



February 19, 2013

Project Reference #13621

Mr. Binyoti Amungwafor
c/o Ms. Victoria Stovall
Wisconsin Dept. of Natural Resources
2300 N. Martin Luther King Jr. Drive
Milwaukee, WI 53212

**RE: Impacted Soil Screening Criteria
Former Lakefield Sand & Gravel Property
7003 West Good Hope Road, Milwaukee, Wisconsin
WDNR BRRTS No. 02-41-548828 FID No. 241377070**

Dear Mr. Amungwafor:

On behalf of the SWP Properties LLC, (property owner) Sigma Environmental Services, Inc. (Sigma) has prepared this letter to present the soil screening criteria recommended for the acceptance and placement of impacted soil at the former Lakefield Sand and Gravel property (Lakefield). The import of the impacted soil is one component of the Wisconsin Department of Natural Resources (WDNR) approved conditional closure/remedial action plan (WDNR letter dated October 24, 2012).

With this document Sigma requests written agreement for the proposed criteria. A check in the amount of \$500 for a technical review is attached.

BACKGROUND

Several series of investigations have been completed at the former Lakefield property since its use in the 1960's for the disposal of construction debris. The investigation activities have included multiple soil and groundwater sampling and water level monitoring events to evaluate the potential for impact. The investigation activities have determined that subsurface soil and groundwater have been impacted as a result of the historic filling activities. The nature of both the impacts as well as the site characteristics indicate that the primary risk associated with the site is through direct contact with shallow soil impacts.

WDNR Approved Remedial Strategy

Based on the direct contact risk and the planned long term use of the property (soccer fields) the import and placement of low level impacted soil beneath a cap was the recommended and approved remedial strategy. The proposed import and filling activities would occur in stages as low level impacted material becomes available *and WDNR approval is received for each source*. To date, one source of low level impacted material has been approved for placement at Lakefield beneath the specified direct contact cap. The WDNR outlined this specific site approval in their October 10, 2012 letter.

The specific criteria for the approval of additional sources of impacted soil has not however been established. Therefore, this request presents the recommended soil screening criteria and associated justification to meet approved site closure requirements.

PROPOSED CRITERIA AND JUSTIFICATION

The proposed criteria for the impacted soil to be imported to the former Lakefield Sand and Gravel site as part of the WDNR approved remedial action plan, presented in Table 1, are based on:

- 1 - Consideration of current WDNR standards and guidelines,

*Several but not all RCRA metal, VOC or PAH constituents were detected within soil samples collected from the Lakefield property. The criteria to be used for those constituents not detected previously at the property include the **ch. NR 720 standards for direct contact**. The specific parameters are highlighted on the attached table in **orange**. The proposed concentration for **arsenic highlighted on the attached table in purple**, is based on **typical background concentrations** detected within southeastern Wisconsin.*

*For those parameters for which no **ch. NR 720 standards** have been established, **site-specific RCLs for direct contact exposure (based on outdoor worker)** were calculated using the WDNR and US EPA Web Calculator. Those parameters are highlighted on the attached table in **green**. The web calculator results are included in Attachment A.*

- 2 - Existing Lakefield soil and groundwater quality

The Lakefield site contains impacted soil and groundwater as a result of historic filling activities. The soil impacts however, are generally limited to the fill mass. Groundwater sampling at the site has demonstrated that limited groundwater impacts have resulted from the presence of these contaminants. In addition, groundwater sampling has shown that groundwater impacts decrease with both depth and distance across the site indicating that in the site's current condition the underlying native materials have the ability to effectively attenuate the migration of impacts from soil to groundwater.

- 3 - The protections of the approved remedial action to address potential future risks to groundwater and the threat from direct contact.

The pre-remediation site conditions and on-going natural attenuation are effectively protective of the site groundwater as demonstrated by the presence of minimally impacted groundwater. The WDNR approved remedial cap will further reduce the potential for groundwater impact by significantly minimizing the infiltration of precipitation through a WDNR approved cap. The cap consists of one foot thick layer of low permeability soil, one foot of clean soil and 3-inches of top soil that will be graded to direct storm water off of the impacted area. The placement of impacted soil below the low permeability cap at an elevation greater than 10 feet from the measured water table would continue to be protective of groundwater.

