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Appendix F.12

Results of IEUBK and Adult Models for Lead and Lead Hotspots

Area A-1

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SURFACE SOILS - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. December 1996).

RELEVANT EQUATIONS: $PbB_{adult\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1050	1050	1050	1050
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SURFACE SOIL - CENTRAL TENDENCY EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. December 1996)

RELEVANT EQUATIONS $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1050	1050	1050	1050
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age resulting from site exposures (ug/dL)	3.4	3.4	4.0	4.0
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentration in fetus of adult women having site exposures (ug/dL)	10.45	11.29	11.97	12.93

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SOILS 0 TO 15 FEET - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	745	745	745	745
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentrations in adult women [illegible] child-bearing age from site exposures (ug/dL)	[illegible]	[illegible]	[illegible]	[illegible]
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	9.82	12.66	11.00	[illegible]

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SOILS 0 TO 15 FEET - CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS $PbB_{adult\ central} = PbB_{adult\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$PbB_{fetal\ 0.95} = PbB_{adult\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	745	745	745	745
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult\ central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	2.92	2.92	3.42	3.42
$PbB_{fetal\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	8.92	8.92	8.11	10.45

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT ADULT RECREATIONAL USER- REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,central} = PbB_{adult,0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,0.95} = PbB_{adult,central} \times GSD_{i,adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	455	455	455	455
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	150	150	150	150
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	4.0	4.6	5.0	5.0
$PbB_{fetal,0.95}$	Calculated 95th percentile blood lead concentration among fetuses of women having site exposures (ug/dL)	6.7	7.9	8.3	9.45

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT ADULT RECREATIONAL USER- CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS. $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	455	455	455	455
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	150	150	150	150
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	2.65	2.65	3.25	2.65
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	4.30	6.55	6.27	6.08

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Exposure to Lead (455 mg/kg – multi-source analysis)
Area A-1: Upper Ferry Creek – Morgan Francis Property
Frequent Child Recreational User
September 1999

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	455.0	328.5
1-2	455.0	328.5
2-3	455.0	328.5
3-4	455.0	328.5
4-5	455.0	328.5
5-6	455.0	328.5
6-7	455.0	328.5

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.70
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

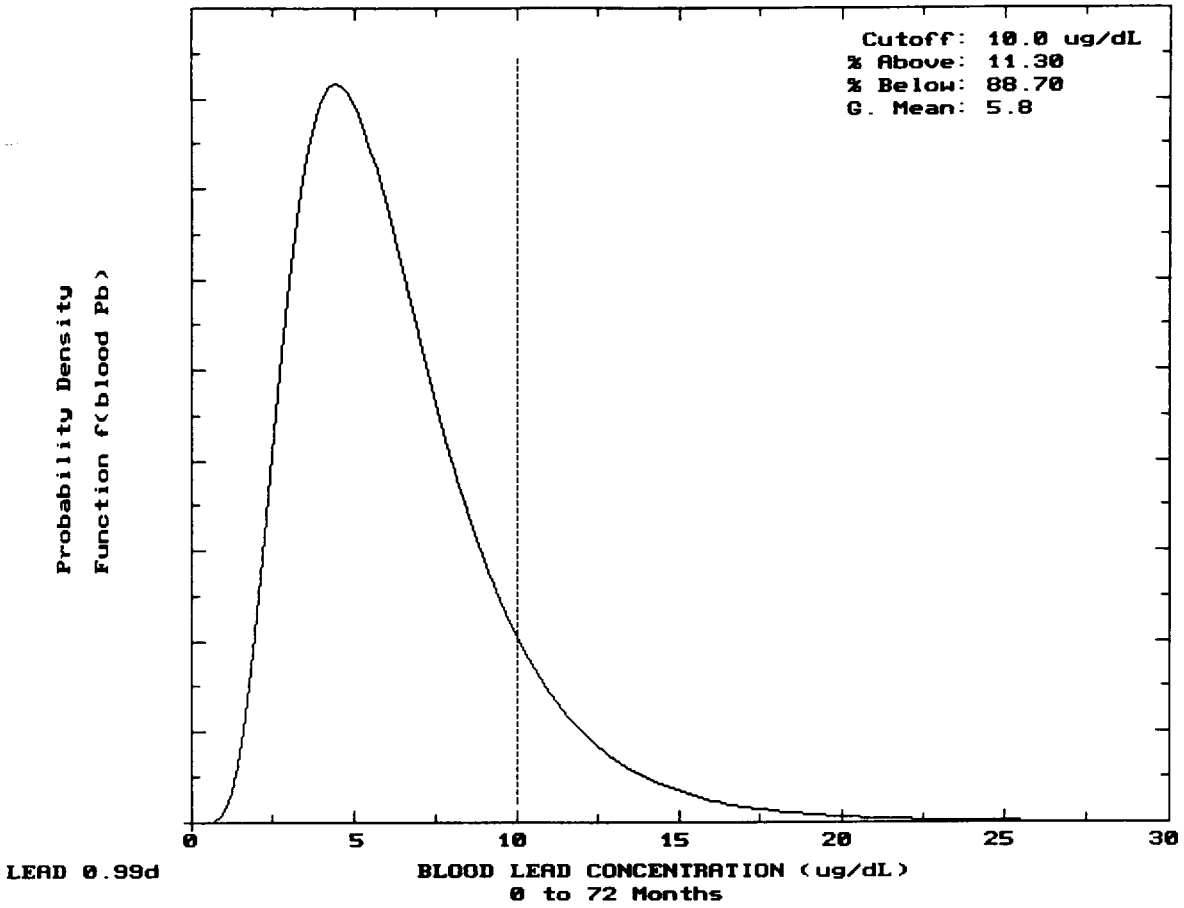
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

