Table 4.11 Parameters used to estimate K^*L_S factors for use in the Universal Soil Loss Equation

Watershed	Dominant soil types in watershed		Weighting factor f_{LS}	K factor	Average slope θ_s (%)	Average length λ	L_S factor for soil type	K^*L_S factor for soil type
	Soil acronym	Description						
Cranberry Lake	ROC	rock outcrop/HLC	0.50	0.2	11.5	150	2.08	0.42
	ROD	rock outcrop/HLC	0.50	0.2	20	125	4.66	0.93
	Weighted-average $K^*L_{S,avg}$ factor for both wooded and open areas							0.67

Table 4.12 Parameters used to estimate concentrations of pollutants in surface waters

Watershed	Average $K^*L_{S,avg}$ factor (see Table 4.11)	R factor (tons/acre-yr per unit K)	Areas (km^2) within watershed				Sediment delivery ratio S_d	Cover factor C		Soil loading to water body R_s (tons/yr)	Runoff Volume V_w (m^3/yr)
			Wooded Land (A_{lw})	Open Land (A_{lo})	Water surface (A_w)	Total area		Wooded land	Open land		
Blendale, Blythea, & Shadowmere Lakes	0.46	160	0.655	0.051	0.098	0.803	0.35	0.006	0.1	58	8.4×10^8
Sapphire Lake	0.55	160	0.594	0.000	0.065	0.659	0.36	0.006	0.1	28	6.9×10^8
Swimming Pond	0.58 (wooded) 0.61 (open)	160	0.347	0.502	0.042	0.891	0.34	0.006	0.1	433	9.2×10^8
Cranberry Lake	0.67	160	0.794	0.003	0.313	1.108	0.35	0.006	0.1	47	1.2×10^9

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Table 4.13 Homegrown produce and animal feed modeling parameter values

Parameter values	Leafy produce	Exposed produce	Protected produce	Hay	Corn silage	Grain	Pasture grass
Intercept fraction (r)	0.119	0.032	NA	0.324	0.488	NA	0.292
Yield (kg/m^2) [wet weight for produce and dry weight for animal feed] (y)	1.5	1	NA	0.136	0.871	NA	0.12
Length of growing season (yr) (t_v)	0.42	0.42	NA	0.110	0.246	NA	0.15
Dry-to-wet weight conversion factor (d_w)	0.066	0.126	0.222	NA	NA	NA	NA
Washoff coefficient (yr^{-1}) (k_v)	18	18	NA	18	18	NA	18

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Table 4.13 Homegrown produce and animal feed modeling parameter values

Contaminants	Root uptake factor (R_u)						
	Leafy produce	Exposed produce	Protected produce	Hay	Corn silage	Grain	Pasture grass
Ammonia	NA	NA	NA	NA	NA	NA	NA
Antimony	0.2	0.03	0.03	0.2	0.2	0.03	0.2
Arsenic	0.04	0.006	0.006	0.04	0.04	0.006	0.04
Barium	0.15	0.015	0.015	0.15	0.15	0.015	0.15
Beryllium	0.01	0.0015	0.0015	0.01	0.01	0.0015	0.01
Cadmium	0.55	0.15	0.15	0.55	0.55	0.15	0.55
Chromium VI	0.0075	0.0045	0.0045	0.0075	0.0075	0.0045	0.0075
Chromium (total)	0.0075	0.0045	0.0045	0.0075	0.0075	0.0045	0.0075
Copper	0.4	0.25	0.25	0.4	0.4	0.25	0.4
Lead	0.045	0.009	0.009	0.045	0.045	0.009	0.045
Manganese	0.25	0.05	0.05	0.25	0.25	0.05	0.25
Mercury	0.9	0.2	0.2	0.9	0.9	0.2	0.9
Nickel	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Selenium	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Silver	0.4	0.1	0.1	0.4	0.4	0.1	0.4
Thallium	0.004	0.0004	0.0004	0.004	0.004	0.0004	0.004
Vanadium	0.0055	0.003	0.003	0.0055	0.0055	0.003	0.0055
Zinc	1.5	0.9	0.9	1.5	1.5	0.9	1.5
Alkyl pyridine	NA	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	NA	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA	NA	NA	NA
3-Picoline	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA

NA = Not applicable

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Table 4.14 Contaminant mass fractions in produce grown at the MEI residence

Contaminants	Leafy produce		Exposed produce		Protected produce	
	mass fraction mg/kg ww	fraction from direct deposition	mass fraction mg/kg ww	fraction from direct deposition	mass fraction mg/kg ww	fraction from direct deposition
Ammonia	NA	NA	NA	NA	NA	NA
Antimony	5.04e-05	0.68	1.84e-05	0.75	4.58e-06	0.00
Arsenic	2.66e-06	0.91	1.04e-06	0.94	6.49e-08	0.00
Barium	8.93e-05	0.74	3.10e-05	0.86	4.41e-06	0.00
Beryllium	1.37e-07	0.98	5.46e-08	0.98	8.91e-10	0.00
Cadmium	3.32e-06	0.44	1.56e-06	0.38	9.72e-07	0.00
Chromium VI	1.71e-05	0.98	7.08e-06	0.95	3.36e-07	0.00
Chromium (total)	1.08e-04	0.98	4.46e-05	0.95	2.12e-06	0.00
Copper	1.28e-04	0.52	1.01e-04	0.27	7.39e-05	0.00
Lead	6.80e-05	0.91	2.72e-05	0.91	2.46e-06	0.00
Manganese	3.36e-04	0.63	1.32e-04	0.64	4.72e-05	0.00
Mercury	4.69e-05	0.32	1.95e-05	0.31	1.35e-05	0.00
Nickel	3.20e-04	0.88	1.87e-04	0.60	7.47e-05	0.00
Selenium	1.44e-06	0.95	6.96e-07	0.78	1.51e-07	0.00
Silver	4.76e-06	0.52	2.09e-06	0.47	1.10e-06	0.00
Thallium	3.20e-07	0.99	1.28e-07	1.00	5.64e-10	0.00
Vanadium	3.77e-06	0.99	1.54e-06	0.97	4.96e-08	0.00
Zinc	1.67e-03	0.22	1.64e-03	0.09	1.49e-03	0.00
Alkyl pyridine	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA	NA	NA
3-Picoline	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA

ww = wet weight; NA = Not applicable

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Table 4.15 Contaminant mass fractions in locally grown cattle feed

