ANNEX A

TITLE 25. ENVIRONMENTAL PROTECTION
PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION
Subpart D. ENVIRONMENTAL HEALTH AND SAFETY
ARTICLE VI. GENERAL HEALTH AND SAFETY
CHAPTER 250. ADMINISTRATION OF LAND RECYCLING PROGRAM

§ 250.1 Definitions

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***Environmental covenant* – A servitude, AS SET FORTH IN A DOCUMENT PREPARED PURSUANT TO THE UNIFORM ENVIRONMENTAL COVENANTS ACT (27Pa. C.S.§ § 6501-6517), arising under an environmental response project which imposes activity and use limitations.**

EQL - Estimated Quantitation Limit. **The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. [~~The EQL is generally 5 to 10 times the MDL (method detection limit). However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the EQL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix dependent. The EQLs in the EPA publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* [SW-846] are provided for guidance and may not always be achievable.~~]**

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NPDES – National Pollutant Discharge Elimination System. **The National system for the issuance of permits under §402 of the Federal Clean Water Act (33 U.S.C.A. §1342) including a state or interstate program which has been approved in whole or in part by the EPA.**

PQL – Practical Quantitation Limit. **The lowest limit that can be reliably achieved within specified limits of precision and accuracy under routine laboratory conditions for a specified matrix and based on quantitation, precision and accuracy, normal operation of a laboratory and the practical need in a compliance-monitoring program to have a sufficient number of laboratories available to conduct the analyses.**

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§ 250.11. Periodic Review of MSCs.

The Department will review new scientific information that relates to the basis of the MSCs as it becomes available and will propose appropriate changes for the consideration of the Environmental Quality Board as necessary, but in no case more than 36 months after the effective date of the most recently promulgated MSCs.

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§ 250.301. Scope.

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(b) This subchapter sets forth generic Statewide health standards for regulated substances determined by the EPA to be mutagens. Tables 1-4 contain statewide health standards based upon the methodology for mutagens in Sections 250.306 (relating to ingestion numeric values) and 250.307 (relating to inhalation numeric values) for the following substances classified as mutagens:

Regulated Substance	CAS Number
Benzo[a]anthracene	56-55-3
Benzidine	92-87-5
Benzo[a]pyrene	50-32-8
Benzo[b]fluoranthene	205-99-2
Benzo[k]fluoranthene	207-08-9
Chrysene	218-01-9
Dibenzo[a,h]anthracene	53-70-3
Dibromo-3-chloropropane, 1,2-	96-12-8
Indeno[1,2,3-cd]pyrene	193-39-5
Methylene bis(2-chloroaniline), 4,4'-	101-14-4
Nitrosodiethylamine, n-	55-18-5
Nitrosodimethylamine, n-	62-75-9
Nitroso-n-ethylurea, n-	759-73-9
Vinyl chloride	75-01-4

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(**[b]c**) This subchapter sets forth minimum threshold MSCs for soil and groundwater that shall be met to demonstrate attainment of the Statewide health standards for regulated substances in Appendix A, Table 6. Minimum threshold MSCs are standards developed for regulated substances for which no chemical-specific toxicological data exist.

(**[c]d**) For regulated substances which do not have an MSC for the relevant medium on Appendix A, Tables 1—4 or 6, the background standard or site-specific standard shall be met to qualify for a release of liability under the act.

§ 250.303 Aquifer determination; current use and currently planned use of aquifer groundwater.

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(d) If the Department determines that groundwater is not used or currently planned to be used, the following requirements apply within the area identified in subsection (b):

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(3) The remediator shall establish institutional controls to maintain the integrity of the nonuse aquifer determination, or include a postremediation care plan in the final report detailing the process of routinely assessing and reporting to the Department compliance with subsection (c).

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(i) Postremediation care plan provisions shall be **[acknowledged within the deed to the**

remediated property upon transfer of ownership] implemented through an environmental covenant to ensure compliance with subsection (c).

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§ 250.304. MSCs for groundwater.