The site in its pre-remediation condition is not however protective of the direct contact threat, therefore the proposed 2-foot - 3-inch clean soil cap will provide an erosion resistant barrier from direct contact from existing shallow soil impacts as well as imported impacted soil.

*The threshold criteria for the balance of the constituents detected at the site therefore reflect the **maximum concentrations detected and therefore allowable at the property**. The criteria for those parameters are presented in **blue**.*

In addition to the constituent threshold criteria the following imported soil criteria are proposed:

Soil Source

The site from which impacted soil is generated may be within the NR 700 program as regulated by the WDNR or a site for which detected concentrations are greater than detection but less than published State cleanup levels.

Soil Types

The imported soil may consist of re-worked soil fill with less than 10% foundry or historically incorporated non-native non-exempt materials (including: glass, ceramic, or other typical urban fill materials) but SHALL NOT contain any other forms of solid or industrial wastes (i.e. non-fill related foundry material, industrial waste products, TSCA or RCRA regulated waste, asbestos or lead containing building materials.).

Remediation Implementation

To ensure the import, placement and final capping of the impacted soil the following site management practices and remediation activities will be implemented:

Imported Soil Management

The filling and capping activities will be completed at the direction and under the observation of Sigma personnel to ensure and document that only WDNR approved impacted soil is imported to the site. In addition, a gate will be installed to prohibit unauthorized site access.

Cap Construction

Sigma personnel will also direct and document that the WDNR approved cap is constructed as follows:

A cap of one foot of clean soil beneath one foot of clean low permeable soils with a hydraulic conductivity of 1×10^{-6} cm/sec must be placed on-site over low level impacted soil (one source of which has been approved for placement). A minimum of 3-inches of topsoil will be placed on top to accommodate seeding for stabilization and use as soccer fields. The cap will be graded to minimize precipitation infiltration and the development of cap erosion features.

Requested Clarification: *We request that the WDNR agree that the one-foot of low permeability soil may be placed below the one-foot of clean soil and 3-inches of top soil. This will ensure constructability and viability of the stabilization seeding.*

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Please call me at 414-643-4127 if you have any questions. I will call you soon to set up a meeting to discuss the requested approval.

Sincerely,

SIGMA ENVIRONMENTAL SERVICES, INC.



