		2.8E-06	<1%
Phenanthrene	1.0E+00	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.1E+00	1.3E-01	2.7E-07	7.8E-07	NA	3.0E-02	NA		2.6E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.0E-01	1.4E-01	1.8E-07	5.4E-07	2.0E+00	2.0E-05	3.7E-07	11%	2.7E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.7E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	3.3E-06	**Hazard Index:**	2.7E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	6.3E-02	1.3E-01	2.5E-08	2.9E-07	2.9E-02	7.0E-02	7.3E-10	<1%	4.2E-06	<1%
2-Methylnaphthalene	5.4E-02	1.3E-01	2.2E-08	2.5E-07	NA	4.0E-03	NA		6.3E-05	<1%
Acenaphthene	1.1E-01	1.3E-01	4.4E-08	5.1E-07	NA	6.0E-02	NA		8.5E-06	<1%
Acenaphthylene	1.7E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	2.5E-01	1.3E-01	1.0E-07	1.2E-06	NA	3.0E-01	NA		3.9E-06	<1%
Benzo[a]anthracene	6.3E-01	1.3E-01	1.3E-06	2.9E-06	7.3E-01	NA	9.8E-07	7%	NA	
Benzo[a]pyrene	5.9E-01	1.3E-01	1.3E-06	2.7E-06	7.3E+00	NA	9.2E-06	63%	NA	
Benzo[b]fluoranthene	7.1E-01	1.3E-01	1.5E-06	3.3E-06	7.3E-01	NA	1.1E-06	8%	NA	
Benzo(g,h,i)perylene	4.1E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.8E-01	1.3E-01	8.1E-07	1.8E-06	7.3E-02	NA	5.9E-08	<1%	NA	
Chrysene	6.2E-01	1.3E-01	1.3E-06	2.9E-06	7.3E-03	NA	9.6E-09	<1%	NA	
Dibenz(a,h)anthracene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E+00	NA	2.0E-06	14%	NA	
Fluoranthene	1.4E+00	1.3E-01	5.6E-07	6.5E-06	NA	4.0E-02	NA		1.6E-04	<1%
Fluorene	1.3E-01	1.3E-01	5.2E-08	6.1E-07	NA	4.0E-02	NA		1.5E-05	<1%
Indeno[1,2,3-cd]pyrene	3.6E-01	1.3E-01	7.7E-07	1.7E-06	7.3E-01	NA	5.6E-07	4%	NA	
Naphthalene	7.8E-02	1.3E-01	3.1E-08	3.6E-07	NA	2.0E-02	NA		1.8E-05	<1%
Phenanthrene	1.0E+00	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.1E+00	1.3E-01	4.4E-07	5.1E-06	NA	3.0E-02	NA		1.7E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	7.0E-01	1.4E-01	3.0E-07	3.5E-06	2.0E+00	2.0E-05	6.0E-07	4%	1.8E-01	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	6.7E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-05	**Hazard Index:**	1.8E-01	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene	1.2E-09	<1%
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.2E-06	7%
Benzo[a]pyrene	1.1E-05	62%
Benzo[b]fluoranthene	1.3E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	7.1E-08	<1%
Chrysene	1.2E-08	<1%
Dibenz(a,h)anthracene	2.4E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	6.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254	9.7E-07	5%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.8E-05	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.86 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **241 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$		=	9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	ND								
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.87 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **245 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	3.6E-02	0.5	8.5E-09	2.5E-08	NA	3.0E-01	NA		8.2E-08	<1%
Benzo[a]anthracene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E-01	NA	4.4E-08	<1%	NA	
Benzo[a]pyrene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E+00	NA	4.4E-07	2%	NA	
Benzo[b]fluoranthene	1.9E-01	0.5	8.2E-08	1.3E-07	7.3E-01	NA	6.0E-08	<1%	NA	
Benzo(g,h,i)perylene	1.2E-01	0.5	2.8E-08	8.2E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	7.2E-02	0.5	3.1E-08	4.9E-08	7.3E-02	NA	2.3E-09	<1%	NA	
Chrysene	1.6E-01	0.5	6.9E-08	1.1E-07	7.3E-03	NA	5.0E-10	<1%	NA	
Dibenz(a,h)anthracene	4.6E-02	0.5	2.0E-08	3.2E-08	7.3E+00	NA	1.4E-07	<1%	NA	
Fluoranthene	2.9E-01	0.5	6.8E-08	2.0E-07	NA	4.0E-02	NA		5.0E-06	<1%
Fluorene	1.3E-02	0.5	3.1E-09	8.9E-09	NA	4.0E-02	NA		2.2E-07	<1%
Indeno[1,2,3-cd]pyrene	1.0E-01	0.5	4.3E-08	6.8E-08	7.3E-01	NA	3.1E-08	<1%	NA	
Naphthalene	ND									
Phenanthrene	1.8E-01	0.5	4.2E-08	1.2E-07	NA	NA	NA		NA	
Pyrene	2.3E-01	0.5	5.4E-08	1.6E-07	NA	3.0E-02	NA		5.3E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.3E+01	1	1.1E-05	3.2E-05	2.0E+00	NA	2.2E-05	96%	NA	
Aroclor-1254	1.4E-01	1	6.6E-08	1.9E-07	2.0E+00	2.0E-05	1.3E-07	<1%	9.6E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	2.2E-02	1	1.9E-08	3.0E-08	4.6E-02	5.0E-04	8.7E-10	<1%	6.0E-05	<1%
						Total Cancer Risk:	2.2E-05	**Hazard Index:**	9.7E-03	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)		100	100	100	100
FR	Fraction from Contaminated Source		1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)		350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)		24	24	10	14
CF	Conversion Factor (kg/mg)		0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)		70	70	70	70
AT	Averaging Time (d)		8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor		1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	3.6E-02	0.5	2.0E-08	2.3E-07	NA	3.0E-01	NA		7.7E-07	<1%
Benzo[a]anthracene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E-01	NA	3.0E-07	<1%	NA	
Benzo[a]pyrene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E+00	NA	3.0E-06	5%	NA	
Benzo[b]fluoranthene	1.9E-01	0.5	5.6E-07	1.2E-06	7.3E-01	NA	4.1E-07	<1%	NA	
Benzo(g,h,i)perylene	1.2E-01	0.5	6.6E-08	7.7E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	7.2E-02	0.5	2.1E-07	4.6E-07	7.3E-02	NA	1.5E-08	<1%	NA	
Chrysene	1.6E-01	0.5	4.7E-07	1.0E-06	7.3E-03	NA	3.4E-09	<1%	NA	
Dibenz(a,h)anthracene	4.6E-02	0.5	1.3E-07	2.9E-07	7.3E+00	NA	9.8E-07	2%	NA	
Fluoranthene	2.9E-01	0.5	1.6E-07	1.9E-06	NA	4.0E-02	NA		4.6E-05	<1%
Fluorene	1.3E-02	0.5	7.1E-09	8.3E-08	NA	4.0E-02	NA		2.1E-06	<1%
Indeno[1,2,3-cd]pyrene	1.0E-01	0.5	2.9E-07	6.4E-07	7.3E-01	NA	2.1E-07	<1%	NA	
Naphthalene	ND									
Phenanthrene	1.8E-01	0.5	9.9E-08	1.2E-06	NA	NA	NA		NA	
Pyrene	2.3E-01	0.5	1.3E-07	1.5E-06	NA	3.0E-02	NA		4.9E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.3E+01	1	2.5E-05	2.9E-04	2.0E+00	NA	5.0E-05	91%	NA	
Aroclor-1254	1.4E-01	1	1.5E-07	1.8E-06	2.0E+00	2.0E-05	3.1E-07	<1%	8.9E-02	99%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	2.2E-02	1	1.3E-07	2.8E-07	4.6E-02	5.0E-04	5.9E-09	<1%	5.6E-04	<1%
						Total Cancer Risk:	5.6E-05	**Hazard Index:**	9.0E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a] 0-2 yrs	Mutagens[a] 2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$		=	1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)		200	200	200	200
FR	Fraction from Contaminated Source		1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)		350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)		6	6	2	4
CF	Conversion Factor (kg/mg)		0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)		15	15	15	15
AT	Averaging Time (d)		2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor		1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.4E-07	<1%