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(c) The MSCs for regulated substances contained in groundwater in aquifers used or currently planned to be used for drinking water or for agricultural purposes is the MCL as established by the Department or the EPA **as established at 25 Pa. Code § 109.202 (relating to state MCLs, MRDLs and treatment technique requirements) [**(U.S. EPA, 1996. Drinking Water Regulations and Health Advisories**.] and Health Advisory levels (HAL) set forth at DRINKING WATER STANDARDS AND HEALTH ADVISORIES,** EPA Office of Water **Publication [EPA 822-R-96-001] No. [~~EPA 822-R-06-013~~|EPA 822-R-09-011 (OCTOBER, 2009)|)]**. For a regulated substance where no MCL has been established, the MSC is the lifetime **[health advisory level (| HAL [ )]** for that compound. For a regulated substance where neither an MCL nor a lifetime HAL **[is] has been** established, the MSC is the lowest concentration calculated using the appropriate residential and nonresidential exposure assumptions and the equations in §§ 250.306 and 250.307 (relating to ingestion numeric values; and inhalation numeric values). **New or revised MCLs or HALs promulgated by the Department or the EPA shall become effective immediately for any demonstration of attainment completed after the date the new or revised MCLs or HALs become effective.**

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[~~(h) The methodology used by the Department for calculating the MSCs for groundwater does not address the vapor intrusion exposure pathway. Therefore, in order to demonstrate attainment under the Act for the vapor intrusion exposure pathway the remediator must ASSESS AND address the vapor intrusion exposure pathway in accordance with Section 304(f)(4) of the Act and Subchapter D of this Chapter, or in accordance with technical guidance published by the Department addressing vapor intrusion into buildings from groundwater and soil under the Statewide health standard~~].

[~~§ 250.305. MSCs for soil.~~]

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[~~(h) The methodology used by the Department for calculating the MSCs for soil does not address the vapor intrusion exposure pathway. Therefore, in order to demonstrate attainment under the Act for the vapor intrusion exposure pathway the remediator must ASSESS AND address the vapor intrusion exposure pathway in accordance with Section 304(f)(4) of the Act and Subchapter D of this Chapter, or in accordance with technical guidance published by the Department addressing vapor intrusion into buildings from groundwater and soil under the Statewide health standard~~].

(Editor's Note: For the equations that are being modified in §250.306 and 307, the original equation is shown as being deleted in its entirety. The modified equation is shown immediately below the equation it replaces, and for clarity and ease of reading it is in normal bold type.)

§ 250.306. Ingestion numeric values.

(a) For a regulated substance which is a systemic toxicant, the ingestion numeric value for that substance was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equation:

[MSC = $\frac{\text{THQ x RfDo x BW x AT}_{DC}\text{ x 365 days/year}}{\text{Abs x EF x ED x IngR x CF}}$]

MSC = $\frac{\text{THQ x RfDo x BW x ATnc x 365 days/year}}{\text{Abs x EF x ED x IngR x CF}}$

(b) For a regulated substance which is a carcinogen, the ingestion numeric value for that substance was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equations:

[MSC = $\frac{\text{TR x ATc x 365 days/year}}{\text{CSFo x Abs x EF x ED x IFadj x CF}}$]

(1) For regulated substances not identified as a mutagen in Section 250.301(b):

MSC = $\frac{\text{TR x ATc x 365 days/year}}{\text{CSFo x Abs x EF x IFadj x CF}}$

(2) For regulated substances identified as a mutagen, except for vinyl chloride, in Section 250.301(b):

MSC = $\frac{\text{TR x ATc x 365 days/year}}{\text{CSFo x Abs x EF x AIFadj x CF}}$

(3) For vinyl chloride:

MSC = $\frac{\text{TR}}{\text{[CSFo x Abs x EF x IFadj x CF / (ATc x 365 days/year)] + (CSFo x Abs x IRc x CF/BWc)}}$

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(c) For a regulated substance that has both an oral reference dose and an oral cancer slope factor, the ingestion numeric value is the lower of the two numbers as calculated by the equations in subsections (a) and (b).