Exposure to Lead (455 mg/kg – multi-source analysis)
Area A-1: Upper Ferry Creek – Morgan Francis Property
Frequent Child Recreational User
September 1999

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	6.1	11.41	8.62
1-2:	6.9	16.82	13.44
2-3:	6.5	17.50	13.68
3-4:	6.2	17.73	13.93
4-5:	5.1	14.53	10.68
5-6:	4.4	13.87	9.73
6-7:	3.9	13.74	9.25

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.42	0.35	0.00	0.02
1-2:	2.49	0.86	0.00	0.03
2-3:	2.84	0.91	0.00	0.06
3-4:	2.78	0.95	0.00	0.07
4-5:	2.77	1.02	0.00	0.07
5-6:	2.96	1.08	0.00	0.09
6-7:	3.29	1.11	0.00	0.09


Cutoff: 10.0 ug/dL
% Above: 11.30
% Below: 88.70
G. Mean: 5.8
Probability Density
Function f(blood Pb)
0
5
10
15
20
25
30
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

Area A-2

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SURFACE SOILS - REASONABLE MAXIMUM EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996)

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	726	726	726	726
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	4.2	4.09	5.8	5.8
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	9.57	12.46	13.96	15.96

[1] The arithmetic mean concentration is the exposure point concentration

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SURFACE SOILS - CENTRAL TENDENCY EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA. Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. December 1996)

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	726	726	726	726
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	3.4	3.4	3.36	3.39
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentration among fetuses born to women having site exposures (ug/dL)	6.8	8.2	6.03	10.35

[1] The arithmetic mean concentration is the exposure point concentration

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SOILS 0 TO 15 FEET - REASONABLE MAXIMUM EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U S EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS $PbB_{adult\ central} = PbB_{adult\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1400	1400	1400	1400
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	3.0	3.30	4.00	4.80
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	14.92	19.22	16.90	20.75

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL WORKER - SOILS 0 TO 15 FEET - CENTRAL TENDENCY EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1400	1400	1400	1400
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	250	250	250	250
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
[illegible]	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	[illegible]	4.00	4.50	4.50
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentration among fetuses of adult women having site exposures (ug/dL)	[illegible]	2.20	0.85	3.73

[1] The arithmetic mean concentration is the exposure point concentration.