Benzo[a]pyrene	3.4E-06	4%
Benzo[b]fluoranthene	4.7E-07	<1%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.8E-08	<1%
Chrysene	3.9E-09	<1%
Dibenz(a,h)anthracene	1.1E-06	1%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.4E-07	<1%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	7.2E-05	92%
Aroclor-1254	4.4E-07	<1%
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene	6.8E-09	<1%
Total Cancer Risk:	7.8E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.88 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **245 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	3.6E-02	1.3E-01	8.8E-09	2.6E-08	NA	3.0E-01	NA		8.5E-08	<1%
Benzo[a]anthracene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E-01	NA	4.6E-08	<1%	NA	
Benzo[a]pyrene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E+00	NA	4.6E-07	4%	NA	
Benzo[b]fluoranthene	1.9E-01	1.3E-01	8.5E-08	1.4E-07	7.3E-01	NA	6.2E-08	<1%	NA	
Benzo(g,h,i)perylene	1.2E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	7.2E-02	1.3E-01	3.2E-08	5.1E-08	7.3E-02	NA	2.3E-09	<1%	NA	
Chrysene	1.6E-01	1.3E-01	7.1E-08	1.1E-07	7.3E-03	NA	5.2E-10	<1%	NA	
Dibenz(a,h)anthracene	4.6E-02	1.3E-01	2.1E-08	3.3E-08	7.3E+00	NA	1.5E-07	1%	NA	
Fluoranthene	2.9E-01	1.3E-01	7.1E-08	2.1E-07	NA	4.0E-02	NA		5.2E-06	<1%
Fluorene	1.3E-02	1.3E-01	3.2E-09	9.2E-09	NA	4.0E-02	NA		2.3E-07	<1%
Indeno[1,2,3-cd]pyrene	1.0E-01	1.3E-01	4.5E-08	7.1E-08	7.3E-01	NA	3.3E-08	<1%	NA	
Naphthalene	ND									
Phenanthrene	1.8E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.3E-01	1.3E-01	5.6E-08	1.6E-07	NA	3.0E-02	NA		5.4E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.3E+01	1.4E-01	6.0E-06	1.8E-05	2.0E+00	NA	1.2E-05	94%	NA	
Aroclor-1254	1.4E-01	1.4E-01	3.7E-08	1.1E-07	2.0E+00	2.0E-05	7.3E-08	<1%	5.4E-03	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	2.2E-02	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	1.3E-05	**Hazard Index:**	5.4E-03	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	3.6E-02	1.3E-01	1.4E-08	1.7E-07	NA	3.0E-01	NA		5.6E-07	<1%
Benzo[a]anthracene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E-01	NA	2.2E-07	<1%	NA	
Benzo[a]pyrene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E+00	NA	2.2E-06	9%	NA	
Benzo[b]fluoranthene	1.9E-01	1.3E-01	4.0E-07	8.8E-07	7.3E-01	NA	3.0E-07	1%	NA	
Benzo(g,h,i)perylene	1.2E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	7.2E-02	1.3E-01	1.5E-07	3.4E-07	7.3E-02	NA	1.1E-08	<1%	NA	
Chrysene	1.6E-01	1.3E-01	3.4E-07	7.4E-07	7.3E-03	NA	2.5E-09	<1%	NA	
Dibenz(a,h)anthracene	4.6E-02	1.3E-01	9.8E-08	2.1E-07	7.3E+00	NA	7.1E-07	3%	NA	
Fluoranthene	2.9E-01	1.3E-01	1.2E-07	1.3E-06	NA	4.0E-02	NA		3.4E-05	<1%
Fluorene	1.3E-02	1.3E-01	5.2E-09	6.1E-08	NA	4.0E-02	NA		1.5E-06	<1%
Indeno[1,2,3-cd]pyrene	1.0E-01	1.3E-01	2.1E-07	4.7E-07	7.3E-01	NA	1.6E-07	<1%	NA	
Naphthalene	ND									
Phenanthrene	1.8E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.3E-01	1.3E-01	9.2E-08	1.1E-06	NA	3.0E-02	NA		3.6E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.3E+01	1.4E-01	9.9E-06	1.2E-04	2.0E+00	NA	2.0E-05	84%	NA	
Aroclor-1254	1.4E-01	1.4E-01	6.0E-08	7.0E-07	2.0E+00	2.0E-05	1.2E-07	<1%	3.5E-02	100%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	2.2E-02	NA	NA	NA	4.6E-02	5.0E-04	NA		NA	
						Total Cancer Risk:	2.3E-05	**Hazard Index:**	3.5E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.6E-07	<1%
Benzo[a]pyrene	2.6E-06	7%
Benzo[b]fluoranthene	3.6E-07	<1%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.4E-08	<1%
Chrysene	3.0E-09	<1%
Dibenz(a,h)anthracene	8.6E-07	2%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.9E-07	<1%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	3.2E-05	88%
Aroclor-1254	1.9E-07	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	3.6E-05	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.89 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **245 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.6E+00	1.2E+00	3.4E-03	2.6E-07	4.0E-02	3.0E-07	100%	8.5E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	3.0E-07	**Hazard Index:**	8.5E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	3.6E+00	2.9E-01	3.4E-03	2.6E-07	4.0E-02	7.6E-08	100%	8.5E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	7.6E-08	**Hazard Index:**	8.5E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	3.8E-07	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	3.8E-07	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.90 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **249 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	6.3E-02	0.5	1.5E-08	4.3E-08	NA	6.0E-02	NA		7.2E-07	<1%
Acenaphthylene	1.4E-02	0.5	3.3E-09	9.6E-09	NA	NA	NA		NA	
Anthracene	1.6E-01	0.5	3.8E-08	1.1E-07	NA	3.0E-01	NA		3.7E-07	<1%
Benzo[a]anthracene	5.5E-01	0.5	2.4E-07	3.8E-07	7.3E-01	NA	1.7E-07	6%	NA	
Benzo[a]pyrene	5.0E-01	0.5	2.2E-07	3.4E-07	7.3E+00	NA	1.6E-06	59%	NA	
Benzo[b]fluoranthene	6.0E-01	0.5	2.6E-07	4.1E-07	7.3E-01	NA	1.9E-07	7%	NA	
Benzo(g,h,i)perylene	3.4E-01	0.5	8.0E-08	2.3E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	0.5	1.4E-07	2.3E-07	7.3E-02	NA	1.0E-08	<1%	NA	
Chrysene	5.8E-01	0.5	2.5E-07	4.0E-07	7.3E-03	NA	1.8E-09	<1%	NA	
Dibenz(a,h)anthracene	1.1E-01	0.5	4.7E-08	7.5E-08	7.3E+00	NA	3.5E-07	13%	NA	
Fluoranthene	1.3E+00	0.5	3.1E-07	8.9E-07	NA	4.0E-02	NA		2.2E-05	<1%
Fluorene	5.1E-02	0.5	1.2E-08	3.5E-08	NA	4.0E-02	NA		8.7E-07	<1%
Indeno[1,2,3-cd]pyrene	3.1E-01	0.5	1.3E-07	2.1E-07	7.3E-01	NA	9.7E-08	4%	NA	
Naphthalene	1.0E-02	0.5	2.3E-09	6.8E-09	NA	2.0E-02	NA		3.4E-07	<1%
Phenanthrene	8.5E-01	0.5	2.0E-07	5.8E-07	NA	NA	NA		NA	
Pyrene	1.1E+00	0.5	2.6E-07	7.5E-07	NA	3.0E-02	NA		2.5E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.1E-01	1	9.9E-08	2.9E-07	2.0E+00	NA	2.0E-07	7%	NA	
Aroclor-1254	8.1E-02	1	3.8E-08	1.1E-07	2.0E+00	2.0E-05	7.6E-08	3%	5.5E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	2.7E-06	**Hazard Index:**	5.6E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	6.3E-02	0.5	3.5E-08	4.0E-07	NA	6.0E-02	NA		6.7E-06	<1%
Acenaphthylene	1.4E-02	0.5	7.7E-09	8.9E-08	NA	NA	NA		NA	
Anthracene	1.6E-01	0.5	8.8E-08	1.0E-06	NA	3.0E-01	NA		3.4E-06	<1%
Benzo[a]anthracene	5.5E-01	0.5	1.6E-06	3.5E-06	7.3E-01	NA	1.2E-06	7%	NA	
Benzo[a]pyrene	5.0E-01	0.5	1.5E-06	3.2E-06	7.3E+00	NA	1.1E-05	63%	NA	
Benzo[b]fluoranthene	6.0E-01	0.5	1.8E-06	3.8E-06	7.3E-01	NA	1.3E-06	8%	NA	
Benzo(g,h,i)perylene	3.4E-01	0.5	1.9E-07	2.2E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	0.5	9.6E-07	2.1E-06	7.3E-02	NA	7.0E-08	<1%	NA	