(d) The default exposure assumptions used to calculate the ingestion numeric values are as follows:

Term		Residential		Nonresidential (Onsite Worker)
		Systemic[1]	Carcinogens[2,6]	
THQ	Target Hazard Quotient	1	N/A	1
RfDo	Oral Reference Dose (mg/kg-day)	Chemical-specific	N/A	Chemical-specific
BW	Body Weight (kg)		N/A	
	Soil	15		70
	Groundwater	70		70
[AT_{DC}] ATnc	Averaging Time for systemic toxicants (yr)			
	Soil	6	N/A	25
	Groundwater	30	N/A	25
Abs	Absorption (unitless)[3]	1	1	1
EF[5]	Exposure Frequency (d/yr)			
	Soil	250	250	180
	Groundwater	350	350	250
ED	Exposure Duration (yr)			
	Soil	6	N/A	25
	Groundwater	30	N/A	25
IngR	Ingestion Rate			
	Soil (mg/day)	100	N/A	50
	GW (L/day)	2	N/A	1
CF	Conversion Factor			
	Soil (kg/mg)	1×10^{-6}	1×10^{-6}	1×10^{-6}
	GW (unitless)	1	1	1
TR	Target Risk	N/A	1×10^{-5}	N/A
[CSF_o] CSFo	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	N/A	Chemical-specific	Chemical-specific
[At_C] ATc	Averaging Time for carcinogens (yr)	N/A	70	70
[If_{adj}] IFadj[4]	Ingestion Factor	N/A		
	Soil (mg-yr/kg-day)		57.1	17.9
	GW (L-yr/kg-day)		1.1	0.4
AIFadj[5]	**Combined Age-**	**N/A**		**N/A**

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	Dependent Adjustment Factor and Ingestion Factor Soil (mg-yr/kg-day) **GW (L-yr/kg-day)**		**245** **3.39**	

Notes:

[1]Residential exposure to noncarcinogens is based on childhood (ages 1-6) exposure for soil, and adult exposure for groundwater, consistent with USEPA (1991).

[2]Residential exposure to carcinogens is based on combined childhood and adult exposure.

[3]The oral absorption factor takes into account absorption and bioavailability. In cases where the oral RfD or CSF is based on administered oral dose, the absorption factor would be limited to bioavailability. The default value is 1.

[4]The Ingestion Factor for the residential scenario is calculated using the equation Ifadj = EDc x IRc/BWc + EDa x IRa/Bwa, where EDc = 6 yr, IRc = 100 mg/day for soils and 1 L/day for groundwater, BWc = 15 kg, EDa = 24 yr, IRa = 50 mg/day for soils and 2 L/day for groundwater, and BWa = 70 kg. The ingestion factor for the nonresidential scenario is calculated using the equation Ifadj = ED x IRc/BWc, where ED = 25 yr, IR = 50 mg/day for soils and 1 L/day for groundwater, and BW = 70 kg.

[5]**[In cases where the inhalation RfD or CSF is based on absorbed dose, this factor can be applied in the exposure algorithm. The default value is 1]The Combined Age-Dependent Adjustment Factor and Ingestion Factor (AIFadj) for the residential scenario is calculated using the equation AIFadj = [$ADAF_{<2}$ x $ED_{<2}$) + ($ADAF_{2-6}$ x ED_{2-6})] x IRc / BWc + [($ADAF_{>6-16}$ x $ED_{>6-16}$) + ($ADAF_{>16}$ x $ED_{>16}$)] x IRa / BWa, where $ADAF_{<2}$ = 10, $ED_{<2}$ = 2 yr, $ADAF_{2-6}$ = 3, ED_{2-6} = 4 yr, IRc = 100 mg/day for soils and 1 L/day for groundwater, BWc = 15 kg, $ADAF_{>6-16}$ = 3, $ED_{>6-16}$ = 10 yr, $ADAF_{>16}$ 1, $ED_{>16}$ = 14 yr, IRa = 50 mg/day for soils and 2 L/day for groundwater, and BWa = 70 kg.**

[6]**For the equation to calculate the vinyl chloride residential MSC based on the carcinogenic effect, IRc = 100 mg/day for soils and 1 L/day for groundwater, BWc = 15 kg..**

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§ 250.307. Inhalation numeric values.

