

# **Appendix 4G**

## **Calculation of Tier 1 acceptance criteria (tables)**

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**Table 4G1a Preliminary Health Risk Based Acceptance Criteria Residential Site Use,**

Site Use:	Residential	Exposure Frequency:	350 d/yr	Exposure Dur.(1-6 yrs):	6 yr
Receptor:	Children resident on site for up to 30 yr	Averaging Time (carc.):	70 Yr	Exposure Dur.(7-31 yrs):	24 yr
		(non-carc.):	30 Yr	Ingestion Rate (1-6 yrs):	100 Mg/d
		Age-adjusted	48.57 mg.yr/kg.d	Ingestion Rate (7-31 yrs):	25 mg/d
Target HI:	0.00001	ingestion factor:		Skin Area (1-6 yr) (cm <sup>2</sup> ):	2625
	1	Age-adjusted Dermal Exposure Factor	2.7E+03	Skin Area (7-30 yr) (cm <sup>2</sup> ):	4700
				Soil Adherence (mg/sq.cm):	0.5
		Body Weight (1-6 yr):	15 kg	Produce Ing (1-6yr, kg):	0.13
		Body Weight (7-31 yr):	70 kg	Produce Ing (7-30yr, kg):	0.45
				Proportion of produce from contaminated source	0.1

Contaminant	Skin Absorption Factor	SF (1/(mg/kg/d))	RfD (mg/kg/d)	Acceptable CDI				Preliminary Remediation Goal (mg/kg) (2)								
				Carcinogenic		Non-carcinogenic		Carcinogenic			Non-carcinogenic					
				Oral	Dermal	Oral	Dermal	Oral	Dermal	Produce (1)	Oral	Dermal	Produce (1)			
<b>Alkanes</b>																
C <sub>7</sub> - C <sub>9</sub>	0.1		5.00E+00			5.0E+00	5.0E+00						7.8E+05	6.0E+05		
C <sub>10</sub> - C <sub>14</sub>	0.1		1.00E-01			1.0E-01	1.0E-01						1.6E+04	1.2E+04		
C <sub>15</sub> - C <sub>36</sub>	0.01		1.50E+00			1.5E+00	1.5E+00						2.3E+05	1.8E+06		
<b>MAHs</b>																
benzene	0.1	2.90E-02		3.4E-04	3.4E-04			5.2E+02	1.9E+02							
toluene	0.1		2.00E-01			2.0E-01	2.0E-01						3.1E+04	2.4E+04		
ethylbenzene	0.1		1.00E-01			1.0E-01	1.0E-01						1.6E+04	1.2E+04		
xylene	0.1		1.80E-01			1.8E-01	1.8E-01						2.8E+04	2.1E+04		
<b>Aromatics</b>																
naphthalene	0.01		4.00E-03			4.0E-03	4.0E-03						6.3E+02	4.8E+03		7.15E+01
pyrene	0.01		3.00E-02			3.0E-02	3.0E-02						4.7E+03	3.6E+04		1.63E+03
benzo(a)pyrene	0.01	7.30E+00		1.4E-06	1.4E-06			2.1E+00	7.5E+00	2.71E-01						

Note: (1) Ingestion of produce.  
 (2) Preliminary remediation goal for carcinogens based on entire 30 yr, PRG for non-carc. based on most critical 6 yr.  
 (3) Limiting values are shaded

**Table 4G1b Preliminary Health Risk Based Acceptance Criteria Residential Site Use  
Estimation of Target Soil Concentrations: - Produce Based**

Contaminant	Target Produce Concentration (mg/kg)		Kow	Uptake Factor	1/(Plant Uptake Factor)	Target Soil Concentration (mg/kg)	
	Carcinogenic	Non-carcinogenic				Carcinogenic	Non-carcinogenic
Alkanes							
hexane		6.02E+03	7.94E+03				
nonane		1.20E+02	4.68E+04				
eicosane		1.80E+03					
MAHs							
benzene	1.22E+00		1.32E+02				
toluene		2.41E+02	5.37E+02				
ethylbenzene		1.20E+02	1.41E+03				
xylene		2.17E+02	1.82E+03				
Aromatics							
naphthalene		4.81E+00	2.34E+03	6.73E-02	1.49E+01		7.15E+01
pyrene		3.61E+01	1.51E+05	2.21E-02	4.52E+01		1.63E+03
benzo(a)pyrene	4.85E-03		1.02E+06	1.79E-02	5.59E+01	2.71E-01	