Chrysene	5.8E-01	0.5	1.7E-06	3.7E-06	7.3E-03	NA	1.2E-08	<1%	NA	
Dibenz(a,h)anthracene	1.1E-01	0.5	3.2E-07	7.0E-07	7.3E+00	NA	2.3E-06	14%	NA	
Fluoranthene	1.3E+00	0.5	7.1E-07	8.3E-06	NA	4.0E-02	NA		2.1E-04	<1%
Fluorene	5.1E-02	0.5	2.8E-08	3.3E-07	NA	4.0E-02	NA		8.2E-06	<1%
Indeno[1,2,3-cd]pyrene	3.1E-01	0.5	9.1E-07	2.0E-06	7.3E-01	NA	6.6E-07	4%	NA	
Naphthalene	1.0E-02	0.5	5.5E-09	6.4E-08	NA	2.0E-02	NA		3.2E-06	<1%
Phenanthrene	8.5E-01	0.5	4.7E-07	5.4E-06	NA	NA	NA		NA	
Pyrene	1.1E+00	0.5	6.0E-07	7.0E-06	NA	3.0E-02	NA		2.3E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.1E-01	1	2.3E-07	2.7E-06	2.0E+00	NA	4.6E-07	3%	NA	
Aroclor-1254	8.1E-02	1	8.9E-08	1.0E-06	2.0E+00	2.0E-05	1.8E-07	1%	5.2E-02	99%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.7E-05	**Hazard Index:**	5.2E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.3E-06	7%
Benzo[a]pyrene	1.2E-05	63%
Benzo[b]fluoranthene	1.5E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	8.1E-08	<1%
Chrysene	1.4E-08	<1%
Dibenz(a,h)anthracene	2.7E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	7.6E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	6.6E-07	3%
Aroclor-1254	2.5E-07	1%
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.0E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.91 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **249 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	6.3E-02	1.3E-01	1.5E-08	4.5E-08	NA	6.0E-02	NA		7.5E-07	<1%
Acenaphthylene	1.4E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	1.6E-01	1.3E-01	3.9E-08	1.1E-07	NA	3.0E-01	NA		3.8E-07	<1%
Benzo[a]anthracene	5.5E-01	1.3E-01	2.5E-07	3.9E-07	7.3E-01	NA	1.8E-07	7%	NA	
Benzo[a]pyrene	5.0E-01	1.3E-01	2.2E-07	3.6E-07	7.3E+00	NA	1.6E-06	62%	NA	
Benzo[b]fluoranthene	6.0E-01	1.3E-01	2.7E-07	4.3E-07	7.3E-01	NA	2.0E-07	7%	NA	
Benzo(g,h,i)perylene	3.4E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	1.3E-01	1.5E-07	2.3E-07	7.3E-02	NA	1.1E-08	<1%	NA	
Chrysene	5.8E-01	1.3E-01	2.6E-07	4.1E-07	7.3E-03	NA	1.9E-09	<1%	NA	
Dibenz(a,h)anthracene	1.1E-01	1.3E-01	4.9E-08	7.8E-08	7.3E+00	NA	3.6E-07	14%	NA	
Fluoranthene	1.3E+00	1.3E-01	3.2E-07	9.2E-07	NA	4.0E-02	NA		2.3E-05	<1%
Fluorene	5.1E-02	1.3E-01	1.2E-08	3.6E-08	NA	4.0E-02	NA		9.1E-07	<1%
Indeno[1,2,3-cd]pyrene	3.1E-01	1.3E-01	1.4E-07	2.2E-07	7.3E-01	NA	1.0E-07	4%	NA	
Naphthalene	1.0E-02	1.3E-01	2.4E-09	7.1E-09	NA	2.0E-02	NA		3.6E-07	<1%
Phenanthrene	8.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.1E+00	1.3E-01	2.7E-07	7.8E-07	NA	3.0E-02	NA		2.6E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.1E-01	1.4E-01	5.5E-08	1.6E-07	2.0E+00	NA	1.1E-07	4%	NA	
Aroclor-1254	8.1E-02	1.4E-01	2.1E-08	6.2E-08	2.0E+00	2.0E-05	4.3E-08	2%	3.1E-03	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	2.6E-06	**Hazard Index:**	3.2E-03	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	6.3E-02	1.3E-01	2.5E-08	2.9E-07	NA	6.0E-02	NA		4.9E-06	<1%
Acenaphthylene	1.4E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	1.6E-01	1.3E-01	6.4E-08	7.4E-07	NA	3.0E-01	NA		2.5E-06	<1%
Benzo[a]anthracene	5.5E-01	1.3E-01	1.2E-06	2.6E-06	7.3E-01	NA	8.5E-07	7%	NA	
Benzo[a]pyrene	5.0E-01	1.3E-01	1.1E-06	2.3E-06	7.3E+00	NA	7.8E-06	64%	NA	
Benzo[b]fluoranthene	6.0E-01	1.3E-01	1.3E-06	2.8E-06	7.3E-01	NA	9.3E-07	8%	NA	
Benzo(g,h,i)perylene	3.4E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	3.3E-01	1.3E-01	7.0E-07	1.5E-06	7.3E-02	NA	5.1E-08	<1%	NA	
Chrysene	5.8E-01	1.3E-01	1.2E-06	2.7E-06	7.3E-03	NA	9.0E-09	<1%	NA	
Dibenz(a,h)anthracene	1.1E-01	1.3E-01	2.3E-07	5.1E-07	7.3E+00	NA	1.7E-06	14%	NA	
Fluoranthene	1.3E+00	1.3E-01	5.2E-07	6.1E-06	NA	4.0E-02	NA		1.5E-04	<1%
Fluorene	5.1E-02	1.3E-01	2.0E-08	2.4E-07	NA	4.0E-02	NA		5.9E-06	<1%
Indeno[1,2,3-cd]pyrene	3.1E-01	1.3E-01	6.6E-07	1.4E-06	7.3E-01	NA	4.8E-07	4%	NA	
Naphthalene	1.0E-02	1.3E-01	4.0E-09	4.7E-08	NA	2.0E-02	NA		2.3E-06	<1%
Phenanthrene	8.5E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.1E+00	1.3E-01	4.4E-07	5.1E-06	NA	3.0E-02	NA		1.7E-04	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.1E-01	1.4E-01	9.0E-08	1.1E-06	2.0E+00	NA	1.8E-07	1%	NA	
Aroclor-1254	8.1E-02	1.4E-01	3.5E-08	4.1E-07	2.0E+00	2.0E-05	7.0E-08	<1%	2.0E-02	98%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.2E-05	**Hazard Index:**	2.1E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.0E-06	7%
Benzo[a]pyrene	9.4E-06	64%
Benzo[b]fluoranthene	1.1E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	6.2E-08	<1%
Chrysene	1.1E-08	<1%
Dibenz(a,h)anthracene	2.1E-06	14%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	5.8E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	2.9E-07	2%
Aroclor-1254	1.1E-07	<1%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	1.5E-05	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.92 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **249 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.0E+01	1.3E+01	3.8E-02	2.6E-07	4.0E-02	3.4E-06	26%	9.6E-01	34%
Trichloroethene	3.9E+00	2.3E+00	3.7E-03	4.1E-06	2.0E-03	9.6E-06	74%	1.9E+00	66%
Vinyl Chloride	ND								
					Total Cancer Risk:	1.3E-05	**Hazard Index:**	2.8E+00	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	4.0E+01	3.3E+00	3.8E-02	2.6E-07	4.0E-02	8.5E-07	11%	9.6E-01	34%
Trichloroethene	3.9E+00	1.7E+00	3.7E-03	4.1E-06	2.0E-03	7.0E-06	89%	1.9E+00	66%
Vinyl Chloride	ND								
					Total Cancer Risk:	7.8E-06	**Hazard Index:**	2.8E+00	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					0-2 yrs	2-6 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	2190	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	4.3E-06	20%
Trichloroethene	1.7E-05	80%
Vinyl Chloride		
Total Cancer Risk:	2.1E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.93 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **253 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.3E-02	0.5	5.4E-09	1.6E-08	NA	3.0E-01	NA		5.3E-08	<1%
Benzo[a]anthracene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E-01	NA	3.8E-08	4%	NA	
Benzo[a]pyrene	1.2E-01	0.5	5.2E-08	8.2E-08	7.3E+00	NA	3.8E-07	43%	NA	
Benzo[b]fluoranthene	1.5E-01	0.5	6.5E-08	1.0E-07	7.3E-01	NA	4.7E-08	5%	NA	
Benzo(g,h,i)perylene	8.9E-02	0.5	2.1E-08	6.1E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.2E-02	0.5	3.5E-08	5.6E-08	7.3E-02	NA	2.6E-09	<1%	NA	
Chrysene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E-03	NA	4.4E-10	<1%	NA	
Dibenz(a,h)anthracene	3.5E-02	0.5	1.5E-08	2.4E-08	7.3E+00	NA	1.1E-07	13%	NA	
Fluoranthene	2.1E-01	0.5	4.9E-08	1.4E-07	NA	4.0E-02	NA		3.6E-06	<1%
Fluorene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	4.0E-02	NA		1.9E-07	<1%