Area A-3

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-3: UPPER FERRY CREEK - RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT ADULT RECREATIONAL USER - REASONABLE MAXIMUM EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1240	1240	1240	1240
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in women of child-bearing age from site exposures (ug/dL)	1.7	1.8	1.8	1.87
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentration among fetuses of adult women having site exposures (ug/dL)	1.86	3.60	3.69	11.19

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-3: UPPER FERRY CREEK - RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT ADULT RECREATIONAL USER - CENTRAL TENDENCY EXPOSURE
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1240	1240	1240	1240
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration of child-bearing age from site exposures (ug/dL)	2.3	2.43	2.93	2.93
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	5.79	7.42	6.94	8.95

[1] The arithmetic mean concentration is the exposure point concentration.

Exposure to Lead (1,240 mg/kg –multi-source analysis)
Area A-3: Upper Ferry Creek – Residential Properties on Housatonic Avenue
Frequent Child Recreational User
September 1999

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	1240.0	878.0
1-2	1240.0	878.0
2-3	1240.0	878.0
3-4	1240.0	878.0
4-5	1240.0	878.0
5-6	1240.0	878.0
6-7	1240.0	878.0

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.70
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

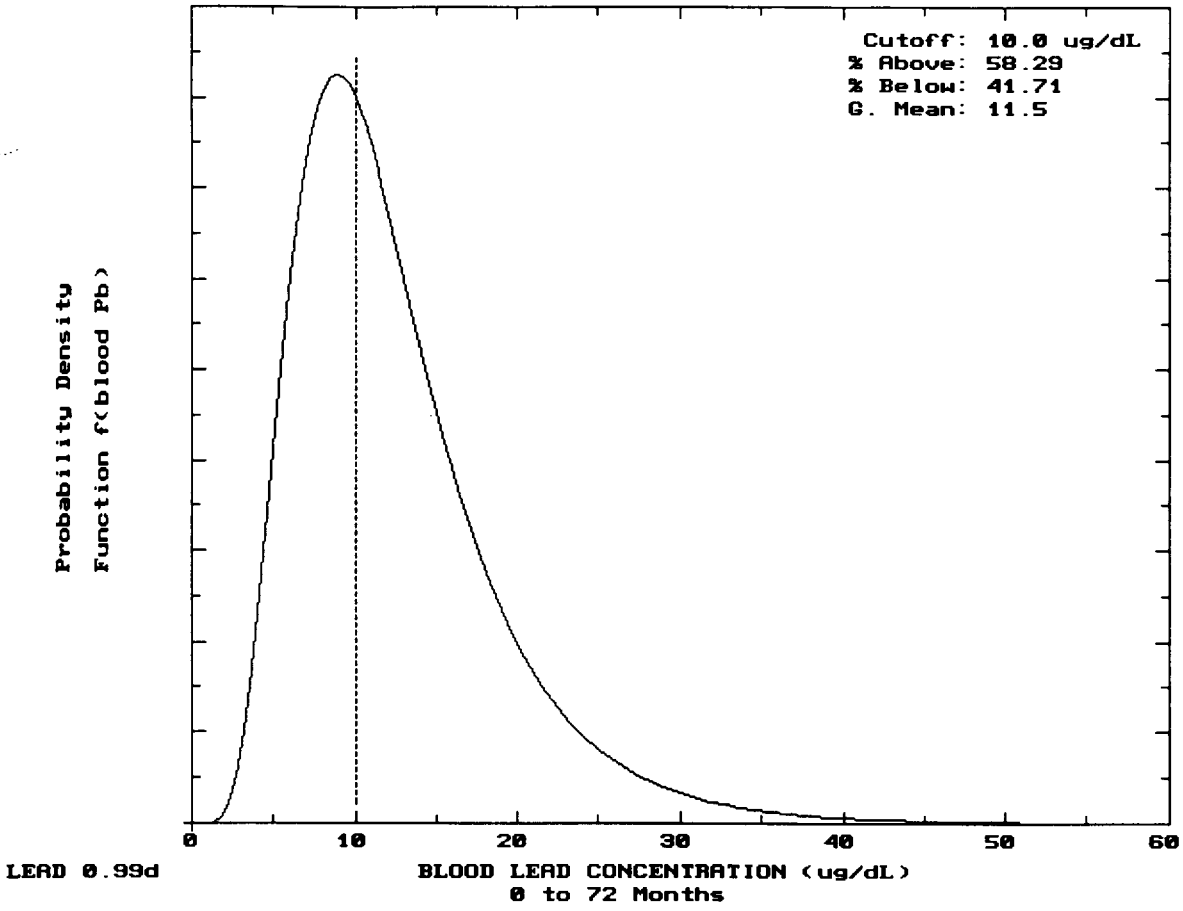
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