**Table 4G1c Preliminary Health Risk Based Acceptance Criteria Residential Site Use**

Site Use:	Residential	Exposure Frequency:	350 d/yr	Exposure Dur.(1-6 yrs):	6 yr
Receptor:	Children resident on site for up to 30 yr	Averaging Time (carc.): (non-carc.):	70 Yr 30 Yr	Exposure Dur.(7-31 yrs):	24 yr
Target Risk:	0.00001	Age-adjusted ingestion factor:	48.57 mg.yr/kg.d	Ingestion Rate (1-6 yrs):	100 Mg/d
Target HI:	1	Age-adjusted Dermal Exposure Factor	2.7E+03	Ingestion Rate (7-31 yrs):	25 mg/d
				Skin Area (1-6 yr) (cm <sup>2</sup> ):	2625
				Skin Area (7-30 yr) (cm <sup>2</sup> ):	4700
				Soil Adherence (mg/sq.cm):	0.5
		Body Weight (1-6 yr):	15 kg	Produce Ing (1-6yr, kg):	0.13
		Body Weight (7-31 yr):	70 kg	Produce Ing (7-30yr, kg):	0.45
				Proportion of produce from contaminated source	0.5

Contaminant	Skin Absorption Factor	SF (1/(mg/kg/d))	RfD (mg/kg/d)	Acceptable CDI				Preliminary Remediation Goal (mg/kg) (2)						
				Carcinogenic		Non-carcinogenic		Carcinogenic			Non-carcinogenic			
				Oral	Dermal	Oral	Dermal	Oral	Dermal	Produce (1)	Oral	Dermal	Produce (1)	
Alkanes														
C <sub>7</sub> - C <sub>9</sub>	0.1		5.00E+00			5.0E+00	5.0E+00				7.8E+05	6.0E+05		
C <sub>10</sub> - C <sub>14</sub>	0.1		1.00E-01			1.0E-01	1.0E-01				1.6E+04	1.2E+04		
C <sub>15</sub> - C <sub>36</sub>	0.01		1.50E+00			1.5E+00	1.5E+00				2.3E+05	1.8E+06		
MAHs														
benzene	0.1	2.90E-02		3.4E-04	3.4E-04			5.2E+02	1.9E+02					
toluene	0.1		2.00E-01			2.0E-01	2.0E-01				3.1E+04	2.4E+04		
ethylbenzene	0.1		1.00E-01			1.0E-01	1.0E-01				1.6E+04	1.2E+04		
xylene	0.1		1.80E-01			1.8E-01	1.8E-01				2.8E+04	2.1E+04		
Aromatics														
naphthalene	0.01		4.00E-03			4.0E-03	4.0E-03				6.3E+02	4.8E+03	1.43E+0	
pyrene	0.01		3.00E-02			3.0E-02	3.0E-02				4.7E+03	3.6E+04	3.27E+0	
benzo(a)pyrene	0.01	7.30E+00		1.4E-06	1.4E-06			2.1E+00	7.5E+00	5.42E-02				

Note: (1) Ingestion of produce.  
(2) Preliminary remediation goal for carcinogens based on entire 30 yr, PRG for non-carc. based on most critical 6 yr.  
(3) Limiting values are shaded

**Table 4G1d Preliminary Health Risk Based Acceptance Criteria Residential Site Use Estimation of Target Soil Concentrations: - Produce Based**

Contaminant	Target Produce Concentration (mg/kg)		Kow	Uptake Factor	1/(Plant Uptake Factor)	Target Soil Concentration (mg/kg)	
	Carcinogenic	Non-carcinogenic				Carcinogenic	Non-carcinogenic
Alkanes							
hexane		1.20E+03	7.94E+03				
nonane		2.41E+01	4.68E+04				
eicosane		3.61E+02					
MAHs							
benzene	2.44E-01		1.32E+02				
toluene		4.81E+01	5.37E+02				
ethylbenzene		2.41E+01	1.41E+03				
xylene		4.33E+01	1.82E+03				
Aromatics							
naphthalene		9.63E-01	2.34E+03	6.73E-02	1.49E+01		1.43E+01
pyrene		7.22E+00	1.51E+05	2.21E-02	4.52E+01		3.27E+02
benzo(a)pyrene	9.70E-04		1.02E+06	1.79E-02	5.59E+01	5.42E-02	