Indeno[1,2,3-cd]pyrene	8.0E-02	0.5	3.4E-08	5.5E-08	7.3E-01	NA	2.5E-08	3%	NA	
Naphthalene	ND									
Phenanthrene	1.6E-01	0.5	3.8E-08	1.1E-07	NA	NA	NA		NA	
Pyrene	2.2E-01	0.5	5.2E-08	1.5E-07	NA	3.0E-02	NA		5.0E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.4E-01	1	1.1E-07	3.3E-07	2.0E+00	NA	2.3E-07	26%	NA	
Aroclor-1254	4.6E-02	1	2.2E-08	6.3E-08	2.0E+00	2.0E-05	4.3E-08	5%	3.2E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.7E-01	1	8.0E-08	2.3E-07	2.1E-03	6.0E-03	1.7E-10	<1%	3.9E-05	1%
Trichloroethene	ND									
						Total Cancer Risk:	8.7E-07	**Hazard Index:**	3.2E-03	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.3E-02	0.5	1.3E-08	1.5E-07	NA	3.0E-01	NA		4.9E-07	<1%
Benzo[a]anthracene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E-01	NA	2.6E-07	5%	NA	
Benzo[a]pyrene	1.2E-01	0.5	3.5E-07	7.7E-07	7.3E+00	NA	2.6E-06	54%	NA	
Benzo[b]fluoranthene	1.5E-01	0.5	4.4E-07	9.6E-07	7.3E-01	NA	3.2E-07	7%	NA	
Benzo(g,h,i)perylene	8.9E-02	0.5	4.9E-08	5.7E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.2E-02	0.5	2.4E-07	5.2E-07	7.3E-02	NA	1.7E-08	<1%	NA	
Chrysene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E-03	NA	3.0E-09	<1%	NA	
Dibenz(a,h)anthracene	3.5E-02	0.5	1.0E-07	2.2E-07	7.3E+00	NA	7.5E-07	16%	NA	
Fluoranthene	2.1E-01	0.5	1.2E-07	1.3E-06	NA	4.0E-02	NA		3.4E-05	<1%
Fluorene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	4.0E-02	NA		1.8E-06	<1%
Indeno[1,2,3-cd]pyrene	8.0E-02	0.5	2.3E-07	5.1E-07	7.3E-01	NA	1.7E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	1.6E-01	0.5	8.8E-08	1.0E-06	NA	NA	NA		NA	
Pyrene	2.2E-01	0.5	1.2E-07	1.4E-06	NA	3.0E-02	NA		4.7E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.4E-01	1	2.6E-07	3.1E-06	2.0E+00	NA	5.3E-07	11%	NA	
Aroclor-1254	4.6E-02	1	5.0E-08	5.9E-07	2.0E+00	2.0E-05	1.0E-07	2%	2.9E-02	99%
Aroclor-1260	ND									
VOC										
Tetrachloroethene	1.7E-01	1	1.9E-07	2.2E-06	2.1E-03	6.0E-03	3.9E-10	<1%	3.6E-04	1%
Trichloroethene	ND									
						Total Cancer Risk:	4.7E-06	**Hazard Index:**	3.0E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.9E-07	5%
Benzo[a]pyrene	2.9E-06	53%
Benzo[b]fluoranthene	3.7E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.0E-08	<1%
Chrysene	3.4E-09	<1%
Dibenz(a,h)anthracene	8.6E-07	15%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.0E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	7.5E-07	13%
Aroclor-1254	1.4E-07	3%
Aroclor-1260		
VOC		
Tetrachloroethene	5.6E-10	<1%
Trichloroethene		
Total Cancer Risk:	5.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.94 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **253 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.3E-02	1.3E-01	5.6E-09	1.6E-08	NA	3.0E-01	NA		5.4E-08	<1%
Benzo[a]anthracene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E-01	NA	3.9E-08	5%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	5.4E-08	8.5E-08	7.3E+00	NA	3.9E-07	51%	NA	
Benzo[b]fluoranthene	1.5E-01	1.3E-01	6.7E-08	1.1E-07	7.3E-01	NA	4.9E-08	6%	NA	
Benzo(g,h,i)perylene	8.9E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.2E-02	1.3E-01	3.7E-08	5.8E-08	7.3E-02	NA	2.7E-09	<1%	NA	
Chrysene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E-03	NA	4.6E-10	<1%	NA	
Dibenz(a,h)anthracene	3.5E-02	1.3E-01	1.6E-08	2.5E-08	7.3E+00	NA	1.1E-07	15%	NA	
Fluoranthene	2.1E-01	1.3E-01	5.1E-08	1.5E-07	NA	4.0E-02	NA		3.7E-06	<1%
Fluorene	1.1E-02	1.3E-01	2.7E-09	7.8E-09	NA	4.0E-02	NA		2.0E-07	<1%
Indeno[1,2,3-cd]pyrene	8.0E-02	1.3E-01	3.6E-08	5.7E-08	7.3E-01	NA	2.6E-08	3%	NA	
Naphthalene	ND									
Phenanthrene	1.6E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.2E-01	1.3E-01	5.4E-08	1.6E-07	NA	3.0E-02	NA		5.2E-06	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.4E-01	1.4E-01	6.3E-08	1.8E-07	2.0E+00	NA	1.3E-07	16%	NA	
Aroclor-1254	4.6E-02	1.4E-01	1.2E-08	3.5E-08	2.0E+00	2.0E-05	2.4E-08	3%	1.8E-03	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.7E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	7.7E-07	**Hazard Index:**	1.8E-03	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	2.3E-02	1.3E-01	9.2E-09	1.1E-07	NA	3.0E-01	NA		3.6E-07	<1%
Benzo[a]anthracene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E-01	NA	1.9E-07	6%	NA	
Benzo[a]pyrene	1.2E-01	1.3E-01	2.6E-07	5.6E-07	7.3E+00	NA	1.9E-06	58%	NA	
Benzo[b]fluoranthene	1.5E-01	1.3E-01	3.2E-07	7.0E-07	7.3E-01	NA	2.3E-07	7%	NA	
Benzo(g,h,i)perylene	8.9E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	8.2E-02	1.3E-01	1.7E-07	3.8E-07	7.3E-02	NA	1.3E-08	<1%	NA	
Chrysene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E-03	NA	2.2E-09	<1%	NA	
Dibenz(a,h)anthracene	3.5E-02	1.3E-01	7.4E-08	1.6E-07	7.3E+00	NA	5.4E-07	17%	NA	
Fluoranthene	2.1E-01	1.3E-01	8.4E-08	9.8E-07	NA	4.0E-02	NA		2.4E-05	<1%
Fluorene	1.1E-02	1.3E-01	4.4E-09	5.1E-08	NA	4.0E-02	NA		1.3E-06	<1%
Indeno[1,2,3-cd]pyrene	8.0E-02	1.3E-01	1.7E-07	3.7E-07	7.3E-01	NA	1.2E-07	4%	NA	
Naphthalene	ND									
Phenanthrene	1.6E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	2.2E-01	1.3E-01	8.8E-08	1.0E-06	NA	3.0E-02	NA		3.4E-05	<1%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	2.4E-01	1.4E-01	1.0E-07	1.2E-06	2.0E+00	NA	2.1E-07	6%	NA	
Aroclor-1254	4.6E-02	1.4E-01	2.0E-08	2.3E-07	2.0E+00	2.0E-05	4.0E-08	1%	1.2E-02	99%
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	1.7E-01	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	3.2E-06	**Hazard Index:**	1.2E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	2.3E-07	6%
Benzo[a]pyrene	2.3E-06	57%
Benzo[b]fluoranthene	2.8E-07	7%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.5E-08	<1%
Chrysene	2.6E-09	<1%
Dibenz(a,h)anthracene	6.6E-07	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	1.5E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	3.3E-07	8%
Aroclor-1254	6.4E-08	2%
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	4.0E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.95 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **253 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	6.7E-01	2.2E-01	6.4E-04	2.6E-07	4.0E-02	5.7E-08	100%	1.6E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	5.7E-08	**Hazard Index:**	1.6E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	6.7E-01	5.5E-02	6.4E-04	2.6E-07	4.0E-02	1.4E-08	100%	1.6E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	1.4E-08	**Hazard Index:**	1.6E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	7.2E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	7.2E-08	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.96 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: 257 Waubesa