Exposure to Lead (1,240 mg/kg –multi-source analysis)
Area A-3: Upper Ferry Creek – Residential Properties on Housatonic Avenue
Frequent Child Recreational User
September 1999

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	11.9	22.75	20.31
1-2:	13.7	33.86	30.97
2-3:	12.9	35.41	32.08
3-4:	12.5	36.53	33.17
4-5:	10.5	29.94	26.40
5-6:	8.9	28.30	24.44
6-7:	7.9	27.65	23.42

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.12	0.31	0.00	0.02
1-2:	2.12	0.73	0.00	0.03
2-3:	2.47	0.79	0.00	0.06
3-4:	2.45	0.83	0.00	0.07
4-5:	2.54	0.93	0.00	0.07
5-6:	2.76	1.01	0.00	0.09
6-7:	3.09	1.04	0.00	0.09


Cutoff: 10.0 ug/dL
% Above: 58.29
% Below: 41.71
G. Mean: 11.5
Probability Density
Function f(blood Pb)
0
10
20
30
40
50
60
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

Lead Hotspots

TABLE 2
HOTSPOT STATISTICS

Receptor	Fraction	Parameter	Cas	Units	Detects	Count	Average	W	WL	WTest	Distribution	UCL_N	UCL_L	MaxOfDetects	EPC (RME/CTE)[1]	EPCStat[2]
a1scmhs	M	LEAD	7439921	MG/KG	10	10	6700	-1	-1	-1	< 11 Samples	-1	-1	24700	24700/6700	Max/arith mean
a1scmhs	PESTP	AROCLOR, TOTAL	AROCLORTOT	UG/KG	5	5	85000	-1	-1	-1	< 11 Samples	-1	-1	410000	410000/85000	Max/arith mean
a1sfrhs	M	LEAD	7439921	MG/KG	28	29	1420	0.522	0.951	0.926	Lognormal	2280	2750	11900	1420	Arith mean
a1sfrhs	PESTP	AROCLOR, TOTAL	AROCLORTOT	UG/KG	8	9	3200	-1	-1	-1	< 11 Samples	-1	-1	19000	19000/3200	Max/arith mean
a1strhs	M	LEAD	7439921	MG/KG	11	11	2160	0.767	0.872	0.85	Lognormal	3580	11500	7330	7330/2160	Max/arith mean
a1strhs	PESTP	AROCLOR, TOTAL	AROCLORTOT	UG/KG	6	6	3400	-1	-1	-1	< 11 Samples	-1	-1	12000	12000/3400	Max/arith mean
a2scmhs	M	LEAD	7439921	MG/KG	23	24	2100	0.829	0.945	0.916	Lognormal	2830	6240	6550	2100	Arith mean
a2scmhs	PESTP	AROCLOR, TOTAL	AROCLORTOT	UG/KG	6	6	15000	-1	-1	-1	< 11 Samples	-1	-1	48000	48000/15000	Max/arith mean

1: RME - Reasonable maximum exposure; CTE - Central tendency exposure

2: Only one statistic presented if the EPC for the RME and CTE is the same.

Area A-1

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL/INDUSTRIAL WORKER - SURFACE SOILS - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. December 1996)

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	24700	24700	24700	24700
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	3.0	3.93	5.43	7.43
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	13.22	24.36	27.40	59.87

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.
[1] The maximum detected concentration is the exposure point concentration.