Contaminants	Hay		Corn silage		Grain		Pasture grass	
	mass fraction mg/kg dw	fraction from direct deposition	mass fraction mg/kg dw	fraction from direct deposition	mass fraction mg/kg dw	fraction from direct deposition	mass fraction mg/kg dw	fraction from direct deposition
Ammonia	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	1.13e-03	0.79	4.82e-04	0.50	3.64e-05	0.00	1.23e-03	0.80
Arsenic	6.63e-05	0.95	2.04e-05	0.83	5.15e-07	0.00	7.30e-05	0.95
Barium	2.06e-03	0.83	8.12e-04	0.57	3.50e-05	0.00	2.24e-03	0.84
Beryllium	3.50e-06	0.99	9.79e-07	0.95	7.07e-09	0.00	3.87e-06	0.99
Cadmium	6.59e-05	0.57	3.84e-05	0.26	7.71e-06	0.00	7.00e-05	0.60
Chromium VI	4.38e-04	0.99	1.22e-04	0.96	2.66e-06	0.00	4.85e-04	0.99
Chromium (total)	2.76e-03	0.99	7.66e-04	0.96	1.68e-05	0.00	3.05e-03	0.99
Copper	2.66e-03	0.65	1.40e-03	0.33	5.86e-04	0.00	2.84e-03	0.67
Lead	1.69e-03	0.94	5.27e-04	0.81	1.95e-05	0.00	1.86e-03	0.95
Manganese	7.36e-03	0.75	3.35e-03	0.44	3.74e-04	0.00	7.94e-03	0.76
Mercury	8.72e-04	0.45	5.87e-04	0.18	1.07e-04	0.00	9.14e-04	0.47
Nickel	7.84e-03	0.92	2.55e-03	0.77	5.93e-04	0.00	8.61e-03	0.93
Selenium	3.63e-05	0.97	1.07e-05	0.89	1.20e-06	0.00	4.00e-05	0.97
Silver	9.85e-05	0.65	5.20e-05	0.33	8.70e-06	0.00	1.05e-04	0.67
Thallium	8.24e-06	0.99	2.26e-06	0.98	4.48e-09	0.00	9.12e-06	1.00
Vanadium	9.69e-05	0.99	2.67e-05	0.97	3.94e-07	0.00	1.07e-04	0.99
Zinc	2.93e-02	0.33	2.22e-02	0.12	1.18e-02	0.00	3.03e-02	0.35
Alkyl pyridine	NA	NA	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	NA	NA	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA	NA	NA	NA	NA
3-Picoline	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA

dw = dry weight; NA = Not applicable

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Table 4.16 Feed ingestion rates for lactating cows and beef cattle

	Intake rate (kg/day dry weight)				
	Hay	Corn silage	Grain	Pasture grass	Soil
Lactating cows	5.0	5.0	5.0	2.5	0.2
Beef cattle	2.5	2.5	2.5	1.25	0.2

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Table 4.17 Contaminant mass fractions in beef and milk produced at the most-impacted farm

Contaminants	Total intake of compound by dairy cows (mg/day)	Milk biotransfer factor (days/kg)	Mass fraction in milk (mg/kg)	Total intake of compound by beef cattle (mg/day)	Beef biotransfer factor (days/kg)	Mass fraction in beef (mg/kg)
Ammonia	NA	NA	NA	NA	NA	NA
Antimony	1.20e-02	1.0e-04	1.20e-06	6.38e-03	1.0e-03	6.38e-06
Arsenic	6.70e-04	6.0e-05	4.02e-08	3.61e-04	2.0e-03	7.22e-07
Barium	2.15e-02	3.5e-04	7.54e-06	1.15e-02	1.5e-04	1.72e-06
Beryllium	3.49e-05	9.0e-07	3.14e-11	1.89e-05	1.0e-03	1.89e-08
Cadmium	7.66e-04	1.0e-03	7.66e-07	3.99e-04	5.5e-04	2.19e-07
Chromium VI	4.38e-03	1.5e-03	6.57e-06	2.37e-03	5.5e-03	1.30e-05
Chromium (total)	2.76e-02	1.5e-03	4.14e-05	1.49e-02	5.5e-03	8.20e-05
Copper	3.17e-02	1.5e-03	4.76e-05	1.66e-02	1.0e-02	1.66e-04
Lead	1.71e-02	2.5e-04	4.28e-06	9.21e-03	3.0e-04	2.76e-06
Manganese	7.97e-02	3.5e-04	2.79e-05	4.21e-02	4.0e-04	1.68e-05
Mercury	1.04e-02	4.5e-04	4.70e-06	5.38e-03	1.5e-02	8.07e-05
Nickel	8.23e-02	1.0e-03	8.23e-05	4.41e-02	6.0e-03	2.65e-04
Selenium	3.70e-04	4.0e-03	1.48e-06	1.99e-04	1.5e-02	2.99e-06
Silver	1.11e-03	2.0e-02	2.22e-05	5.82e-04	3.0e-03	1.75e-06
Thallium	8.21e-05	2.0e-03	1.64e-07	4.44e-05	4.0e-02	1.78e-06
Vanadium	9.67e-04	2.0e-03	1.93e-06	5.23e-04	2.5e-03	1.31e-06
Zinc	4.00e-01	1.0e-02	4.00e-03	2.04e-01	1.0e-01	2.04e-02
Alkyl pyridine	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA
Ethanol	NA	NA	NA	NA	NA	NA
Isopropanol	NA	NA	NA	NA	NA	NA
Methanol	NA	NA	NA	NA	NA	NA
2-Picoline	NA	NA	NA	NA	NA	NA
3-Picoline	NA	NA	NA	NA	NA	NA
Pyridine	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA

NA = Not applicable

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Table 4.18 Contaminant mass fractions in fish