**Table 4G2 Preliminary Health Risk Based Acceptance Criteria Commercial Site Use**

Site Use: Commercial/ Exposure Frequency: 240 d/yr Exposure Duration: 20 yr  
 Receptor: Industrial Adult Averaging Time (carc.): 70 yr  
 Worker for 20 yr (non-carc.): 20 yr Ingestion Rate (1-6 yr): 25 mg/d  
 Target Risk: 0.00001 ingestion Factor: Skin Area (cm<sup>2</sup>): 4700  
 Target HI: 1 Exposure Factor: Body Weight: 70 kg Soil Adherence (mg/cm<sup>2</sup>): 1

Contaminant	Skin Absorption Factor	SF (1/(mg/kg/d))	RfD (mg/kg/d)	Acceptable CDI				Preliminary Remediation Goal (mg/kg) (2)						
				Carcinogenic		Non-carcinogenic		Carcinogenic			Non-carcinogenic			
				Oral	Dermal	Oral	Dermal	Oral	Dermal	Produce (1)	Oral	Dermal	Produce (1)	
<b>Alkanes</b>														
C <sub>7</sub> - C <sub>9</sub>	0.1		5.00E+00			5.0E+00	5.0E+00					2.1E+07	1.1E+06	
C <sub>10</sub> - C <sub>14</sub>	0.1		1.00E-01			1.0E-01	1.0E-01					4.3E+05	2.3E+04	
C <sub>15</sub> - C <sub>36</sub>	0.01		1.50E+00			1.5E+00	1.5E+00					6.4E+06	3.4E+06	
<b>MAHs</b>														
benzene	0.1	2.90E-02		3.4E-04	3.4E-04			5.1E+03	2.7E+02					
toluene	0.1		2.00E-01			2.0E-01	2.0E-01					8.5E+05	4.5E+04	
ethylbenzene	0.1		1.00E-01			1.0E-01	1.0E-01					4.3E+05	2.3E+04	
xylene	0.1		1.80E-01			1.8E-01	1.8E-01					7.7E+05	4.1E+04	
<b>Aromatics</b>														
naphthalene	0.01		4.00E-03			4.0E-03	4.0E-03					1.7E+04	9.1E+03	
pyrene	0.01		3.00E-02			3.0E-02	3.0E-02					1.3E+05	6.8E+04	
benzo(a)pyrene	0.01	7.30E+00		1.4E-06	1.4E-06			2.0E+01	1.1E+01					

**Table 4G3a Preliminary Health Risk Based Acceptance Criteria Agricultural Site Use**

Site Use:	Residential	Exposure Frequency:	350 d/yr	Exposure Dur.(1-6 yrs):	6 yr
Receptor:	Children resident on site for up to 30 yr	Averaging Time (carc.): (non-carc.):	70 Yr 30 Yr	Exposure Dur.(7-31 yrs):	24 yr
Target Risk:		Age-adjusted ingestion factor:	48.57 mg.yr/kg.d	Ingestion Rate (1-6 yrs):	100 Mg/d
0.00001				Ingestion Rate (7-31 yrs):	25 mg/d
Target HI:	1	Age-adjusted Dermal Exposure Factor	2.7E+03	Skin Area (1-6 yr) (cm <sup>2</sup> ):	2625
				Skin Area (7-30 yr) (cm <sup>2</sup> ):	4700
		Body Weight (1-6 yr):	15 kg	Soil Adherence (mg/sq.cm):	1
		Body Weight (7-31 yr):	70 kg	Produce Ing (1-6yr, kg):	0.13
				Produce Ing (7-30yr, kg):	0.45
				Proportion of produce from contaminated source	1

Contaminant	Skin Absorption Factor	SF (1/(mg/kg/d))	RfD (mg/kg/d)	Acceptable CDI				Preliminary Remediation Goal (mg/kg) (2)						
				Carcinogenic		Non-carcinogenic		Carcinogenic			Non-carcinogenic			
				Oral	Dermal	Oral	Dermal	Oral	Dermal	Produce (1)	Oral	Dermal	Produce (1)	
Alkanes														
C <sub>7</sub> - C <sub>9</sub>	0.1		5.00E+00			5.0E+00	5.0E+00					7.8E+05	3.0E+05	
C <sub>10</sub> - C <sub>14</sub>	0.1		1.00E-01			1.0E-01	1.0E-01					1.6E+04	6.0E+03	
C <sub>15</sub> - C <sub>36</sub>	0.01		1.50E+00			1.5E+00	1.5E+00					2.3E+05	8.9E+05	
MAHs														
benzene	0.1	2.90E-02		3.4E-04	3.4E-04			5.2E+02	9.5E+01					
toluene	0.1		2.00E-01			2.0E-01	2.0E-01					3.1E+04	1.2E+04	
ethylbenzene	0.1		1.00E-01			1.0E-01	1.0E-01					1.6E+04	6.0E+03	
xylene	0.1		1.80E-01			1.8E-01	1.8E-01					2.8E+04	1.1E+04	
Aromatics														
naphthalene	0.01		4.00E-03			4.0E-03	4.0E-03					6.3E+02	2.4E+03	7.15E+00
pyrene	0.01		3.00E-02			3.0E-02	3.0E-02					4.7E+03	1.8E+04	1.63E+02
benzo(a)pyrene	0.01	7.30E+00		1.4E-06	1.4E-06			2.1E+00	3.8E+00	2.71E-02				