Kristin Kurzka, P.E.
Senior Engineer



Randy E. Boness, P.G.
Geosciences Group Leader

kal

cc: Ms. Pam Mylotta, WDNR

Lakefield Sand and Gravel Data Summary					Proposed Threshold Soil Concentrations	
RCRA Metals						
Arsenic	3.6	to	12	mg/kg	15	mg/kg
Cadmium	0.35	to	54	mg/kg	510	mg/kg
Chromium, total	13	to	100	mg/kg	200	mg/kg
Lead	7.2	to	4800	mg/kg	500	mg/kg
Mercury	0.031	to	0.57	mg/kg	0.57	mg/kg
Silver	0.27	to	9.6	mg/kg	9.6	mg/kg
VOCs						
Benzene	32	to	890	ug/kg	8500	ug/kg
sec-Butylbenzene	26.3	to	46000	ug/kg	46000	ug/kg
tert-Butylbenzene	26.9	to	99	ug/kg	99	ug/kg
n-Butylbenzene	88	to	272000	ug/kg	272000	ug/kg
Chlorobenzene	54	to	135	ug/kg	135	ug/kg
1,4-Dichlorobenzene	50	to	155	ug/kg	11.9	ug/kg
1,2-Dichlorobenzene	35	to	208	ug/kg	9690	ug/kg
cis-1,2-Dichloroethene	37	to	290	ug/kg	2270	ug/kg
trans-1,2-Dichloroethene	25.2			ug/kg	670	ug/kg
1,2-Dichloropropane	660			ug/kg	4.61	ug/kg
Ethylbenzene	36	to	137000	ug/kg	4600	ug/kg
Isopropylbenzene	28.7	to	26100	ug/kg	26100	ug/kg
p-Isopropyltoluene	29.3	to	46000	ug/kg	46000	ug/kg
n-Propylbenzene	29	to	91000	ug/kg	91000	ug/kg
Toluene	71	to	4000	ug/kg	38000	ug/kg
Trichloroethene	47	to	520	ug/kg	592	ug/kg
1,2,4-Trimethylbenzene	27.5	to	890000	ug/kg	83000	ug/kg
1,3,5-Trimethylbenzene	40	to	180000	ug/kg	11000	ug/kg
Total Xylenes	71	to	428000	ug/kg	42000	ug/kg
PAHs						
Acenaphthene	69	to	43300	ug/kg	43300	ug/kg
Acenaphthylene	36	to	177	ug/kg	177	ug/kg
Anthracene	12	to	103000	ug/kg	103000	ug/kg
Benzo(a)anthracene	15	to	104000	ug/kg	104000	ug/kg
Benzo(b)fluoranthene	12	to	128000	ug/kg	128000	ug/kg
Benzo(k)fluoranthene	21	to	44000	ug/kg	44000	ug/kg
Benzo(a)pyrene	9.3	to	93600	ug/kg	93600	ug/kg
Benzo(g,h,i)perylene	23	to	46800	ug/kg	46800	ug/kg
Chrysene	27	to	90500	ug/kg	90500	ug/kg
Dibenzo(a,h)anthracene	30	to	12000	ug/kg	12000	ug/kg
Fluoranthene	22	to	300000	ug/kg	300000	ug/kg
Fluorene	11	to	69500	ug/kg	69500	ug/kg
Indeno(1,2,3-cd)pyrene	12	to	53600	ug/kg	53600	ug/kg
1-Methylnaphthalene	13	to	36000	ug/kg	36000	ug/kg
2-Methylnaphthalene	16	to	115000	ug/kg	115000	ug/kg
Naphthalene	19	to	662000	ug/kg	662000	ug/kg
Phenanthrene	9.9	to	290000	ug/kg	290000	ug/kg
Pyrene	18	to	210000	ug/kg	210000	ug/kg
PCBs						
PCB-1248			17	ug/kg	17	ug/kg

Legend:

- = ch. NR 720 RCLs
- = calculated site-specific RCLs for direct contact exposure based on outdoor workers
- = maximum concentration detected at the property
- = typical southeastern Wisconsin background concentration

ATTACHMENT 1

**Site-Specific Web Based Calculations
Outdoor Worker Equations**

Site-specific

Outdoor Worker Equation Inputs for Soil

1

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
AT _{ow} (averaging time)	365
EF _{ow} (exposure frequency) d/yr	225
ED _{ow} (exposure duration) yr	25
ET _{ow} (exposure time) hr	8
LT (lifetime) yr	70
BW _{ow} (body weight)	70
IR _{ow} (soil ingestion rate) mg/day	100
SA _{ow} (surface area) cm ² /day	3300
AF _{ow} (skin adherence factor) mg/cm ²	0.2
City (Climate Zone) PEF Selection	Chicago, IL (7)
A _c (acres) PEF Selection	10
Q/C _{wp} (g/m ² -s per kg/m ³) PEF Selection	59.64691
PEF (particulate emission factor) m ³ /kg	945642494
A (PEF Dispersion Constant)	16.8653
B (PEF Dispersion Constant)	18.7848
C (PEF Dispersion Constant)	215.0624
V (fraction of vegetative cover) unitless	0.5
U _m (mean annual wind speed) m/s	4.65
U _i (equivalent threshold value)	11.32
F(x) (function dependant on U _m /U _i) unitless	0.182
City (Climate Zone) VF Selection	Chicago, IL (7)
A _c (acres) VF Selection	10
Q/C _{wp} (g/m ² -s per kg/m ³) VF Selection	59.64691
foc (fraction organic carbon in soil) g/g	0.006
ρ _b (dry soil bulk density) g/cm ³	1.5