Contaminant	Total water concentration c_w (mg/l)	Bioconcentration in fish B_{cf} (l/kg)	Mass fraction in fish m_f (mg/kg)
Ammonia	NA	NA	NA
Antimony	1.45e-06	1	1.45e-06
Arsenic	1.03e-07	44	4.53e-06
Barium	2.80e-06	100	2.80e-04
Beryllium	5.65e-09	19	1.07e-07
Cadmium	6.16e-08	81	4.99e-06
Chromium VI	7.10e-07	16	1.14e-05
Chromium (total)	4.47e-06	16	7.16e-05
Copper	2.81e-06	200	5.62e-04
Lead	2.60e-06	49	1.27e-04
Manganese	8.97e-06	100	8.97e-04
Mercury	6.41e-07	5500	3.52e-03
Nickel	1.19e-05	47	5.57e-04
Selenium	5.74e-08	16	9.18e-07
Silver	1.04e-07	28	2.92e-06
Thallium	1.34e-08	1430	1.92e-05
Vanadium	1.57e-07	5500	8.65e-04
Zinc	1.57e-05	47	7.38e-04
Alkyl pyridine	NA	NA	NA
2-Cyanopyridine	NA	NA	NA
3-Cyanopyridine	NA	NA	NA
Benzene	NA	NA	NA
Ethanol	NA	NA	NA
Isopropanol	NA	NA	NA
Methanol	NA	NA	NA
2-Picoline	NA	NA	NA
3-Picoline	NA	NA	NA
Pyridine	NA	NA	NA
Toluene	NA	NA	NA

NA = Not applicable

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5 Exposure assessment

Potential exposures to contaminants emitted from the NEPERA incinerator are evaluated for two receptors: (1) a 2.5 year-old MEI, and (2) an adult MEI. For each of these hypothetical receptors, daily exposure doses are estimated for each route of exposure using the methodologies recommended by NYSDOH (1991) guidance.

Estimated exposure doses by route of exposure are summarized in Table 5.1 for the 2.5 year-old MEI and Table 5.2 for the adult MEI. A summary of the exposure routes included in this assessment is provided in Table 5.3. Each of these routes is evaluated in the sections that follow.

5.1 Exposure parameters

For the reader's convenience, the parameter values used in assessing exposures to the child and adult MEI are summarized in Table 5.4. The values are selected in accordance with NYSDOH (1991) guidance when available. Most of these parameter values are discussed in the section in which the parameter is used. The parameter values that are used repeatedly throughout the exposure assessment are discussed here and include average body weight and average lifetime.

The child and adult body weights (*W*) recommended by NYSDOH (1991) are 13.2 and 70 kg, respectively. These values represent approximate averages for the American population and are based on information in Diem and Lentner (1973).

In accordance with NYSDOH (1991), the average lifetime is taken to be 70 years. This 70-year lifetime is used for most regulatory assessments and approximates the average life expectancy in the U.S. This methodology assumes that the MEI resides at the same location for his or her entire lifetime. For most U.S. citizens, this is not the case (U.S. EPA, 1989b).

5.2 Direct inhalation

Air concentrations at the point of maximum impact are tabulated in Table 4.5. As calculated, these concentrations represent estimates of the maximum long-term average air concentrations associated with the operation of the NEPERA incinerator. Exposure to plant-related contaminants *via* direct inhalation is evaluated using these air concentrations for both MEI receptors. The inhalation exposure concentrations (*c*) for all MEI receptors are reported in Table 5.5.

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5.3 Ingestion of surface soil

Exposure to a contaminant from soil ingestion (e_s, mg/kg-day) is given by:

$$e_s = \frac{m_s \gamma_s f_w f_y}{W} \tag{5.1}$$

where the terms are

m_s	mass fraction of contaminant in soil (kg/kg),
γ_s	soil ingestion rate (mg/d),
f_w	fraction of week during which soil is ingested,
f_y	fraction of year during which soil is ingested, and
W	body weight (kg).

The contaminant mass fraction in soil (m_s) at the MEI residence is used to evaluate the exposure *via* soil ingestion for the MEI receptors. These soil mass fractions are calculated in Section 4.2 and reported in Table 4.8[1].

In accordance with NYSDOH guidance, the adult and child soil ingestion rates (γ_s) are taken to be 100 and 200 mg/day, respectively. These ingestion rates correspond to U.S. EPA regulatory guidance values designed to be conservative in the absence of better information. In accordance with NYSDOH (1991) guidance, the frequency of potential soil contact is accounted for when using these soil ingestion rates to assess exposure. Adult contact with soil is assumed to occur 2 days out of each week (f_w of 2/7) and 5 months of each year (f_y of 5/12). Child contact with soil is taken to occur more frequently — 5 days of each week (f_w of 5/7) and 6 months of each year (f_y of 6/12). The adult and child values for body weight (W) are 70 and 13.2 kg as recommended by NYSDOH (1991).

Estimated exposures *via* soil ingestion are reported in Table 5.6.

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[1] The soil mass fractions required for Equation (5.1) need to be in units of kg/kg. The values reported in Table 4.8 are in units of mg/kg and may be converted to units of kg/kg by multiplying by 10^{-6}.

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5.4 Ingestion of homegrown leafy produce

Exposure to contaminants in leafy produce (e_{lv}, mg/kg-day) is given by:

$$e_{lv} = \frac{m_{lv}\gamma_{lv}f_v}{W} \tag{5.2}$$

where the terms are

- m_{lv} mass fraction of contaminant in leafy produce (mg/kg),
- γ_{lv} consumption rate of leafy produce (kg/day),
- f_v fraction of produce that is homegrown, and
- W body weight (kg).

The methodology used for estimating contaminant mass fractions in leafy produce (m_{lv}) is discussed in Section 4.4. The resulting mass fractions in leafy produce raised at the MEI residence are tabulated in Table 4.14.

The consumption rates for leafy produce (γ_{lv}) are recommended by NYSDOH (1991) and are based on a review of the USDA Nationwide Food Consumption Survey by Yang and Nelson (1986). The adult and child values for γ_{lv} are 0.039 and 0.023 kg/day, respectively. The fraction of produce (f_v) assumed to be grown locally is assumed to be 1, in accordance with NYSDOH (1991) guidance. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The calculated exposures from consumption of leafy produce are reported in Table 5.7 for the MEI receptors.