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.1E-02	0.5	2.6E-09	7.5E-09	NA	6.0E-02	NA		1.3E-07	<1%
Acenaphthylene	2.8E-02	0.5	6.6E-09	1.9E-08	NA	NA	NA		NA	
Anthracene	4.7E-02	0.5	1.1E-08	3.2E-08	NA	3.0E-01	NA		1.1E-07	<1%
Benzo[a]anthracene	2.9E-01	0.5	1.2E-07	2.0E-07	7.3E-01	NA	9.1E-08	5%	NA	
Benzo[a]pyrene	3.1E-01	0.5	1.3E-07	2.1E-07	7.3E+00	NA	9.7E-07	53%	NA	
Benzo[b]fluoranthene	4.1E-01	0.5	1.8E-07	2.8E-07	7.3E-01	NA	1.3E-07	7%	NA	
Benzo(g,h,i)perylene	2.6E-01	0.5	6.1E-08	1.8E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	0.5	7.3E-08	1.2E-07	7.3E-02	NA	5.3E-09	<1%	NA	
Chrysene	3.4E-01	0.5	1.5E-07	2.3E-07	7.3E-03	NA	1.1E-09	<1%	NA	
Dibenz(a,h)anthracene	7.8E-02	0.5	3.4E-08	5.3E-08	7.3E+00	NA	2.5E-07	13%	NA	
Fluoranthene	5.7E-01	0.5	1.3E-07	3.9E-07	NA	4.0E-02	NA		9.8E-06	28%
Fluorene	1.3E-02	0.5	3.1E-09	8.9E-09	NA	4.0E-02	NA		2.2E-07	<1%
Indeno[1,2,3-cd]pyrene	1.9E-01	0.5	8.2E-08	1.3E-07	7.3E-01	NA	6.0E-08	3%	NA	
Naphthalene	1.9E-02	0.5	4.5E-09	1.3E-08	NA	2.0E-02	NA		6.5E-07	2%
Phenanthrene	2.8E-01	0.5	6.6E-08	1.9E-07	NA	NA	NA		NA	
Pyrene	5.5E-01	0.5	1.3E-07	3.8E-07	NA	3.0E-02	NA		1.3E-05	36%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	3.7E-01	1	1.7E-07	5.1E-07	2.0E+00	NA	3.5E-07	19%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	1	2.4E-08	7.1E-08	2.1E-03	6.0E-03	5.1E-11	<1%	1.2E-05	34%
Trichloroethene	ND									
						Total Cancer Risk:	1.9E-06	**Hazard Index:**	3.5E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				6-16 yrs	16-30 yrs
		1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)	100	100	100	100
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.1E-02	0.5	6.0E-09	7.0E-08	NA	6.0E-02	NA		1.2E-06	<1%
Acenaphthylene	2.8E-02	0.5	1.5E-08	1.8E-07	NA	NA	NA		NA	
Anthracene	4.7E-02	0.5	2.6E-08	3.0E-07	NA	3.0E-01	NA		1.0E-06	<1%
Benzo[a]anthracene	2.9E-01	0.5	8.5E-07	1.9E-06	7.3E-01	NA	6.2E-07	6%	NA	
Benzo[a]pyrene	3.1E-01	0.5	9.1E-07	2.0E-06	7.3E+00	NA	6.6E-06	60%	NA	
Benzo[b]fluoranthene	4.1E-01	0.5	1.2E-06	2.6E-06	7.3E-01	NA	8.7E-07	8%	NA	
Benzo(g,h,i)perylene	2.6E-01	0.5	1.4E-07	1.7E-06	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	0.5	5.0E-07	1.1E-06	7.3E-02	NA	3.6E-08	<1%	NA	
Chrysene	3.4E-01	0.5	9.9E-07	2.2E-06	7.3E-03	NA	7.3E-09	<1%	NA	
Dibenz(a,h)anthracene	7.8E-02	0.5	2.3E-07	5.0E-07	7.3E+00	NA	1.7E-06	15%	NA	
Fluoranthene	5.7E-01	0.5	3.1E-07	3.6E-06	NA	4.0E-02	NA		9.1E-05	28%
Fluorene	1.3E-02	0.5	7.1E-09	8.3E-08	NA	4.0E-02	NA		2.1E-06	<1%
Indeno[1,2,3-cd]pyrene	1.9E-01	0.5	5.6E-07	1.2E-06	7.3E-01	NA	4.1E-07	4%	NA	
Naphthalene	1.9E-02	0.5	1.0E-08	1.2E-07	NA	2.0E-02	NA		6.1E-06	2%
Phenanthrene	2.8E-01	0.5	1.5E-07	1.8E-06	NA	NA	NA		NA	
Pyrene	5.5E-01	0.5	3.0E-07	3.5E-06	NA	3.0E-02	NA		1.2E-04	36%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	3.7E-01	1	4.1E-07	4.7E-06	2.0E+00	NA	8.1E-07	7%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	5.2E-02	1	5.7E-08	6.6E-07	2.1E-03	6.0E-03	1.2E-10	<1%	1.1E-04	34%
Trichloroethene	ND									
						Total Cancer Risk:	1.1E-05	**Hazard Index:**	3.3E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	7.1E-07	6%
Benzo[a]pyrene	7.6E-06	59%
Benzo[b]fluoranthene	1.0E-06	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	4.2E-08	<1%
Chrysene	8.3E-09	<1%
Dibenz(a,h)anthracene	1.9E-06	15%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	4.7E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	1.2E-06	9%
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	1.7E-10	<1%
Trichloroethene		
Total Cancer Risk:	1.3E-05	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.97 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **257 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.1E-02	1.3E-01	2.7E-09	7.8E-09	NA	6.0E-02	NA		1.3E-07	<1%
Acenaphthylene	2.8E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.7E-02	1.3E-01	1.1E-08	3.3E-08	NA	3.0E-01	NA		1.1E-07	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	1.3E-07	2.1E-07	7.3E-01	NA	9.5E-08	5%	NA	
Benzo[a]pyrene	3.1E-01	1.3E-01	1.4E-07	2.2E-07	7.3E+00	NA	1.0E-06	58%	NA	
Benzo[b]fluoranthene	4.1E-01	1.3E-01	1.8E-07	2.9E-07	7.3E-01	NA	1.3E-07	8%	NA	
Benzo(g,h,i)perylene	2.6E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	1.3E-01	7.6E-08	1.2E-07	7.3E-02	NA	5.5E-09	<1%	NA	
Chrysene	3.4E-01	1.3E-01	1.5E-07	2.4E-07	7.3E-03	NA	1.1E-09	<1%	NA	
Dibenz(a,h)anthracene	7.8E-02	1.3E-01	3.5E-08	5.5E-08	7.3E+00	NA	2.5E-07	14%	NA	
Fluoranthene	5.7E-01	1.3E-01	1.4E-07	4.1E-07	NA	4.0E-02	NA		1.0E-05	42%
Fluorene	1.3E-02	1.3E-01	3.2E-09	9.2E-09	NA	4.0E-02	NA		2.3E-07	<1%
Indeno[1,2,3-cd]pyrene	1.9E-01	1.3E-01	8.5E-08	1.4E-07	7.3E-01	NA	6.2E-08	4%	NA	
Naphthalene	1.9E-02	1.3E-01	4.6E-09	1.4E-08	NA	2.0E-02	NA		6.8E-07	3%
Phenanthrene	2.8E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.5E-01	1.3E-01	1.3E-07	3.9E-07	NA	3.0E-02	NA		1.3E-05	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	3.7E-01	1.4E-01	9.7E-08	2.8E-07	2.0E+00	NA	1.9E-07	11%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.8E-06	**Hazard Index:**	2.4E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.1E-02	1.3E-01	4.4E-09	5.1E-08	NA	6.0E-02	NA		8.5E-07	<1%
Acenaphthylene	2.8E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	4.7E-02	1.3E-01	1.9E-08	2.2E-07	NA	3.0E-01	NA		7.3E-07	<1%
Benzo[a]anthracene	2.9E-01	1.3E-01	6.2E-07	1.3E-06	7.3E-01	NA	4.5E-07	6%	NA	
Benzo[a]pyrene	3.1E-01	1.3E-01	6.6E-07	1.4E-06	7.3E+00	NA	4.8E-06	62%	NA	
Benzo[b]fluoranthene	4.1E-01	1.3E-01	8.7E-07	1.9E-06	7.3E-01	NA	6.4E-07	8%	NA	
Benzo(g,h,i)perylene	2.6E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.7E-01	1.3E-01	3.6E-07	7.9E-07	7.3E-02	NA	2.6E-08	<1%	NA	
Chrysene	3.4E-01	1.3E-01	7.2E-07	1.6E-06	7.3E-03	NA	5.3E-09	<1%	NA	
Dibenz(a,h)anthracene	7.8E-02	1.3E-01	1.7E-07	3.6E-07	7.3E+00	NA	1.2E-06	16%	NA	
Fluoranthene	5.7E-01	1.3E-01	2.3E-07	2.7E-06	NA	4.0E-02	NA		6.6E-05	42%
Fluorene	1.3E-02	1.3E-01	5.2E-09	6.1E-08	NA	4.0E-02	NA		1.5E-06	<1%
Indeno[1,2,3-cd]pyrene	1.9E-01	1.3E-01	4.0E-07	8.8E-07	7.3E-01	NA	3.0E-07	4%	NA	
Naphthalene	1.9E-02	1.3E-01	7.6E-09	8.8E-08	NA	2.0E-02	NA		4.4E-06	3%
Phenanthrene	2.8E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	5.5E-01	1.3E-01	2.2E-07	2.6E-06	NA	3.0E-02	NA		8.5E-05	54%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	3.7E-01	1.4E-01	1.6E-07	1.9E-06	2.0E+00	NA	3.2E-07	4%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	5.2E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	7.8E-06	**Hazard Index:**	1.6E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.4E-07	6%
Benzo[a]pyrene	5.8E-06	61%
Benzo[b]fluoranthene	7.7E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.2E-08	<1%
Chrysene	6.4E-09	<1%
Dibenz(a,h)anthracene	1.5E-06	15%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.6E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248	5.1E-07	5%
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	9.5E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.98 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: 257 Waubesa