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Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL/INDUSTRIAL WORKER - SURFACE SOILS - CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	6700	6700	6700	6700
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	3.4	5.64	4.10	6.16
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	11.45	17.28	14.50	18.80

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT RECREATIONAL USER - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1420	1420	1420	1420
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	[illegible]	[illegible]	[illegible]	[illegible]
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses from women having site exposures (ug/dL)	[illegible]	[illegible]	[illegible]	[illegible]

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: FREQUENT RECREATIONAL USER -CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult, central} = PbB_{adult, 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal, 0.95} = PbB_{adult, central} \times GSD_{i, adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult, 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult, 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	1420	1420	1420	1420
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i, adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult, central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposure (ug/dL)	2.0	2.4	2.4	2.8
$PbB_{fetal, 0.95}$	Calculated 95th percentile blood lead concentration among fetuses from women having the exposures (ug/dL)	3.0	4.3	4.2	6.2

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

1-22-1

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: ADOLESCENT TRESPASSER - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	7330	7330	7330	7330
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	52	52	52	52
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	3.7	6.7	7.2	9.2
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentration among fetuses born to women having site exposures (ug/dL)	8.3	20.4	17.0	22.0

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.
[1] The maximum detected concentration is the exposure point concentration.

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-1: UPPER FERRY CREEK - MORGAN FRANCIS PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: ADOLESCENT TRESPASSER - CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	2160	2160	2160	2160
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	52	52	52	52
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	2.4	2.4	2.9	2.9
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	6.7	8.1	8.0	8.96

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.

[1] The arithmetic mean concentration is the exposure point concentration.

Exposure to Lead (1,420 mg/kg – multi-source analysis)
Area A-1: Upper Ferry Creek – Morgan Francis Property
Frequent Child Recreational User
September 1999

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	1420.0	1004.0
1-2	1420.0	1004.0
2-3	1420.0	1004.0
3-4	1420.0	1004.0
4-5	1420.0	1004.0
5-6	1420.0	1004.0
6-7	1420.0	1004.0

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.70
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

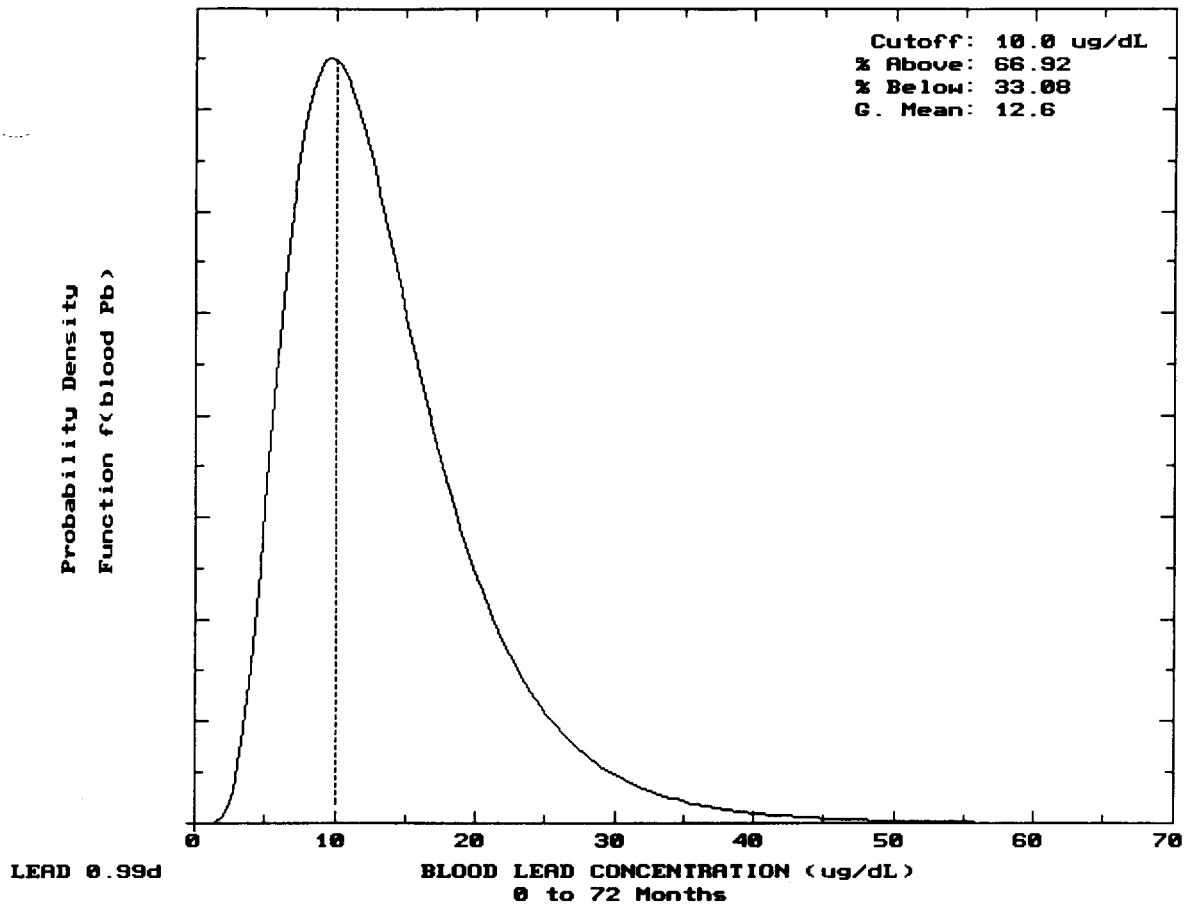
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