5.5 Ingestion of homegrown exposed produce

Exposure to contaminants in exposed produce (e_{ev}, mg/kg-day) is given by:

$$e_{ev} = \frac{m_{ev}\gamma_{ev}f_v}{W} \tag{5.3}$$

where the terms are

- m_{ev} mass fraction of contaminant in exposed produce (mg/kg),
- γ_{ev} consumption rate of exposed produce (kg/day),
- f_v fraction of produce that is homegrown, and
- W body weight (kg).

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Estimating contaminant mass fractions in exposed produce (m_{ev}) is discussed in Section 4.4. The mass fractions in exposed produce raised at the MEI residence are reported in Table 4.14.

As recommended by NYSDOH (1991), the adult and child values for γ_{ev} are 0.089 and 0.053 kg/day, respectively. These consumption rates for exposed produce are based on a review of the USDA Nationwide Food Consumption Survey by Yang and Nelson (1986). The fraction of produce (f_v) assumed to be grown locally is 1. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

Exposure from consumption of exposed produce is reported in Table 5.8.

5.6 Ingestion of homegrown protected produce

Exposure to contaminants in protected produce (e_{pv}, mg/kg-day) is given by:

$$e_{pv} = \frac{m_{pv}\gamma_{pv}f_v}{W} \tag{5.4}$$

where the terms are

- m_{pv} mass fraction of contaminant in protected produce (mg/kg),
- γ_{pv} consumption rate of protected produce (kg/day),
- f_v fraction of produce that is homegrown, and
- W body weight (kg).

Contaminant mass fractions in protected produce (m_{pv}) are calculated in Section 4.4. The resulting mass fractions in protected produce raised at the MEI residence are reported in Table 4.14.

In accordance with NYSDOH (1991), the adult and child values for γ_{pv} are assumed to be 0.137 and 0.082 kg/day, respectively. These consumption rates for protected produce are based on a review of the USDA Nationwide Food Consumption Survey by Yang and Nelson (1986). The fraction of produce (f_v) assumed to be grown locally is 1. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The calculated exposures from consumption of protected produce are reported in Table 5.9 for the MEI receptors.

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5.7 Ingestion of locally-produced milk

Exposure to contaminants in cow's milk (e_m, mg/kg-day) is given by:

$$e_m = \frac{m_m \gamma_m f_m}{W} \tag{5.5}$$

where the terms are

- m_m mass fraction of contaminant in milk (mg/kg),
- γ_m consumption rate of milk (kg/day),
- f_m fraction of milk that is produced locally, and
- W body weight (kg).

The contaminant mass fraction in locally-produced milk (m_m) is computed using Equation (4.18), as described in Section 4.5. The resulting mass fractions are tabulated in Table 4.17.

The adult and child milk consumption rates (γ_m) provided by NYSDOH (1991) are 0.283 and 0.418 kg/day, respectively. These consumption rates are based on the USDA Nationwide Food Consumption Survey (USDA, 1983). Assuming that the MEI provides his own milk, the fraction of milk that is produced locally (f_m) is taken to be 1. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The estimated exposures from ingestion of locally-produced milk are summarized in Table 5.10.

5.8 Ingestion of locally-produced beef

Exposure to contaminants in beef (e_b, mg/kg-day) is given by:

$$e_b = \frac{m_b \gamma_b f_b}{W} \tag{5.6}$$

where the terms are

- m_b mass fraction of contaminant in beef (mg/kg),
- γ_b consumption rate of beef (kg/day),
- f_b fraction of beef that is local, and
- W body weight (kg).

As described in Section 4.5, contaminant mass fractions in beef are calculated using Equation (4.17). These mass fractions are reported in Table 4.17.

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As recommended by NYSDOH (1991), the adult and child beef consumption rates (γ_b) are 0.051 and 0.02 kg/day, respectively. These consumption rates are based on the USDA Nationwide Food Consumption Survey (USDA, 1983). The fraction of beef from local sources (f_b) is assumed to be 1. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The estimated exposures from consumption of locally-produced beef are summarized in Table 5.11.

5.9 Ingestion of locally-caught fish

Exposure to contaminants in fish (e_f, mg/kg-day) is given by:

$$e_f = \frac{m_f \gamma_f f_f}{W} \tag{5.7}$$

where the terms are

- m_f mass fraction of contaminant in fish (mg/kg),
- γ_f consumption rate of fish (kg/day),
- f_f fraction of fish that is local, and
- W body weight (kg).

The methodology for computing the contaminant mass fractions in fish (m_f) is described in Section 4.6. The resulting mass fractions are reported in Table 4.18.

NYSDOH (1991) reports an estimate of fish consumption rate (γ_f) by adults of 0.0324 kg/day from U.S. EPA (1989b). The fish ingestion rate for a child is estimated by scaling the adult fish consumption rate by the ratio of the child beef consumption rate to that of the adult (0.02/0.051). Using this methodology, the child fish consumption rate is calculated to be 0.0127 kg/day. The MEI fraction of fish caught locally is taken as 1. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The estimated exposures from consumption of local fish are summarized in Table 5.12.

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5.10 Ingestion of drinking water

Exposure to contaminants in drinking water (e_w, mg/kg-day) is given by:

$$e_w = \frac{m_w \gamma_w}{W} \tag{5.8}$$

where the terms are

- m_w mass fraction of contaminant in drinking water (mg/kg),
- γ_w consumption rate of drinking water (kg/day), and
- W body weight (kg).

Contaminant mass fractions in drinking water are calculated for the Cranberry Lake. Although not used as a public water supply, ingestion of water from Cranberry Lake is evaluated since the lake is the most-impacted surface water body in the area and may be used as a water source for the Arden Estate. The methodology for estimating the surface water concentrations is discussed in Section 4.3. The resulting concentrations are reported in Table 4.9.

In accordance with New York state guidance (NYSDOH, 1991), drinking water ingestion rates (γ_w) of 1 ℓ/day (1 kg/day) and 2 ℓ/day are used for the child and adult MEIs, respectively. These values, taken from U.S. EPA (1989b), are often used for regulatory purposes. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

The exposure *via* drinking water ingestion is reported in Table 5.13 for the MEIs.