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Site-specific

Outdoor Worker Equation Inputs for Soil

2

Variable	Value
ρ_s (soil particle density) g/cm ³	2.65
θ_w (water-filled soil porosity) L_{water}/L_{soil}	0.15
T (exposure interval) s	9.5e8
A (VF Dispersion Constant)	16.8653
B (VF Dispersion Constant)	18.7848
C (VF Dispersion Constant)	215.0624

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Site-specific

Outdoor Worker Risk-Based Screening Levels (RSL) for Soil

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),

ca** (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

3

Chemical	CAS Number	Ingestion SF		Inhalation Unit Risk		Chronic RfD		Chronic RfC		Volatilization		Soil Saturation Concentration (mg/kg)	
		(mg/kg-day) ⁻¹	SFO Ref	(ug/m ³) ⁻¹	IUR Ref	(mg/kg-day)	RfD Ref	(mg/m ³)	RfC Ref	GIABS	ABS		Factor (m ³ /kg)
Benzene	71-43-2	5.50E-02	I	7.80E-06	I	4.00E-03	I	3.00E-02	I	1	-	3.33E+03	1.82E+03
Dichlorobenzene	25321-22-6	-	-	-	-	-	-	-	-	1	0.1	9.98E+03	1.93E+02
Dichlorobenzene, 1,2-	95-50-1	-	-	-	-	9.00E-02	I	2.00E-01	H	1	-	1.10E+04	3.76E+02
Dichlorobenzene, 1,3-	541-73-1	-	-	-	-	-	-	-	-	1	-	9.35E+03	2.97E+02
Dichlorobenzene, 1,4-	106-46-7	5.40E-03	C	1.10E-05	C	7.00E-02	A	8.00E-01	I	1	-	9.83E+03	-
Dichloroethane, 1,1-	75-34-3	5.70E-03	C	1.60E-06	C	2.00E-01	P	-	-	1	-	1.96E+03	1.69E+03
Dichloroethane, 1,2-	107-06-2	9.10E-02	I	2.60E-05	I	6.00E-03	X	7.00E-03	P	1	-	4.31E+03	2.98E+03
Dichloroethylene, 1,1-	75-35-4	-	-	-	-	5.00E-02	I	2.00E-01	I	1	-	1.09E+03	1.19E+03
Dichloroethylene, 1,2- (Mixed Isomers)	540-59-0	-	-	-	-	9.00E-03	H	-	-	1	-	2.36E+03	1.29E+03
Dichloroethylene, 1,2-cis-	156-59-2	-	-	-	-	2.00E-03	I	-	-	1	-	2.35E+03	2.37E+03
Dichloroethylene, 1,2-trans-	156-60-5	-	-	-	-	2.00E-02	I	6.00E-02	P	1	-	2.36E+03	1.67E+03
Dichloropropane, 1,2-	78-87-5	3.60E-02	C	1.00E-05	C	9.00E-02	A	4.00E-03	I	1	-	3.57E+03	1.36E+03
Dichloropropane, 1,3-	142-28-9	-	-	-	-	2.00E-02	P	-	-	1	-	6.37E+03	1.49E+03
Dichloropropane, 2,2-	594-20-7	-	-	-	-	-	-	-	-	1	-	1.42E+03	5.27E+02
Dichloropropanol, 2,3-	616-23-9	-	-	-	-	3.00E-03	I	-	-	1	0.1	-	-
Dichloropropene, 1,3-	542-75-6	1.00E-01	I	4.00E-06	I	3.00E-02	I	2.00E-02	I	1	-	3.35E+03	1.57E+03
Dichloropropene, 2,3-	78-98-6	-	-	-	-	-	-	-	-	1	0.1	2.91E+03	1.07E+03
Dichloropropene, cis-1,3-	10061-01-5	-	-	-	-	-	-	-	-	1	0.1	3.34E+03	1.22E+03
Dichloropropene, trans-1,3-	10061-02-6	-	-	-	-	-	-	-	-	1	0.1	3.35E+03	1.57E+03
Ethylbenzene	100-41-4	1.10E-02	C	2.50E-06	C	1.00E-01	I	1.00E+00	I	1	-	5.34E+03	4.80E+02
Acenaphthene	83-32-9	-	-	-	-	6.00E-02	I	-	-	1	0.13	1.32E+05	-
Acenaphthylene	208-96-8	-	-	-	-	-	-	-	-	1	0.13	1.78E+05	-
Anthracene	120-12-7	-	-	-	-	3.00E-01	I	-	-	1	0.13	4.93E+05	-
Benz[a]anthracene	56-55-3	7.30E-01	W	1.10E-04	C	-	-	-	-	1	0.13	-	-
Benzo(j)fluoranthene	205-82-3	1.20E+00	C	1.10E-04	C	-	-	-	-	1	0.13	-	-
Benzo[a]pyrene	50-32-8	7.30E+00	I	1.10E-03	C	-	-	-	-	1	0.13	-	-