(a) For a regulated substance which is a systemic toxicant, the following applies:

(1) For a volatile compound, the numeric value for inhalation from soil shall be calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equation using TF for volatiles:

$$[MSC = \frac{THQ \times RfD_i \times BW \times AT_{nc} \times 365\ days/year \times TF}{Abs \times ET \times EF \times ED \times IR}]$$

$$MSC = \frac{THQ \times RfCi \times ATnc \times 365\ days/year \times TF}{ET \times EF \times ED}$$

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(2) For a regulated substance attached to particulates, the numeric value for inhalation from soil was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the equation in paragraph (1) using TF for particulates.

(b) For a regulated substance which is a carcinogen, the following apply:

(1) For a volatile compound, the numeric value for inhalation from soil was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equation using TF for volatiles:

$$[MSC = \frac{TR \times AT_c \times 365\ days/year \times TF}{CSFi \times Abs \times ET \times EF \times IF_{adj}]}$$

$$MSC = \frac{TR \times ATc \times 365\ days/year \times 24\ hr/day \times TF}{IUR \times ET \times EF \times ED \times CF}$$

(2) For a regulated substance attached to particulates, the numeric value for inhalation from soil was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the equation in paragraph (1) using TF for particulates.

(3) For a regulated substance identified in Section 250.301(b) as a mutagen, except for vinyl chloride, the numeric value for inhalation from soil was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equation using the TF for volatiles:

$$MSC = \frac{TR \times ATc \times 365\ days/year \times 24\ hr/day \times TF}{IUR \times ET \times EF \times AED \times CF}$$

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(4) For vinyl chloride, the numeric value for inhalation from soil was calculated using the appropriate residential or nonresidential exposure assumptions from subsection (d) according to the following equation using the TF for volatiles:

$$MSC = \frac{TR}{[IURxETxEFxEDxCF / (ATc \times 365days/yr \times 24hr/d \times TF)] + (IUR \times CF \times TF)}$$

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(d) The default exposure assumptions used to calculate the inhalation numeric values for soil are as follows:

Term		Residential		Nonresidential (Onsite Worker)
		Systemic[1]	Carcinogens[2]	
THQ	Target Hazard Quotient	1	N/A	1
[RfD$_i$] RfCi	Inhal. Reference	Chemical-	N/A	Chemical-specific

	[Dose] Concentration [(mg/kg-day] (mg/m^3)	specific		
[BW]	**[Body Weight (kg)]**	**[70]**	**[N/A]**	**[70]**
[AT$_{nc}$] ATnc	Averaging Time for systemic toxicants (yr)	30	N/A	25
TF	Transport Factor (mg/kg)/(mg/m^3) Volatilization[3] Particulate[4]	Chemical-specific 1 x 10^{10}	Chemical-specific 1 x 10^{10}	Chemical-specific 1 x 10^{10}
[Abs]	**[Absorption (unitless)[5]]**	**[1]**	**[1]**	**[1]**
ET	Exposure Time (hr/day)	24	24	8
EF	Exposure Frequency[6]5 (d/yr)	250	250	180
ED	Exposure Duration (yr)	30	N/A	25
CF	**Conversion Factor**	**1000 µg/mg**	**1000 µg/mg**	**1000 µg/mg**
[IR]	**[Inhalation Rate (m^3/hr)]**	**[0.8[3]]**	**[N/A]**	**[1.25]**
TR	Target Risk	N/A	1 x 10^{-5}	1 x 10^{-5}
[CSF$_i$] IUR	Inhalation **[Cancer Slope Factor]Unit Risk [(mg/kg-day] (µg/m^3)$^{-1}$**	N/A	Chemical-specific	Chemical-specific
[AT$_c$] ATc	Averaging Time for carcinogens (yr)	N/A	70	70
[If$_{adj}$]	**[Inhalation Factor[7] (m^3-yr/kg-hr)]**	**[N/A]**	**[0.5]**	**[0.4]**
AED	**Combined Age-Dependent Adjustment Factor and Exposure Duration (yr)[6]**	**N/A**	**76**	**N/A**

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Notes: Modified from USEPA Region III Risk-based Concentration Table, dated October 20, 1995.
N/A = Not Applicable

[1]Residential exposure to systemic toxicants is based on adult exposure, consistent with USEPA (1991).