5.11 Incidental ingestion of water while swimming

Exposure to contaminants due to incidental ingestion of water while swimming (e_{sw}, mg/kg-day) is given by:

$$e_{sw} = \frac{m_w \gamma_{sw} t_s f_{sw} f_{sy}}{W} \tag{5.9}$$

where the terms are

- m_w mass fraction of contaminant in swimming water (mg/kg),
- γ_{sw} accidental consumption rate of swimming water (kg/hr),
- t_s time spent swimming, on days when the individual swims (hr),
- f_{sw} fraction of week during which swimming occurs,
- f_{sy} fraction of year during which swimming occurs, and
- W body weight (kg).

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Swimming Pond in Monroe is the most-impacted surface water body known to be used regularly by swimmers. Contaminant mass fractions in pond (m_w) are calculated using the methodology discussed in Section 4.3. The resulting concentrations[2] are reported in Table 4.10.

NYSDOH (1991) does not provide guidance on assessing exposures associated with swimming in local surface water bodies. The parameter values used to assess exposure from incidental ingestion of water are taken from other sources. The frequency of swimming episodes (f_{sw} and f_{sy}) were selected based on knowledge of swimming practices in other locale. In many cases such ponds are used for community swimming lessons so that the frequency of swimming events is high in the summer months. An adult MEI is assumed to swim 2 days out of each week (f_{sw} of 2/7) and 4 months of each year (f_{sy} of 4/12). A child MEI swims more frequently — 6 days of each week (f_{sw} of 6/7) and 4 months of each year (f_{sy} of 4/12). The average duration of each swimming event (t_s) and the rate of incidental ingestion of water (γ_{sw}) while swimming are taken to be 2.6 hr/day and 0.05 kg/hr, respectively. These values are based on U.S. EPA regulatory guidance (U.S. EPA, 1988). The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

Resultant estimates of exposures from incidental water ingestion while swimming are reported in Table 5.14.

5.12 Dermal absorption while swimming

The absorbed dose of contaminants due to dermal absorption while swimming (e_{sd}, mg/kg-day) is given by:

$$e_{sd} = \frac{c_w \xi A_b t_s f_{sw} f_{sy} \beta}{W} \tag{5.10}$$

where the terms are

- c_w surface water concentration in swimming water (mg/ℓ),
- ξ skin permeability for the relevant compound (cm/hr),
- A_b total area of exposed skin (cm^2),
- t_s time spent swimming, on days when the individual swims (hr),
- f_{sw} fraction of week during which swimming occurs,
- f_{sy} fraction of year during which swimming occurs,
- β conversion factor (1 ℓ/ 1000 cm^3), and
- W body weight (kg).

[2] Note that these concentrations are reported in mg/ℓ which is equivalent to mg/kg.

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NYSDOH (1991) does not provide guidance on assessing exposures from dermal absorption while swimming. The methodology presented above is recommended by U.S. EPA for regulatory assessments (U.S. EPA, 1989b).

The contaminant concentration in swimming water (c_w) is estimated for the Swimming Pond, a surface water body known to be used for swimming. The methodology for calculating surface water concentrations is summarized in Section 4.3. The resultant concentrations are reported in Table 4.10.

In assessing dermal absorption while swimming, the total skin surface area is assumed to be in contact with the water. From Anderson *et al.* (1985), the skin surface area (A_b) for an adult and child are 1.94e+04 and 6.03e+03 cm^2, respectively. Since the Swimming Pond may be frequented by some members of the community, the frequency of swimming events is assumed to be high in the summer months. For this assessment, an adult MEI is assumed to swim 2 days out of each week (f_{sw} of 2/7) and 4 months of each year (f_{sy} of 4/12). A child MEI swims more frequently, 6 days of each week (f_{sw} of 6/7) and 4 months of each year (f_{sy} of 4/12). Based on U.S. EPA regulatory guidance (U.S. EPA, 1988), the average duration of each swimming event (t_s) is taken to be 2.6 hr/day. The adult and child values for body weight (W) are 70 and 13.2 kg, respectively (NYSDOH, 1991).

Skin permeability (ξ) for low concentrations of chemicals in water is generally not well-known. Following U.S. EPA (1988), metals are assigned the same skin permeability as water (0.0008 cm/hr). Such assignments should ensure an overestimate of absorption.

Resultant estimates of absorbed dose from dermal absorption while swimming are reported in Table 5.15.

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Table 5.1 Exposure summary for the 2.5 year-old child MEI