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	7.3E-01	2.4E-01	7.0E-04	2.6E-07	4.0E-02	6.2E-08	100%	1.7E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	6.2E-08	**Hazard Index:**	1.7E-02	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[b]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT}$ =			9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
	ET	Exposure time (hrs/day)	24	24	24	24
	EF	Exposure Frequency (days/yr)	350	350	350	350
	ED	Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
	AT	Averaging Time (d)	8760	25550	25550	25550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	7.3E-01	6.0E-02	7.0E-04	2.6E-07	4.0E-02	1.6E-08	100%	1.7E-02	100%
Trichloroethene	ND								
Vinyl Chloride	ND								
					Total Cancer Risk:	1.6E-08	**Hazard Index:**	1.7E-02	

Notes:

$$\text{Intake Factor (IF)} = \frac{ET \times EF \times ED \times CF \times (1day/24h) \times TAF}{AT} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene	7.8E-08	100%
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	7.8E-08	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.99 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **261 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.6E-02	0.5	3.8E-09	1.1E-08	NA	3.0E-01	NA		3.7E-08	<1%
Benzo[a]anthracene	5.4E-02	0.5	2.3E-08	3.7E-08	7.3E-01	NA	1.7E-08	5%	NA	
Benzo[a]pyrene	7.6E-02	0.5	3.3E-08	5.2E-08	7.3E+00	NA	2.4E-07	71%	NA	
Benzo[b]fluoranthene	8.1E-02	0.5	3.5E-08	5.5E-08	7.3E-01	NA	2.5E-08	8%	NA	
Benzo(g,h,i)perylene	4.2E-02	0.5	9.9E-09	2.9E-08	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.0E-02	0.5	2.6E-08	4.1E-08	7.3E-02	NA	1.9E-09	<1%	NA	
Chrysene	9.0E-02	0.5	3.9E-08	6.2E-08	7.3E-03	NA	2.8E-10	<1%	NA	
Dibenz(a,h)anthracene	1.4E-02	0.5	6.0E-09	9.6E-09	7.3E+00	NA	4.4E-08	13%	NA	
Fluoranthene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	4.0E-02	NA		2.2E-06	39%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.0E-02	0.5	1.3E-08	2.1E-08	7.3E-01	NA	9.4E-09	3%	NA	
Naphthalene	1.5E-02	0.5	3.5E-09	1.0E-08	NA	2.0E-02	NA		5.1E-07	9%
Phenanthrene	7.0E-02	0.5	1.6E-08	4.8E-08	NA	NA	NA		NA	
Pyrene	1.3E-01	0.5	3.1E-08	8.9E-08	NA	3.0E-02	NA		3.0E-06	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	3.4E-07	**Hazard Index:**	5.7E-06	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
	IR	Ingestion Rate (mg/day)	100	100	100	100
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.6E-02	0.5	8.8E-09	1.0E-07	NA	3.0E-01	NA		3.4E-07	<1%
Benzo[a]anthracene	5.4E-02	0.5	1.6E-07	3.5E-07	7.3E-01	NA	1.2E-07	5%	NA	
Benzo[a]pyrene	7.6E-02	0.5	2.2E-07	4.9E-07	7.3E+00	NA	1.6E-06	71%	NA	
Benzo[b]fluoranthene	8.1E-02	0.5	2.4E-07	5.2E-07	7.3E-01	NA	1.7E-07	8%	NA	
Benzo(g,h,i)perylene	4.2E-02	0.5	2.3E-08	2.7E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.0E-02	0.5	1.8E-07	3.8E-07	7.3E-02	NA	1.3E-08	<1%	NA	
Chrysene	9.0E-02	0.5	2.6E-07	5.8E-07	7.3E-03	NA	1.9E-09	<1%	NA	
Dibenz(a,h)anthracene	1.4E-02	0.5	4.1E-08	8.9E-08	7.3E+00	NA	3.0E-07	13%	NA	
Fluoranthene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	4.0E-02	NA		2.1E-05	39%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.0E-02	0.5	8.8E-08	1.9E-07	7.3E-01	NA	6.4E-08	3%	NA	
Naphthalene	1.5E-02	0.5	8.2E-09	9.6E-08	NA	2.0E-02	NA		4.8E-06	9%
Phenanthrene	7.0E-02	0.5	3.8E-08	4.5E-07	NA	NA	NA		NA	
Pyrene	1.3E-01	0.5	7.1E-08	8.3E-07	NA	3.0E-02	NA		2.8E-05	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	2.3E-06	**Hazard Index:**	5.4E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{IR x EF x ED x CF x FR x TAF}}{\text{BW x AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[a]	
				0-2 yrs	2-6 yrs
		1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
IR	Ingestion Rate (mg/day)	200	200	200	200
FR	Fraction from Contaminated Source	1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.3E-07	5%
Benzo[a]pyrene	1.9E-06	71%
Benzo[b]fluoranthene	2.0E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.5E-08	<1%
Chrysene	2.2E-09	<1%
Dibenz(a,h)anthracene	3.4E-07	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	7.3E-08	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.6E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.100 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **261 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.6E-02	1.3E-01	3.9E-09	1.1E-08	NA	3.0E-01	NA		3.8E-08	<1%
Benzo[a]anthracene	5.4E-02	1.3E-01	2.4E-08	3.8E-08	7.3E-01	NA	1.8E-08	5%	NA	
Benzo[a]pyrene	7.6E-02	1.3E-01	3.4E-08	5.4E-08	7.3E+00	NA	2.5E-07	71%	NA	
Benzo[b]fluoranthene	8.1E-02	1.3E-01	3.6E-08	5.8E-08	7.3E-01	NA	2.6E-08	8%	NA	
Benzo(g,h,i)perylene	4.2E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.0E-02	1.3E-01	2.7E-08	4.3E-08	7.3E-02	NA	2.0E-09	<1%	NA	
Chrysene	9.0E-02	1.3E-01	4.0E-08	6.4E-08	7.3E-03	NA	2.9E-10	<1%	NA	
Dibenz(a,h)anthracene	1.4E-02	1.3E-01	6.3E-09	9.9E-09	7.3E+00	NA	4.6E-08	13%	NA	
Fluoranthene	1.3E-01	1.3E-01	3.2E-08	9.2E-08	NA	4.0E-02	NA		2.3E-06	39%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.0E-02	1.3E-01	1.3E-08	2.1E-08	7.3E-01	NA	9.8E-09	3%	NA	
Naphthalene	1.5E-02	1.3E-01	3.7E-09	1.1E-08	NA	2.0E-02	NA		5.3E-07	9%
Phenanthrene	7.0E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.3E-01	1.3E-01	3.2E-08	9.2E-08	NA	3.0E-02	NA		3.1E-06	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	3.5E-07	**Hazard Index:**	6.0E-06	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				6-16 yrs	16-30 yrs
		5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	70	70	70	70
AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	ND									
Acenaphthylene	ND									
Anthracene	1.6E-02	1.3E-01	6.4E-09	7.4E-08	NA	3.0E-01	NA		2.5E-07	<1%
Benzo[a]anthracene	5.4E-02	1.3E-01	1.1E-07	2.5E-07	7.3E-01	NA	8.4E-08	5%	NA	
Benzo[a]pyrene	7.6E-02	1.3E-01	1.6E-07	3.5E-07	7.3E+00	NA	1.2E-06	71%	NA	
Benzo[b]fluoranthene	8.1E-02	1.3E-01	1.7E-07	3.8E-07	7.3E-01	NA	1.3E-07	8%	NA	
Benzo(g,h,i)perylene	4.2E-02	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	6.0E-02	1.3E-01	1.3E-07	2.8E-07	7.3E-02	NA	9.3E-09	<1%	NA	
Chrysene	9.0E-02	1.3E-01	1.9E-07	4.2E-07	7.3E-03	NA	1.4E-09	<1%	NA	
Dibenz(a,h)anthracene	1.4E-02	1.3E-01	3.0E-08	6.5E-08	7.3E+00	NA	2.2E-07	13%	NA	
Fluoranthene	1.3E-01	1.3E-01	5.2E-08	6.1E-07	NA	4.0E-02	NA		1.5E-05	39%
Fluorene	ND									
Indeno[1,2,3-cd]pyrene	3.0E-02	1.3E-01	6.4E-08	1.4E-07	7.3E-01	NA	4.7E-08	3%	NA	
Naphthalene	1.5E-02	1.3E-01	6.0E-09	7.0E-08	NA	2.0E-02	NA		3.5E-06	9%
Phenanthrene	7.0E-02	NA	NA	NA	NA	NA	NA		NA	
Pyrene	1.3E-01	1.3E-01	5.2E-08	6.1E-07	NA	3.0E-02	NA		2.0E-05	52%
PCBs										
Aroclor-1242	ND									
Aroclor-1248	ND									
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	ND									
Trichloroethene	ND									
						Total Cancer Risk:	1.7E-06	**Hazard Index:**	3.9E-05	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	1.0E-07	5%
Benzo[a]pyrene	1.4E-06	71%
Benzo[b]fluoranthene	1.5E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	1.1E-08	<1%
Chrysene	1.7E-09	<1%
Dibenz(a,h)anthracene	2.6E-07	13%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	5.6E-08	3%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242		
Aroclor-1248		
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	2.0E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.101 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **261 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET} \times \text{EF} \times \text{ED} \times \text{CF} \times (1\text{day}/24\text{h}) \times \text{TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