[2]Residential exposure to carcinogens is based on combined child and adult exposure.

[3]Volatilization transport factor is calculated using TF = (ER x DF)$^{-1}$, where DF = 12 (mg/m^3)/(m^2-sec). See soil depth-specific algorithm for the calculation of ER.

[4]Particulate transfer factor was calculated using TF = (ER x DF)$^{-1}$, where ER = 8.25 x 10^{-12} (mg/m^2-sec)/(mg/kg) and DF = 12(mg/m^3)/(mg/m^2-sec).

[[5]In cases where the inhalation RfD or CSF is based on absorbed dose, this factor can be applied in the exposure algorithm. The default value is 1.]

[6][5]Assumes approximately 100 days/yr with the ground being frozen. Exposure to surficial soils when the ground is frozen is considered de minimis. The nonresidential exposure frequency is defined as 5/7 x 250 days/yr.

[[7]The inhalation factor for the residential scenario is calculated using the equation $IF_{adj} = ED_c \times IR_c/BW_c + ED_a \times IR_a/BW_a$, where ED_c = 6 yr, IR_c = 0.5 m^3/hr, BW_c = 15kg, ED_a = 24 yr, IR_a = 0.83 m^3/hr, and BW_a = 70 kg. The inhalation factor for the nonresidential scenario is calculated using the equation $IF_{adj} = ED \times IR/BW$, where ED = 25 yr, IR = 1.25 m^3/hr and BW = 70 kg.]

[6]The Combined Age-Dependent Adjustment Factor and Exposure Duration (AED) is calculated using the equation $AED = ADAF_{<2} \times ED_{<2} + ADAF_{2\text{-}16} \times ED_{2\text{-}16} + ADAF_{>16}$, where $ADAF_{<2}$ = 10, $ED_{<2}$ = 2 yr, $ADAF_{2\text{-}16}$ = 3, $ED_{2\text{-}16}$ = 14 yr, $ADAF_{>16}$ = 1, $ED_{>16}$ = 14 yr.

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(f) For a regulated substance which is a systemic toxicant and is a volatile compound, the numeric value for the inhalation of volatiles from groundwater was calculated by using the appropriate residential or nonresidential exposure assumptions from subsection (h) according to the following equation:

$$\text{[MSC} = \frac{\text{THQ x RfDi x BW x ATnc x 365 days/year}}{\text{Abs x ET x EF x ED x IR x TF]}}$$

$$\text{MSC} = \frac{\text{THQ x RfC x ATnc x 365 days/year x 24 hr/day}}{\text{ET x EF x ED x TF}}$$

(g) For a regulated substance which is a carcinogen and is a volatile compound, the numeric value for the inhalation of volatiles from groundwater was calculated by using the appropriate residential or nonresidential exposure assumptions from subsection (h) according to the following equations:

$$\text{[MSC} = \frac{\text{TR x ATc x 365 days/yr}}{\text{CSFi x ABs x ET x EF x IFadj x TF]}}$$

(1) For regulated substances not identified as a mutagen in Section 250.301(b):

$$\text{MSC} = \frac{\text{TR x ATc x 365 days/year}}{\text{IUR x ET x EF x ED x TF x CF}}$$

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(2) For regulated substances identified as a mutagen, except for vinyl chloride, in Section 250.301(b):

$$\mathbf{MSC = \frac{TR \times ATc \times 365\ days/year \times 24\ hr/day}{IUR \times ET \times EF \times AED \times TF \times CF}}$$

(3) For vinyl chloride:

$$\mathbf{MSC = \frac{TR}{[(IUR \times ET \times EF \times ED \times TF \times CF) / (ATc \times 365\ days/year \times 24\ hr/day)] + (IUR \times TF \times CF)}}$$