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Site-specific

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 ca** (Where nc SL < 10 x ca SL),
 max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	Particulate Emission Factor (m ³ /kg)	Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)	Ingestion SL HQ=1 (mg/kg)	Dermal SL HQ=1 (mg/kg)	Inhalation SL HQ=1 (mg/kg)	Noncarcinogenic SL HI=1 (mg/kg)	Screening Level (mg/kg)
Benzene	9.46E+08	5.78E+01	-	5.82E+00	5.29E+00	4.54E+03	-	4.86E+02	4.39E+02	5.29E+00 ca*
Dichlorobenzene	9.46E+08	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,2-	9.46E+08	-	-	-	-	1.02E+05	-	1.07E+04	9.69E+03	9.69E+03 sat
Dichlorobenzene, 1,3-	9.46E+08	-	-	-	-	-	-	-	-	-
Dichlorobenzene, 1,4-	9.46E+08	5.89E+02	-	1.22E+01	1.19E+01	7.95E+04	-	3.83E+04	2.58E+04	1.19E+01 ca
Dichloroethane, 1,1-	9.46E+08	5.58E+02	-	1.67E+01	1.62E+01	2.27E+05	-	-	2.27E+05	1.62E+01 ca
Dichloroethane, 1,2-	9.46E+08	3.49E+01	-	2.26E+00	2.12E+00	6.81E+03	-	1.47E+02	1.44E+02	2.12E+00 ca*
Dichloroethylene, 1,1-	9.46E+08	-	-	-	-	5.68E+04	-	1.06E+03	1.04E+03	1.04E+03 nc
Dichloroethylene, 1,2- (Mixed isomers)	9.46E+08	-	-	-	-	1.02E+04	-	-	1.02E+04	1.02E+04 sat
Dichloroethylene, 1,2-cis-	9.46E+08	-	-	-	-	2.27E+03	-	-	2.27E+03	2.27E+03 nc
Dichloroethylene, 1,2-trans-	9.46E+08	-	-	-	-	2.27E+04	-	6.90E+02	6.70E+02	6.70E+02 nc
Dichloropropane, 1,2-	9.46E+08	8.83E+01	-	4.86E+00	4.61E+00	1.02E+05	-	6.94E+01	6.94E+01	4.61E+00 ca*
Dichloropropane, 1,3-	9.46E+08	-	-	-	-	2.27E+04	-	-	2.27E+04	2.27E+04 sat
Dichloropropane, 2,2-	9.46E+08	-	-	-	-	-	-	-	-	-
Dichloropropanol, 2,3-	9.46E+08	-	-	-	-	3.41E+03	5.16E+03	-	2.05E+03	2.05E+03 nc
Dichloropropene, 1,3-	9.46E+08	3.18E+01	-	1.14E+01	8.39E+00	3.41E+04	-	3.26E+02	3.23E+02	8.39E+00 ca*
Dichloropropene, 2,3-	9.46E+08	-	-	-	-	-	-	-	-	-
Dichloropropene, cis-1,3-	9.46E+08	-	-	-	-	-	-	-	-	-
Dichloropropene, trans-1,3-	9.46E+08	-	-	-	-	-	-	-	-	-
Ethylbenzene	9.46E+08	2.89E+02	-	2.91E+01	2.64E+01	1.14E+05	-	2.60E+04	2.11E+04	2.64E+01 ca
Acenaphthene	9.46E+08	-	-	-	-	6.81E+04	7.94E+04	-	3.67E+04	3.67E+04 nc
Acenaphthylene	9.46E+08	-	-	-	-	-	-	-	-	-
Anthracene	9.46E+08	-	-	-	-	3.41E+05	3.97E+05	-	1.83E+05	1.83E+05 max
Benz[a]anthracene	9.46E+08	4.36E+00	5.08E+00	1.17E+05	2.34E+00	-	-	-	-	2.34E+00 ca**
Benzo[<i>b</i>]fluoranthene	9.46E+08	2.65E+00	3.09E+00	1.17E+05	1.43E+00	-	-	-	-	1.43E+00 ca**
Benzo[a]pyrene	9.46E+08	4.36E-01	5.08E-01	1.17E+04	2.34E-01	-	-	-	-	2.34E-01 ca**