Contaminant	Direct inhalation µg/m³	Soil ingestion mg/kg-d	Leafy produce mg/kg-d	Exposed produce mg/kg-d	Protected produce mg/kg-d	Milk mg/kg-d	Beef mg/kg-d	Fish mg/kg-d	Drinking water mg/kg-d	Swimming dermal mg/kg-d	Swimming oral mg/kg-d
Ammonia	1.78e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	2.47e-04	1.97e-08	8.78e-08	7.38e-08	2.85e-08	3.81e-08	9.67e-09	1.40e-09	1.10e-07	2.94e-10	3.05e-09
Arsenic	1.75e-05	1.39e-09	4.64e-09	4.18e-09	4.03e-10	1.27e-09	1.09e-09	4.36e-09	7.79e-09	2.08e-11	2.16e-10
Barium	4.75e-04	3.79e-08	1.56e-07	1.24e-07	2.74e-08	2.39e-07	2.61e-09	2.70e-07	2.12e-07	5.67e-10	5.87e-09
Beryllium	9.60e-07	7.65e-11	2.38e-10	2.19e-10	5.53e-12	9.96e-13	2.86e-11	1.03e-10	4.28e-10	1.14e-12	1.19e-11
Cadmium	1.05e-05	8.35e-10	5.79e-09	6.25e-09	6.04e-09	2.43e-08	3.32e-10	4.81e-09	4.67e-09	1.25e-11	1.29e-10
Chromium VI	1.21e-04	9.61e-09	2.98e-08	2.84e-08	2.09e-09	2.08e-07	1.97e-08	1.09e-08	5.38e-08	1.44e-10	1.49e-09
Chromium (total)	7.60e-04	6.06e-08	1.88e-07	1.79e-07	1.31e-08	1.31e-06	1.24e-07	6.89e-08	3.39e-07	9.06e-10	9.39e-09
Copper	4.78e-04	3.81e-08	2.24e-07	4.04e-07	4.59e-07	1.51e-06	2.51e-07	5.42e-07	2.13e-07	5.69e-10	5.90e-09
Lead	4.42e-04	3.52e-08	1.18e-07	1.09e-07	1.53e-08	1.36e-07	4.19e-09	1.23e-07	1.97e-07	5.27e-10	5.46e-09
Manganese	1.52e-03	1.21e-07	5.85e-07	5.31e-07	2.93e-07	8.84e-07	2.55e-08	8.64e-07	6.80e-07	1.82e-09	1.88e-08
Mercury	1.09e-04	8.67e-09	8.17e-08	7.85e-08	8.36e-08	1.49e-07	1.22e-07	3.39e-06	4.85e-08	1.30e-10	1.34e-09
Nickel	2.01e-03	1.60e-07	5.57e-07	7.52e-07	4.64e-07	2.61e-06	4.01e-07	5.37e-07	8.98e-07	2.40e-09	2.49e-08
Selenium	9.75e-06	7.77e-10	2.50e-09	2.79e-09	9.37e-10	4.68e-08	4.53e-09	8.85e-10	4.35e-09	1.16e-11	1.20e-10
Silver	1.77e-05	1.41e-09	8.30e-09	8.38e-09	6.81e-09	7.04e-07	2.64e-09	2.81e-09	7.90e-09	2.11e-11	2.19e-10
Thallium	2.28e-06	1.82e-10	5.58e-10	5.14e-10	3.50e-12	5.20e-09	2.69e-09	1.85e-08	1.02e-09	2.72e-12	2.82e-11
Vanadium	2.67e-05	2.13e-09	6.57e-09	6.20e-09	3.08e-10	6.12e-08	1.98e-09	8.34e-07	1.19e-08	3.19e-11	3.30e-10
Zinc	2.67e-03	2.13e-07	2.91e-06	6.56e-06	9.23e-06	1.27e-04	3.09e-05	7.11e-07	1.19e-06	3.18e-09	3.30e-08
Alkyl pyridine	2.91e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	8.67e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	8.67e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5.91e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Picoline	7.38e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Picoline	7.39e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	4.64e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	9.20e-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not applicable

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5.2 Exposure summary for the adult MEI

Contaminant	Direct inhalation µg/m³	Soil ingestion mg/kg-d	Leafy produce mg/kg-d	Exposed produce mg/kg-d	Protected produce mg/kg-d	Milk mg/kg-d	Beef mg/kg-d	Fish mg/kg-d	Drinking water mg/kg-d	Swimming dermal mg/kg-d	Swimming oral mg/kg-d
Ammonia	1.78e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	2.47e-04	6.19e-10	2.81e-08	2.34e-08	8.97e-09	4.87e-09	4.65e-09	6.73e-10	4.15e-08	5.95e-11	1.92e-10
Arsenic	1.75e-05	4.38e-11	1.48e-09	1.32e-09	1.27e-10	1.63e-10	5.26e-10	2.10e-09	2.94e-09	4.21e-12	1.36e-11
Barium	4.75e-04	1.19e-09	4.98e-08	3.94e-08	8.63e-09	3.05e-08	1.25e-09	1.30e-07	7.99e-08	1.15e-10	3.69e-10
Beryllium	9.60e-07	2.40e-12	7.62e-11	6.94e-11	1.74e-12	1.27e-13	1.38e-11	4.97e-11	1.61e-10	2.31e-13	7.46e-13
Cadmium	1.05e-05	2.62e-11	1.85e-09	1.98e-09	1.90e-09	3.10e-09	1.60e-10	2.31e-09	1.76e-09	2.52e-12	8.13e-12
Chromium VI	1.21e-04	3.02e-10	9.52e-09	9.00e-09	6.57e-10	2.66e-08	9.49e-09	5.26e-09	2.03e-08	2.91e-11	9.36e-11
Chromium (total)	7.60e-04	1.90e-09	6.00e-08	5.67e-08	4.14e-09	1.67e-07	5.98e-08	3.32e-08	1.28e-07	1.83e-10	5.90e-10
Copper	4.78e-04	1.20e-09	7.15e-08	1.28e-07	1.45e-07	1.92e-07	1.21e-07	2.60e-07	8.03e-08	1.15e-10	3.71e-10
Lead	4.42e-04	1.11e-09	3.79e-08	3.45e-08	4.82e-09	1.73e-08	2.01e-09	5.91e-08	7.43e-08	1.07e-10	3.43e-10
Manganese	1.52e-03	3.82e-09	1.87e-07	1.68e-07	9.23e-08	1.13e-07	1.23e-08	4.16e-07	2.56e-07	3.67e-10	1.18e-09
Mercury	1.09e-04	2.73e-10	2.61e-08	2.49e-08	2.64e-08	1.90e-08	5.88e-08	1.63e-06	1.83e-08	2.62e-11	8.45e-11
Nickel	2.01e-03	5.04e-09	1.78e-07	2.38e-07	1.46e-07	3.33e-07	1.93e-07	2.58e-07	3.39e-07	4.85e-10	1.56e-09
Selenium	9.75e-06	2.44e-11	8.01e-10	8.85e-10	2.95e-10	5.98e-09	2.18e-09	4.25e-10	1.64e-09	2.35e-12	7.57e-12
Silver	1.77e-05	4.44e-11	2.65e-09	2.65e-09	2.14e-09	8.99e-08	1.27e-09	1.35e-09	2.98e-09	4.27e-12	1.38e-11
Thallium	2.28e-06	5.71e-12	1.79e-10	1.63e-10	1.10e-12	6.63e-10	1.29e-09	8.89e-09	3.83e-10	5.49e-13	1.77e-12
Vanadium	2.67e-05	6.70e-11	2.10e-09	1.96e-09	9.71e-11	7.82e-09	9.52e-10	4.01e-07	4.50e-09	6.44e-12	2.08e-11
Zinc	2.67e-03	6.68e-09	9.30e-07	2.08e-06	2.91e-06	1.62e-05	1.49e-05	3.42e-07	4.49e-07	6.43e-10	2.07e-09
Alkyl pyridine	2.91e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Cyanopyridine	8.67e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Cyanopyridine	8.67e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5.91e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methanol	4.60e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Picoline	7.38e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Picoline	7.39e-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	4.64e-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	9.20e-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = Not applicable