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(h) The default exposure assumptions used to calculate the inhalation numeric values for the inhalation of volatiles from groundwater are as follows:

Term		Residential		Nonresidential (Onsite Worker)
		Systemic[1]	Carcinogens[2]	
THQ	Target Hazard Quotient	1	N/A	1
[RfD_i] RfC	Inhal. Reference **[Dose] Concentration [(mg/kg-day)] (mg/m^3)**	Chemical-specific	N/A	Chemical-specific
[BW]	**[Body Weight (kg)]**	**[70]**	**[N/A]**	**[70]**
[AT_{nc}] ATnc	Averaging Time for systemic toxicants (yr)	30	N/A	25
[Abs]	**[Absorption (unitless)[3]]**	**[1]**	**[1]**	**[1]**
ET	Exposure Time (hr/day)	24	24	8
EF	Exposure Frequency[6] (d/yr)	350	350	250
ED	Exposure Duration (yr)	30	**[N/A] 30**	25
[IR]	**[Inhalation rate (m^3/hr)]**	**[0.625]**	**[N/A]**	**[1.25]**
TF	Transfer Factor (L/m^3)[4]3	0.5	0.5	0.5
CF	**Conversion Factor**	**N/A**	**1,000 µg/mg**	**1,000 µg/mg**
TR	Target Risk	N/A	1×10^{-5}	1×10^{-5}
[CSF_i] IUR	Inhalation **[Cancer**	N/A	Chemical-specific	Chemical-specific

	Slope Factor] Unit Risk [(mg/kg-day)$^{-1}$] (ug/m^3)$^{-1}$			
[AT$_c$] ATc	Averaging Time for carcinogens (yr)	N/A	70	70
[IF$_{adj}$]	**[Inhalation Factor[5] (m^3-yr/kg-hr)]**	**[N/A]**	**[0.4]**	**[0.4]**
AED	**Combined Age-Dependent adjustment Factor and Exposure Duration (yr)[4]**	**N/A**	**76**	**N/A**

Notes: Modified from USEPA Region III Risk-based Concentration Table, dated October 20, 1995.
N/A = Not Applicable
[1]Residential exposure to systemic toxicants is based on adult exposure, consistent with USEPA (1991).
[2]Residential exposure to carcinogens is based on combined child and adult exposure.
[[3]In cases where the inhalation RfD or CSF is based on absorbed dose, this factor can be applied in the exposure algorithm.]
[4][3]Default Transfer Factor is as presented in USEPA's RAGS, Part B.
[5][The inhalation factor for the residential scenario is calculated using the equation IFadj = EDc x IRc/BWc + EDa x IRa/Bwa, where EDc = 6 yr, IRc = 0.5 m^3/hr, BWc = 15 kg, EDa = 24 yr, IRa = 0.625 m^3/hr, and BWa = 70 kg. The inhalation factor for the nonresidential scenario is calculated using the equation IFadj = ED x IR/BW, where ED = 25 yr, IR = 1.25 m^3/hr and BW = 70 kg.] The Combined Age-Dependent Adjustment Factor and Exposure Duration (AED) is calculated using the equation AED = ADAF$_{<2}$ x ED$_{<2}$ + ADAF$_{2-16}$ x ED$_{2-16}$ + ADAF$_{>16}$ x ED$_{>16}$, where ADAF$_{<2}$ = 10, ED$_{<2}$ = 2yr, ADAF$_{2-16}$ = 3, ED$_{2-16}$ = 14 yr, ADAF$_{>16}$ = 1, ED$_{>16}$ = 14 yr.

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§ 250.308. Soil to groundwater pathway numeric values.

(a) A person may use the soil-to-groundwater pathway numeric values listed in Appendix A, Table**s** 3B **and 4B,** as developed using the methods contained in paragraph (1), (2) or (4), may use a concentration in soil at the site which does not produce a leachate in excess of the MSC for groundwater contained in Appendix A, Tables 1 and 2, when subjected to the Synthetic Precipitation Leaching Procedure (Method 1312 of SW-846, Test Methods for Evaluating Solid Waste, promulgated by the U. S. EPA), or may use the soil-to-groundwater pathway soil buffer criteria in subsection (b) or may use the soil-to-groundwater pathway equivalency demonstration in subsection (d).