"-" = Not sampled.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF

Table D.102 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Incidental Ingestion of Soil

Property: **265 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.6E-02	0.5	3.8E-09	1.1E-08	NA	6.0E-02	NA		1.8E-07	<1%
Acenaphthylene	1.3E-02	0.5	3.1E-09	8.9E-09	NA	NA	NA		NA	
Anthracene	3.9E-02	0.5	9.2E-09	2.7E-08	NA	3.0E-01	NA		8.9E-08	<1%
Benzo[a]anthracene	2.1E-01	0.5	9.0E-08	1.4E-07	7.3E-01	NA	6.6E-08	5%	NA	
Benzo[a]pyrene	2.3E-01	0.5	9.9E-08	1.6E-07	7.3E+00	NA	7.2E-07	53%	NA	
Benzo[b]fluoranthene	3.2E-01	0.5	1.4E-07	2.2E-07	7.3E-01	NA	1.0E-07	7%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	3.5E-08	1.0E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.3E-01	0.5	5.6E-08	8.9E-08	7.3E-02	NA	4.1E-09	<1%	NA	
Chrysene	2.7E-01	0.5	1.2E-07	1.8E-07	7.3E-03	NA	8.5E-10	<1%	NA	
Dibenz(a,h)anthracene	6.8E-02	0.5	2.9E-08	4.7E-08	7.3E+00	NA	2.1E-07	16%	NA	
Fluoranthene	4.1E-01	0.5	9.6E-08	2.8E-07	NA	4.0E-02	NA		7.0E-06	19%
Fluorene	1.7E-02	0.5	4.0E-09	1.2E-08	NA	4.0E-02	NA		2.9E-07	<1%
Indeno[1,2,3-cd]pyrene	1.4E-01	0.5	6.0E-08	9.6E-08	7.3E-01	NA	4.4E-08	3%	NA	
Naphthalene	9.7E-03	0.5	2.3E-09	6.6E-09	NA	2.0E-02	NA		3.3E-07	<1%
Phenanthrene	2.0E-01	0.5	4.7E-08	1.4E-07	NA	NA	NA		NA	
Pyrene	4.0E-01	0.5	9.4E-08	2.7E-07	NA	3.0E-02	NA		9.1E-06	25%
PCBs										
Aroclor-1242	1.3E-01	1	6.1E-08	1.8E-07	2.0E+00	NA	1.2E-07	9%	NA	
Aroclor-1248	9.4E-02	1	4.4E-08	1.3E-07	2.0E+00	NA	8.8E-08	6%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.6E-02	1	4.0E-08	1.2E-07	2.1E-03	6.0E-03	8.5E-11	<1%	2.0E-05	54%
Trichloroethene	ND									
						Total Cancer Risk:	1.4E-06	**Hazard Index:**	3.7E-05	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.4E-06 (non-cancer)	4.7E-07 (cancer)	5.9E-07 (cancer)	2.7E-07 (cancer)
IR	Ingestion Rate (mg/day)		100	100	100	100
FR	Fraction from Contaminated Source		1	1	1	1
EF	Soil Ingestion Exposure Frequency (days/yr)		350	350	350	350
ED	Soil Ingestion Exposure Duration (yrs)		24	24	10	14
CF	Conversion Factor (kg/mg)		0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)		70	70	70	70
AT	Averaging Time (d)		8,760	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor		1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Oral Bioavailability (B) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk CR = DI_c x SF**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = DI_{nc}÷RfD**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.6E-02	0.5	8.8E-09	1.0E-07	NA	6.0E-02	NA		1.7E-06	<1%
Acenaphthylene	1.3E-02	0.5	7.1E-09	8.3E-08	NA	NA	NA		NA	
Anthracene	3.9E-02	0.5	2.1E-08	2.5E-07	NA	3.0E-01	NA		8.3E-07	<1%
Benzo[a]anthracene	2.1E-01	0.5	6.1E-07	1.3E-06	7.3E-01	NA	4.5E-07	5%	NA	
Benzo[a]pyrene	2.3E-01	0.5	6.7E-07	1.5E-06	7.3E+00	NA	4.9E-06	59%	NA	
Benzo[b]fluoranthene	3.2E-01	0.5	9.4E-07	2.0E-06	7.3E-01	NA	6.8E-07	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	0.5	8.2E-08	9.6E-07	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.3E-01	0.5	3.8E-07	8.3E-07	7.3E-02	NA	2.8E-08	<1%	NA	
Chrysene	2.7E-01	0.5	7.9E-07	1.7E-06	7.3E-03	NA	5.8E-09	<1%	NA	
Dibenz(a,h)anthracene	6.8E-02	0.5	2.0E-07	4.3E-07	7.3E+00	NA	1.5E-06	17%	NA	
Fluoranthene	4.1E-01	0.5	2.2E-07	2.6E-06	NA	4.0E-02	NA		6.6E-05	19%
Fluorene	1.7E-02	0.5	9.3E-09	1.1E-07	NA	4.0E-02	NA		2.7E-06	<1%
Indeno[1,2,3-cd]pyrene	1.4E-01	0.5	4.1E-07	8.9E-07	7.3E-01	NA	3.0E-07	4%	NA	
Naphthalene	9.7E-03	0.5	5.3E-09	6.2E-08	NA	2.0E-02	NA		3.1E-06	<1%
Phenanthrene	2.0E-01	0.5	1.1E-07	1.3E-06	NA	NA	NA		NA	
Pyrene	4.0E-01	0.5	2.2E-07	2.6E-06	NA	3.0E-02	NA		8.5E-05	25%
PCBs										
Aroclor-1242	1.3E-01	1	1.4E-07	1.7E-06	2.0E+00	NA	2.8E-07	3%	NA	
Aroclor-1248	9.4E-02	1	1.0E-07	1.2E-06	2.0E+00	NA	2.1E-07	2%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOC										
Tetrachloroethene	8.6E-02	1	9.4E-08	1.1E-06	2.1E-03	6.0E-03	2.0E-10	<1%	1.8E-04	54%
Trichloroethene	ND									
						Total Cancer Risk:	8.3E-06	**Hazard Index:**	3.4E-04	

Notes:

			Non-Cancer	Non-Mutagen	Mutagens[a] 0-2 yrs	Mutagens[a] 2-6 yrs
Intake Factor (IF) = $\frac{IR \times EF \times ED \times CF \times FR \times TAF}{BW \times AT}$ =			1.3E-05 (non-cancer)	1.1E-06 (cancer)	3.7E-06 (cancer)	2.2E-06 (cancer)
	IR	Ingestion Rate (mg/day)	200	200	200	200
	FR	Fraction from Contaminated Source	1	1	1	1
	EF	Soil Ingestion Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Ingestion Exposure Duration (yrs)	6	6	2	4
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	15	15	15	15
	AT	Averaging Time (d)	2,190	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = DI_c x SF	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	5.1E-07	5%
Benzo[a]pyrene	5.6E-06	58%
Benzo[b]fluoranthene	7.8E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	3.2E-08	<1%
Chrysene	6.6E-09	<1%
Dibenz(a,h)anthracene	1.7E-06	17%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	3.4E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242	4.1E-07	4%
Aroclor-1248	2.9E-07	3%
Aroclor-1254		
Aroclor-1260		
VOC		
Tetrachloroethene	2.8E-10	<1%
Trichloroethene		
Total Cancer Risk:	9.7E-06	

Notes:

NA = Not available; risk or hazard could not be calculated.

ND = Not detected.

(a) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*B

Table D.103 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Dermal Contact with Soil

Property: **265 Waubesa**

Adult Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.6E-02	1.3E-01	3.9E-09	1.1E-08	NA	6.0E-02	NA		1.9E-07	1%
Acenaphthylene	1.3E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.9E-02	1.3E-01	9.5E-09	2.8E-08	NA	3.0E-01	NA		9.2E-08	<1%
Benzo[a]anthracene	2.1E-01	1.3E-01	9.4E-08	1.5E-07	7.3E-01	NA	6.8E-08	5%	NA	
Benzo[a]pyrene	2.3E-01	1.3E-01	1.0E-07	1.6E-07	7.3E+00	NA	7.5E-07	57%	NA	
Benzo[b]fluoranthene	3.2E-01	1.3E-01	1.4E-07	2.3E-07	7.3E-01	NA	1.0E-07	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.3E-01	1.3E-01	5.8E-08	9.2E-08	7.3E-02	NA	4.2E-09	<1%	NA	
Chrysene	2.7E-01	1.3E-01	1.2E-07	1.9E-07	7.3E-03	NA	8.8E-10	<1%	NA	
Dibenz(a,h)anthracene	6.8E-02	1.3E-01	3.0E-08	4.8E-08	7.3E+00	NA	2.2E-07	17%	NA	
Fluoranthene	4.1E-01	1.3E-01	1.0E-07	2.9E-07	NA	4.0E-02	NA		7.3E-06	41%
Fluorene	1.7E-02	1.3E-01	4.1E-09	1.2E-08	NA	4.0E-02	NA		3.0E-07	2%
Indeno[1,2,3-cd]pyrene	1.4E-01	1.3E-01	6.3E-08	9.9E-08	7.3E-01	NA	4.6E-08	3%	NA	
Naphthalene	9.7E-03	1.3E-01	2.4E-09	6.9E-09	NA	2.0E-02	NA		3.4E-07	2%
Phenanthrene	2.0E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.0E-01	1.3E-01	9.7E-08	2.8E-07	NA	3.0E-02	NA		9.5E-06	54%
PCBs										
Aroclor-1242	1.3E-01	1.4E-01	3.4E-08	9.9E-08	2.0E+00	NA	6.8E-08	5%	NA	
Aroclor-1248	9.4E-02	1.4E-01	2.5E-08	7.2E-08	2.0E+00	NA	4.9E-08	4%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.6E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	1.3E-06	**Hazard Index:**	1.8E-05	