Table 5.3 Overview of the routes evaluated in the exposure assessment

Mechanism	Route	Discussed in section...
Inhalation	Direct inhalation	5.2
Ingestion	Ingestion of surface soil	5.3
	Ingestion of leafy produce	5.4
	Ingestion of exposed produce	5.5
	Ingestion of protected produce	5.6
	Ingestion of milk	5.7
	Ingestion of beef	5.8
	Ingestion of fish	5.9
	Ingestion of drinking water	5.10
	Incidental ingestion of water while swimming	5.11
Dermal absorption	Dermal absorption while swimming	5.12

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Table 5.4 Summary of exposure parameters

Exposure parameters	Symbol	Units	Parameter value for		Source
			Adult	2.5 year-old	
Average lifetime	T	yr	70	70	NYSDOH (1991)
Body weight	W	kg	70	13.2	NYSDOH (1991)
Consumption rate of soil	γ_s	mg/day	100	200	NYSDOH (1991)
Consumption rate of leafy produce	γ_{lv}	kg/day	0.039	0.023	NYSDOH (1991)
Consumption rate of exposed produce	γ_{ev}	kg/day	0.089	0.053	NYSDOH (1991)
Consumption rate of protected produce	γ_{pv}	kg/day	0.137	0.082	NYSDOH (1991)
Consumption rate of milk	γ_m	kg/day	0.283	0.418	NYSDOH (1991)
Consumption rate of beef	γ_b	kg/day	0.051	0.02	NYSDOH (1991)
Consumption rate of fish	γ_f	kg/day	0.0324	0.0127	NYSDOH (1991)
Drinking water consumption rate	γ_w	ℓ/day	2	1	NYSDOH (1991)
Fraction of produce that is homegrown	f_v		1	1	(a)
Fraction of milk that is locally produced	f_m		1	1	(a)
Fraction of beef that is locally produced	f_b		1	1	(a)
Fraction of fish that is local	f_f		1	1	(a)
Fraction of week soil contact occurs	f_w		0.29	0.71	NYSDOH (1991)
Fraction of year soil contact occurs	f_y		0.42	0.50	NYSDOH (1991)
Fraction of week swimming occurs	f_{sw}		0.29	0.86	(a)
Fraction of year swimming occurs	f_{sy}		0.33	0.33	(a)
Duration of swimming	t_s	hr/day	2.6	2.6	U.S. EPA (1988)
Water ingestion rate for swimming	γ_{sw}	kg/hr	0.05	0.05	U.S. EPA (1988)
Skin contact area while swimming	A_b	cm^2	19400	6030	Anderson *et al.* (1985)

(a) Provided as a conservative estimate based on professional judgement.

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Table 5.5 Inhalation exposure concentrations

Contaminant	2.5 year old child µg/m³	Adult µg/m³
Ammonia	1.78e-02	1.78e-02
Antimony	2.47e-04	2.47e-04
Arsenic	1.75e-05	1.75e-05
Barium	4.75e-04	4.75e-04
Beryllium	9.60e-07	9.60e-07
Cadmium	1.05e-05	1.05e-05
Chromium VI	1.21e-04	1.21e-04
Chromium (total)	7.60e-04	7.60e-04
Copper	4.78e-04	4.78e-04
Lead	4.42e-04	4.42e-04
Manganese	1.52e-03	1.52e-03
Mercury	1.09e-04	1.09e-04
Nickel	2.01e-03	2.01e-03
Selenium	9.75e-06	9.75e-06
Silver	1.77e-05	1.77e-05
Thallium	2.28e-06	2.28e-06
Vanadium	2.67e-05	2.67e-05
Zinc	2.67e-03	2.67e-03
Alkyl pyridine	2.91e-02	2.91e-02
2-Cyanopyridine	8.67e-03	8.67e-03
3-Cyanopyridine	8.67e-03	8.67e-03
Benzene	5.91e-03	5.91e-03
Ethanol	4.60e-03	4.60e-03
Isopropanol	4.60e-03	4.60e-03
Methanol	4.60e-03	4.60e-03
2-Picoline	7.38e-03	7.38e-03
3-Picoline	7.39e-03	7.39e-03
Pyridine	4.64e-02	4.64e-02
Toluene	9.20e-04	9.20e-04

NA = Not applicable

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Table 5.6 Exposure from ingestion of surface soil

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	1.97e-08	6.19e-10
Arsenic	1.39e-09	4.38e-11
Barium	3.79e-08	1.19e-09
Beryllium	7.65e-11	2.40e-12
Cadmium	8.35e-10	2.62e-11
Chromium VI	9.61e-09	3.02e-10
Chromium (total)	6.06e-08	1.90e-09
Copper	3.81e-08	1.20e-09
Lead	3.52e-08	1.11e-09
Manganese	1.21e-07	3.82e-09
Mercury	8.67e-09	2.73e-10
Nickel	1.60e-07	5.04e-09
Selenium	7.77e-10	2.44e-11
Silver	1.41e-09	4.44e-11
Thallium	1.82e-10	5.71e-12
Vanadium	2.13e-09	6.70e-11
Zinc	2.13e-07	6.68e-09
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.7 Exposure from ingestion of homegrown leafy produce