Site-specific

Outdoor Worker Risk-Based Screening Levels (RSL) for Soil

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),

ca** (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

5

Chemical	CAS Number	Ingestion SF		Inhalation		Chronic RfD		Chronic RfC		Volatilization		Soil Saturation Concentration (mg/kg)	
		(mg/kg-day) ⁻¹	SFO Ref	Unit Risk (ug/m ³) ⁻¹	IUR Ref	(mg/kg-day)	Ref	(mg/m ³)	RfC Ref	GIABS	ABS		Factor (m ³ /kg)
Benzo[b]fluoranthene	205-99-2	7.30E-01	W	1.10E-04	C	-	-	-	-	1	0.13	-	-
Benzo[g,h,i]perylene	191-24-2	-	-	-	-	-	-	-	-	1	0.13	-	-
Benzo[k]fluoranthene	207-08-9	7.30E-02	W	1.10E-04	C	-	-	-	-	1	0.13	-	-
Chrysene	218-01-9	7.30E-03	W	1.10E-05	C	-	-	-	-	1	0.13	-	-
Dibenz[a,h]anthracene	53-70-3	7.30E+00	W	1.20E-03	C	-	-	-	-	1	0.13	-	-
Dibenzo[a,e]pyrene	192-65-4	1.20E+01	C	1.10E-03	C	-	-	-	-	1	0.13	-	-
Fluoranthene	206-44-0	-	-	-	-	4.00E-02	I	-	-	1	0.13	-	-
Fluorene	86-73-7	-	-	-	-	4.00E-02	I	-	-	1	0.13	2.65E+05	-
Indeno[1,2,3-cd]pyrene	193-39-5	7.30E-01	W	1.10E-04	C	-	-	-	-	1	0.13	-	-
Methylnaphthalene, 1-	90-12-0	2.90E-02	P	-	-	7.00E-02	A	-	-	1	0.13	5.52E+04	-
Methylnaphthalene, 2-	91-57-6	-	-	-	-	4.00E-03	I	-	-	1	0.13	5.46E+04	-
Naphthalene	91-20-3	-	-	3.40E-05	C	2.00E-02	I	3.00E-03	I	1	0.13	4.36E+04	-
Phenanthrene	85-01-8	-	-	-	-	-	-	-	-	1	0.13	6.06E+05	-
Pyrene	129-00-0	-	-	-	-	3.00E-02	I	-	-	1	0.13	2.24E+06	-
Tetrachloroethylene	127-18-4	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1	-	2.21E+03	1.66E+02
Trichloroethylene	79-01-6	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1	-	2.08E+03	6.92E+02
Trimethylbenzene, 1,2,3-	526-73-8	-	-	-	-	-	-	5.00E-03	P	1	-	8.89E+03	2.93E+02
Trimethylbenzene, 1,2,4-	95-63-6	-	-	-	-	-	-	7.00E-03	P	1	-	7.45E+03	2.19E+02
Trimethylbenzene, 1,3,5-	108-67-8	-	-	-	-	1.00E-02	X	-	-	1	-	6.22E+03	1.82E+02
Vinyl Chloride	75-01-4	7.20E-01	I	4.40E-06	I	3.00E-03	I	1.00E-01	I	1	-	9.00E+02	3.92E+03
Xylenes	1330-20-7	-	-	-	-	2.00E-01	I	1.00E-01	I	1	-	5.48E+03	2.58E+02