- Note:
- (1) Ingestion of produce.
  - (2) Preliminary remediation goal for carcinogens based on entire 30 yr, PRG for non-carc. based on most critical 6 yr.
  - (3) Limiting values are shaded

**Table 4G3b Preliminary Health Risk Based Acceptance Criteria Agricultural Site Use Estimation of Target Soil Concentrations: - Produce Based**

Contaminant	Target Produce Concentration (mg/kg)		Koc	Kow	Uptake Factor	1/(Plant Uptake Factor)	Target Soil Concentration (mg/kg)	
	Carcinogenic	Non-carcinogenic					Carcinogenic	Non-carcinogenic
Alkanes								
hexane		6.02E+02	4.45E+03	7.94E+03				
nonane		1.20E+01	2.34E+04	4.68E+04				
eicosane		1.80E+02						
MAHs								
benzene	1.22E-01		8.30E+01	1.32E+02				
toluene		2.41E+01	3.02E+02	5.37E+02				
ethylbenzene		1.20E+01	1.10E+03	1.41E+03				
xylene		2.17E+01	2.40E+02	1.82E+03				
Aromatics								
naphthalene		4.81E-01	1.29E+03	2.34E+03	6.73E-02	1.49E+01		7.15E+00
pyrene		3.61E+00	3.80E+04	1.51E+05	2.21E-02	4.52E+01		1.63E+02
benzo(a)pyrene	4.85E-04		3.89E+05	1.02E+06	1.79E-02	5.59E+01	2.71E-02	

**Table 4G4 Preliminary Health Risk Based Acceptance Criteria *Commercial Site Use***

Site Use: Maintenance Exposure Frequency: 50 d/yr Exposure Duration: 20 yr  
 Receptor: Worker for 20 yr Averaging Time: 70 yr  
 (carc.):  
 (non-carc.): 20 yr Ingestion Rate (1-6 yr): 100 mg/d  
 Target Risk 0.00001 ingestion Factor: Skin Area (cm<sup>2</sup>): 4700  
 Target HI: 1 Exposure Factor: Soil Adherence (mg/cm<sup>2</sup>): 1.5  
 Body Weight: 70 kg

Contaminant	Skin Absorption Factor	SF (1/(mg/kg/d))	RfD (mg/kg/d)	Acceptable CDI				Preliminary Remediation Goal (mg/kg) (2)						
				Carcinogenic		Non-carcinogenic		Carcinogenic			Non-carcinogenic			
				Oral	Dermal	Oral	Dermal	Oral	Dermal	Produce (1)	Oral	Dermal	Produce (1)	
<b>Alkanes</b>														
C <sub>7</sub> - C <sub>9</sub>	0.1		5.00E+00			5.0E+00	5.0E+00					2.6E+07	3.6E+06	
C <sub>10</sub> - C <sub>14</sub>	0.1		1.00E-01			1.0E-01	1.0E-01					5.1E+05	7.2E+04	
C <sub>15</sub> - C <sub>36</sub>	0.01		1.50E+00			1.5E+00	1.5E+00					7.7E+06	1.1E+07	
<b>MAHs</b>														
benzene	0.1	2.90E-02		3.4E-04	3.4E-04			6.2E+03	8.7E+02					
toluene	0.1		2.00E-01			2.0E-01	2.0E-01					1.0E+06	1.4E+05	
ethylbenzene	0.1		1.00E-01			1.0E-01	1.0E-01					5.1E+05	7.2E+04	
xylene	0.1		1.80E-01			1.8E-01	1.8E-01					9.2E+05	1.3E+05	
<b>Aromatics</b>														
naphthalene	0.01		4.00E-03			4.0E-03	4.0E-03					2.0E+04	2.9E+04	
pyrene	0.01		3.00E-02			3.0E-02	3.0E-02					1.5E+05	2.2E+05	
benzo(a)pyrene	0.01	7.30E+00		1.4E-06	1.4E-06			2.5E+01	3.5E+01					