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	8.78e-08	2.81e-08
Arsenic	4.64e-09	1.48e-09
Barium	1.56e-07	4.98e-08
Beryllium	2.38e-10	7.62e-11
Cadmium	5.79e-09	1.85e-09
Chromium VI	2.98e-08	9.52e-09
Chromium (total)	1.88e-07	6.00e-08
Copper	2.24e-07	7.15e-08
Lead	1.18e-07	3.79e-08
Manganese	5.85e-07	1.87e-07
Mercury	8.17e-08	2.61e-08
Nickel	5.57e-07	1.78e-07
Selenium	2.50e-09	8.01e-10
Silver	8.30e-09	2.65e-09
Thallium	5.58e-10	1.79e-10
Vanadium	6.57e-09	2.10e-09
Zinc	2.91e-06	9.30e-07
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.8 Exposure from ingestion of homegrown exposed produce

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	7.38e-08	2.34e-08
Arsenic	4.18e-09	1.32e-09
Barium	1.24e-07	3.94e-08
Beryllium	2.19e-10	6.94e-11
Cadmium	6.25e-09	1.98e-09
Chromium VI	2.84e-08	9.00e-09
Chromium (total)	1.79e-07	5.67e-08
Copper	4.04e-07	1.28e-07
Lead	1.09e-07	3.45e-08
Manganese	5.31e-07	1.68e-07
Mercury	7.85e-08	2.49e-08
Nickel	7.52e-07	2.38e-07
Selenium	2.79e-09	8.85e-10
Silver	8.38e-09	2.65e-09
Thallium	5.14e-10	1.63e-10
Vanadium	6.20e-09	1.96e-09
Zinc	6.56e-06	2.08e-06
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.9 Exposure from ingestion of homegrown protected produce

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	2.85e-08	8.97e-09
Arsenic	4.03e-10	1.27e-10
Barium	2.74e-08	8.63e-09
Beryllium	5.53e-12	1.74e-12
Cadmium	6.04e-09	1.90e-09
Chromium VI	2.09e-09	6.57e-10
Chromium (total)	1.31e-08	4.14e-09
Copper	4.59e-07	1.45e-07
Lead	1.53e-08	4.82e-09
Manganese	2.93e-07	9.23e-08
Mercury	8.36e-08	2.64e-08
Nickel	4.64e-07	1.46e-07
Selenium	9.37e-10	2.95e-10
Silver	6.81e-09	2.14e-09
Thallium	3.50e-12	1.10e-12
Vanadium	3.08e-10	9.71e-11
Zinc	9.23e-06	2.91e-06
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.10 Exposure from ingestion of locally-produced milk

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	3.81e-08	4.87e-09
Arsenic	1.27e-09	1.63e-10
Barium	2.39e-07	3.05e-08
Beryllium	9.96e-13	1.27e-13
Cadmium	2.43e-08	3.10e-09
Chromium VI	2.08e-07	2.66e-08
Chromium (total)	1.31e-06	1.67e-07
Copper	1.51e-06	1.92e-07
Lead	1.36e-07	1.73e-08
Manganese	8.84e-07	1.13e-07
Mercury	1.49e-07	1.90e-08
Nickel	2.61e-06	3.33e-07
Selenium	4.68e-08	5.98e-09
Silver	7.04e-07	8.99e-08
Thallium	5.20e-09	6.63e-10
Vanadium	6.12e-08	7.82e-09
Zinc	1.27e-04	1.62e-05
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.11 Exposure from ingestion of locally-produced beef

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	9.67e-09	4.65e-09
Arsenic	1.09e-09	5.26e-10
Barium	2.61e-09	1.25e-09
Beryllium	2.86e-11	1.38e-11
Cadmium	3.32e-10	1.60e-10
Chromium VI	1.97e-08	9.49e-09
Chromium (total)	1.24e-07	5.98e-08
Copper	2.51e-07	1.21e-07
Lead	4.19e-09	2.01e-09
Manganese	2.55e-08	1.23e-08
Mercury	1.22e-07	5.88e-08
Nickel	4.01e-07	1.93e-07
Selenium	4.53e-09	2.18e-09
Silver	2.64e-09	1.27e-09
Thallium	2.69e-09	1.29e-09
Vanadium	1.98e-09	9.52e-10
Zinc	3.09e-05	1.49e-05
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.12 Exposure from ingestion of local fish

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	1.40e-09	6.73e-10
Arsenic	4.36e-09	2.10e-09
Barium	2.70e-07	1.30e-07
Beryllium	1.03e-10	4.97e-11
Cadmium	4.81e-09	2.31e-09
Chromium VI	1.09e-08	5.26e-09
Chromium (total)	6.89e-08	3.32e-08
Copper	5.42e-07	2.60e-07
Lead	1.23e-07	5.91e-08
Manganese	8.64e-07	4.16e-07
Mercury	3.39e-06	1.63e-06
Nickel	5.37e-07	2.58e-07
Selenium	8.85e-10	4.25e-10
Silver	2.81e-09	1.35e-09
Thallium	1.85e-08	8.89e-09
Vanadium	8.34e-07	4.01e-07
Zinc	7.11e-07	3.42e-07
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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Table 5.13 Exposure from ingestion of drinking water

Contaminant	2.5 year old child mg/kg-day	Adult mg/kg-day
Ammonia	NA	NA
Antimony	1.10e-07	4.15e-08
Arsenic	7.79e-09	2.94e-09
Barium	2.12e-07	7.99e-08
Beryllium	4.28e-10	1.61e-10
Cadmium	4.67e-09	1.76e-09
Chromium VI	5.38e-08	2.03e-08
Chromium (total)	3.39e-07	1.28e-07
Copper	2.13e-07	8.03e-08
Lead	1.97e-07	7.43e-08
Manganese	6.80e-07	2.56e-07
Mercury	4.85e-08	1.83e-08
Nickel	8.98e-07	3.39e-07
Selenium	4.35e-09	1.64e-09
Silver	7.90e-09	2.98e-09
Thallium	1.02e-09	3.83e-10
Vanadium	1.19e-08	4.50e-09
Zinc	1.19e-06	4.49e-07
Alkyl pyridine	NA	NA
2-Cyanopyridine	NA	NA
3-Cyanopyridine	NA	NA
Benzene	NA	NA
Ethanol	NA	NA
Isopropanol	NA	NA
Methanol	NA	NA
2-Picoline	NA	NA
3-Picoline	NA	NA
Pyridine	NA	NA
Toluene	NA	NA

NA = Not applicable

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