Site-specific

Outdoor Worker Risk-Based Screening Levels (RSL) for Soil

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),

ca** (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	Particulate Emission Factor (m ³ /kg)	Ingestion	Dermal	Inhalation	Carcinogenic	Ingestion	Dermal	Inhalation	Noncarcinogenic	Screening Level (mg/kg)
		SL TR=1.0E-6 (mg/kg)	SL TR=1.0E-6 (mg/kg)	SL TR=1.0E-6 (mg/kg)	SL TR=1.0E-6 (mg/kg)	SL HQ=1 (mg/kg)	SL HQ=1 (mg/kg)	SL HQ=1 (mg/kg)	SL HI=1 (mg/kg)	
Benzo[b]fluoranthene	9.46E+08	4.36E+00	5.08E+00	1.17E+05	2.34E+00	-	-	-	-	2.34E+00 ca**
Benzo[g,h,i]perylene	9.46E+08	-	-	-	-	-	-	-	-	-
Benzo[k]fluoranthene	9.46E+08	4.36E+01	5.08E+01	1.17E+05	2.34E+01	-	-	-	-	2.34E+01 ca**
Chrysene	9.46E+08	4.36E+02	5.08E+02	1.17E+06	2.34E+02	-	-	-	-	2.34E+02 ca**
Dibenz[a,h]anthracene	9.46E+08	4.36E-01	5.08E-01	1.07E+04	2.34E-01	-	-	-	-	2.34E-01 ca**
Dibenzo[a,e]pyrene	9.46E+08	2.65E-01	3.09E-01	1.17E+04	1.43E-01	-	-	-	-	1.43E-01 ca**
Fluoranthene	9.46E+08	-	-	-	-	4.54E+04	5.29E+04	-	2.44E+04	2.44E+04 nc
Fluorene	9.46E+08	-	-	-	-	4.54E+04	5.29E+04	-	2.44E+04	2.44E+04 nc
Indeno[1,2,3-cd]pyrene	9.46E+08	4.36E+00	5.08E+00	1.17E+05	2.34E+00	-	-	-	-	2.34E+00 ca**
Methylnaphthalene, 1-	9.46E+08	1.10E+02	1.28E+02	-	5.90E+01	7.95E+04	9.26E+04	-	4.28E+04	5.90E+01 ca
Methylnaphthalene, 2-	9.46E+08	-	-	-	-	4.54E+03	5.29E+03	-	2.44E+03	2.44E+03 nc
Naphthalene	9.46E+08	-	-	1.75E+01	1.75E+01	2.27E+04	2.65E+04	6.37E+02	6.05E+02	1.75E+01 ca*
Phenanthrene	9.46E+08	-	-	-	-	-	-	-	-	-
Pyrene	9.46E+08	-	-	-	-	3.41E+04	3.97E+04	-	1.83E+04	1.83E+04 nc
Tetrachloroethylene	9.46E+08	1.51E+03	-	1.16E+02	1.08E+02	6.81E+03	-	4.30E+02	4.05E+02	1.08E+02 ca**
Trichloroethylene	9.46E+08	6.91E+01	-	6.91E+00	6.28E+00	5.68E+02	-	2.02E+01	1.95E+01	6.28E+00 ca**
Trimethylbenzene, 1,2,3-	9.46E+08	-	-	-	-	-	-	2.16E+02	2.16E+02	2.16E+02 nc
Trimethylbenzene, 1,2,4-	9.46E+08	-	-	-	-	-	-	2.54E+02	2.54E+02	2.54E+02 sat
Trimethylbenzene, 1,3,5-l	9.46E+08	-	-	-	-	1.14E+04	-	-	1.14E+04	1.14E+04 sat
Vinyl Chloride	9.46E+08	4.42E+00	-	2.79E+00	1.71E+00	3.41E+03	-	4.38E+02	3.88E+02	1.71E+00 ca
Xylenes	9.46E+08	-	-	-	-	2.27E+05	-	2.67E+03	2.64E+03	2.64E+03 sat