Notes:

			Non-Mutagens		Mutagens[1]	
					6-16 yrs	16-30 yrs
Intake Factor (IF) = $\frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT}$ =			5.5E-06 (non-cancer)	1.9E-06 (cancer)	2.3E-06 (cancer)	1.1E-06 (cancer)
	SA	Surface Area Exposed to Soil (cm^2/day)	5700	5700	5700	5700
	AF	Soil Skin Adherence Factor (mg/cm^2)	0.07	0.07	0.07	0.07
	EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
	ED	Soil Dermal Exposure Duration (yrs)	24	24	10	14
	CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
	BW	Body Weight (kg)	70	70	70	70
	AT	Averaging Time - Cancer (d)	8,760	25,550	25,550	25,550
	TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident										
COPC	**Soil EPC (mg/kg)**	**Dermal Absorption Fraction (ABS) (unitless)**	**Daily Intake Cancer (DI_c) (mg/kg-d)**	**Daily Intake Non-Cancer (DI_{nc}) (mg/kg-d)**	**Cancer Slope Factor (SF) $(mg/kg\text{-}d)^{-1}$**	**Reference Dose (RfD) (mg/kg-d)**	**Cancer Risk $CR = DI_c \times SF$**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = DI_{nc} \div RfD$**	**Percent Contribution to Total Non-Cancer Risk**
PAHs										
1-Methylnaphthalene	ND									
2-Methylnaphthalene	ND									
Acenaphthene	1.6E-02	1.3E-01	6.4E-09	7.4E-08	NA	6.0E-02	NA		1.2E-06	1%
Acenaphthylene	1.3E-02	NA	NA	NA	NA	NA	NA		NA	
Anthracene	3.9E-02	1.3E-01	1.6E-08	1.8E-07	NA	3.0E-01	NA		6.1E-07	<1%
Benzo[a]anthracene	2.1E-01	1.3E-01	4.5E-07	9.8E-07	7.3E-01	NA	3.3E-07	6%	NA	
Benzo[a]pyrene	2.3E-01	1.3E-01	4.9E-07	1.1E-06	7.3E+00	NA	3.6E-06	61%	NA	
Benzo[b]fluoranthene	3.2E-01	1.3E-01	6.8E-07	1.5E-06	7.3E-01	NA	5.0E-07	8%	NA	
Benzo(g,h,i)perylene	1.5E-01	NA	NA	NA	NA	NA	NA		NA	
Benzo(k)fluoranthene	1.3E-01	1.3E-01	2.8E-07	6.1E-07	7.3E-02	NA	2.0E-08	<1%	NA	
Chrysene	2.7E-01	1.3E-01	5.7E-07	1.3E-06	7.3E-03	NA	4.2E-09	<1%	NA	
Dibenz(a,h)anthracene	6.8E-02	1.3E-01	1.4E-07	3.2E-07	7.3E+00	NA	1.1E-06	18%	NA	
Fluoranthene	4.1E-01	1.3E-01	1.6E-07	1.9E-06	NA	4.0E-02	NA		4.8E-05	41%
Fluorene	1.7E-02	1.3E-01	6.8E-09	7.9E-08	NA	4.0E-02	NA		2.0E-06	2%
Indeno[1,2,3-cd]pyrene	1.4E-01	1.3E-01	3.0E-07	6.5E-07	7.3E-01	NA	2.2E-07	4%	NA	
Naphthalene	9.7E-03	1.3E-01	3.9E-09	4.5E-08	NA	2.0E-02	NA		2.3E-06	2%
Phenanthrene	2.0E-01	NA	NA	NA	NA	NA	NA		NA	
Pyrene	4.0E-01	1.3E-01	1.6E-07	1.9E-06	NA	3.0E-02	NA		6.2E-05	54%
PCBs										
Aroclor-1242	1.3E-01	1.4E-01	5.6E-08	6.5E-07	2.0E+00	NA	1.1E-07	2%	NA	
Aroclor-1248	9.4E-02	1.4E-01	4.0E-08	4.7E-07	2.0E+00	NA	8.1E-08	1%	NA	
Aroclor-1254	ND									
Aroclor-1260	ND									
VOCs										
Tetrachloroethene	8.6E-02	NA	NA	NA	2.1E-03	6.0E-03	NA		NA	
Trichloroethene	ND									
						Total Cancer Risk:	5.9E-06	**Hazard Index:**	1.2E-04	

Notes:

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF \times TAF}{BW \times AT} =$$

		Non-Mutagens		Mutagens[1]	
				0-2 yrs	2-6 yrs
		3.6E-05 (non-cancer)	3.1E-06 (cancer)	1.0E-05 (cancer)	6.1E-06 (cancer)
SA	Surface Area Exposed to Soil (cm^2/day)	2800	2800	2800	2800
AF	Soil Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2
EF	Soil Dermal Exposure Frequency (days/yr)	350	350	350	350
ED	Soil Dermal Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001
BW	Body Weight (kg)	15	15	15	15
AT	Averaging Time - Cancer (d)	2,190	25,550	25,550	25,550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk $CR = DI_c \times SF$	Percent Contribution to Total Cancer Risk
PAHs		
1-Methylnaphthalene		
2-Methylnaphthalene		
Acenaphthene		
Acenaphthylene		
Anthracene		
Benzo[a]anthracene	3.9E-07	5%
Benzo[a]pyrene	4.3E-06	60%
Benzo[b]fluoranthene	6.0E-07	8%
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene	2.4E-08	<1%
Chrysene	5.1E-09	<1%
Dibenz(a,h)anthracene	1.3E-06	18%
Fluoranthene		
Fluorene		
Indeno[1,2,3-cd]pyrene	2.6E-07	4%
Naphthalene		
Phenanthrene		
Pyrene		
PCBs		
Aroclor-1242	1.8E-07	2%
Aroclor-1248	1.3E-07	2%
Aroclor-1254		
Aroclor-1260		
VOCs		
Tetrachloroethene		
Trichloroethene		
Total Cancer Risk:	7.2E-06	

Notes:

NA = Not available.

ND = Not detected.

(1) The mutagen risks for separate age groups are added together to calculate the total risk.

DI (mg/kg·d) = EPC*IF*ABS

Table D.104 Excess Lifetime Cancer and Non-Cancer Risk by Chemical for Adult and Child Resident

Indoor Air Exposure

Property: **265 Waubesa**

Adult Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk CR = ADE_c x IUR[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient HQ = ADE_{nc}÷RfC**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET x EF x ED x CF x (1day/24h) x TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				6-16 yrs	16-30 yrs
		9.6E-04 (non-cancer)	3.3E-01 (cancer)	4.1E-01 (cancer)	1.9E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	24	24	10	14
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	8760	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	3	1

Child Resident									
COPC	**Air EPC ($\mu g/m^3$)**	**Average Daily Exposure (ADE_c) ($\mu g/m^3$)**	**Average Daily Exposure (ADE_{nc}) (mg/m^3)**	**Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$**	**Reference Concentration (RfC) (mg/m^3)**	**Cancer Risk $CR = ADE_c \times IUR$[a]**	**Percent Contribution to Total Cancer Risk**	**Hazard Quotient $HQ = ADE_{nc} \div RfC$**	**Percent Contribution to Total Non-Cancer Hazard**
VOCs									
Tetrachloroethene	-								
Trichloroethene	-								
Vinyl Chloride	-								
					Total Cancer Risk:	NA	**Hazard Index:**	NA	

Notes:

$$\text{Intake Factor (IF)} = \frac{\text{ET} \times \text{EF} \times \text{ED} \times \text{CF} \times (1\text{day}/24\text{h}) \times \text{TAF}}{\text{AT}} =$$

		Non-Cancer	Non-Mutagen	Mutagens[b]	
				0-2 yrs	2-6 yrs
		9.6E-04 (non-cancer)	8.2E-02 (cancer)	2.7E-01 (cancer)	1.6E-01 (cancer)
ET	Exposure time (hrs/day)	24	24	24	24
EF	Exposure Frequency (days/yr)	350	350	350	350
ED	Exposure Duration (yrs)	6	6	2	4
CF	Conversion Factor - Non-Cancer (mg/ug)	0.001	0.001	0.001	0.001
AT	Averaging Time (d)	2190	25550	25550	25550
TAF	Toxicity Adjustment Factor	1	1	10	3

Total Excess Lifetime Cancer Risk (Child and Adult Resident)

COPC	Cancer Risk CR = ADE_c x IUR	Percent Contribution to Total Cancer Risk
VOCs		
Tetrachloroethene		
Trichloroethene		
Vinyl Chloride		
Total Cancer Risk:	NA	

Notes:

NA = Not available; risk or hazard could not be calculated.

"-" = Not sampled.

(a) If vinyl chloride is detected at the address, cancer risks are calculated in a separate table.

(b) The mutagen risks for separate age groups are added together to calculate the total risk.

ADE ($\mu g/m^3$) = EPC*IF