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§ 250.312. Final report

(a) For sites remediated under the statewide health standard, the person conducting the remediation shall submit a final report to the Department which documents attainment of the selected standard. This final report shall include site characterization information identified in § 250.204(b)—(e) (relating to final report). The site characterization shall be conducted in accordance with scientifically recognized principles, standards and procedures. The level of detail in the investigation, and the selected methods and analyses, that may include models, shall sufficiently define the rate of movement and the present and future extent and fate of contaminants to ensure continued attainment of the remediation standard. **THE FINAL REPORT SHALL INCLUDE, AS APPROPRIATE, AN ASSESSMENT THAT ADDRESSES THE VAPOR INTRUSION EXPOSURE PATHWAY.** Interpretations of geologic and hydrogeologic data shall be prepared by a professional geologist licensed in this Commonwealth.

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§ 250.407. Point of Compliance.

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[(e) For attainment of soil -to- groundwater standards in both residential and nonresidential areas, the point of compliance is throughout the soil column.]

[(f)] (e) * * *

§ 250.605. Sources of toxicity information.

(a) For site-specific standards , the person shall use appropriate reference doses, **reference concentrations, [and]** cancer slope factors **and unit risk factors** identified in Subchapter C (relating to Statewide health standards), unless the person can demonstrate that published data, available from one of the following sources, provides more current reference doses**, reference concentrations, [or]** cancer slope factors **or unit risk factors:**

(1) Integrated Risk Information System (IRIS).

[(2) Health Effects Assessment Summary Tables (HEAST).]

[(3)] (2) United States Environmental Protection Agency, National Center for Environmental Assessment (NCEA) Provisional Peer-Reviewed Toxicity Values (PPRTV).

[(4) Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles.

(5) California EPA, California Cancer Potency Factors and Chronic Reference Exposure Levels.

(6) EPA criteria documents, including drinking water criteria documents, drinking water health advisory summaries, ambient water quality criteria documents and air quality criteria documents.]

(3) Other sources

(i) Health Effects Assessment Summary Tables (HEAST)

(ii) Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles.

(iii) California EPA, California Cancer Potency Factors and Chronic Reference Exposure Levels.

(iv) EPA criteria documents, including drinking water criteria documents, drinking water health advisory summaries, ambient water quality criteria documents and air quality criteria documents.

§ 250.704. General attainment requirements for groundwater.

* * * * *

(d) For statistical methods under 250.707(b)(2)(i) (relating to statistical tests), the demonstration of attainment for groundwater shall be based upon at least eight consecutive quarters of groundwater data**, which may include characterization data.** As an alternative, the Department may accept **[four consecutive]** **fewer** quarterly sampling events **[or less]** with written approval from the Department under the following conditions:

* * * *

§ 250.707. Statistical tests

* * * *

(B) For sites not covered by clause (A), including all sites being remediated under an NIR under this chapter, samples shall be taken from the bottom and sidewalls of the excavation in a biased fashion that concentrates on areas where any remaining contamination above the Statewide health standard would most likely be found. The samples shall be taken from these suspect areas based on visual observation and the use of field instruments. If a sufficient number of samples has been collected from all suspect locations and the minimum number of samples has not been collected, or if there are no suspect areas, the locations to meet the minimum number of samples shall be based on a random procedure. The number of sample points required shall be determined in the following way:

* * * * *

(VI) For sites where there is a release to surface soils resulting in excavation of 50 cubic yards or less of contaminated soil, samples shall be collected as described in subparagraph (iii)(B), except that two samples shall be collected.

(C) All sample results shall be equal to or less than the applicable Statewide health MSC as determined using Tables 1 — 4 and 6 in Appendix A.

[(iv) For sites where there is a release to surface soils resulting in excavation of 50 cubic yards or less of contaminated soil, samples shall be collected as described in subparagraph (iii)(B), except that two samples shall be collected.]

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