Exposure to Lead (1,420 mg/kg – multi-source analysis)
Area A-1: Upper Ferry Creek – Morgan Francis Property
Frequent Child Recreational User
September 1999

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	13.0	24.99	22.61
1-2:	14.9	37.16	34.35
2-3:	14.1	38.93	35.70
3-4:	13.7	40.28	37.00
4-5:	11.6	33.14	29.66
5-6:	9.8	31.34	27.53
6-7:	8.7	30.61	26.44

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.06	0.30	0.00	0.02
1-2:	2.06	0.71	0.00	0.03
2-3:	2.40	0.77	0.00	0.06
3-4:	2.39	0.81	0.00	0.07
4-5:	2.49	0.91	0.00	0.07
5-6:	2.71	0.99	0.00	0.09
6-7:	3.05	1.03	0.00	0.09


Cutoff: 10.0 ug/dL
% Above: 66.92
% Below: 33.08
G. Mean: 12.6
Probability Density
Function f(blood Pb)
0
10
20
30
40
50
60
70
LEAD 0.99d
BLOOD LEAD CONCENTRATION (ug/dL)
0 to 72 Months

Area A-2

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL/INDUSTRIAL WORKER - SURFACE SOILS - REASONABLE MAXIMUM EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U S EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996)

RELEVANT EQUATIONS. $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	2100	2100	2100	2100
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	3.1	4.19	4.84	6.69
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	7.01	12.77	11.09	17.29

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.
[1] The arithmetic mean concentration is the exposure point concentration.

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Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: AREA A-2: UPPER FERRY CREEK - SPADA PROPERTY
LOCATION: FERRY CREEK, STRATFORD, CONNECTICUT
RECEPTOR: COMMERCIAL/INDUSTRIAL WORKER - SURFACE SOILS - CENTRAL TENDENCY EXPOSURES
DATE: SEPTEMBER 13, 1999

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996)

RELEVANT EQUATIONS: $PbB_{adult,\ central} = PbB_{adult,\ 0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT$

and

$$PbB_{fetal,\ 0.95} = PbB_{adult,\ central} \times GSD_{i,\ adult}^{1.645} \times R_{fetal/maternal}$$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\ 0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\ 0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg) [1]	2100	2100	2100	2100
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.050	0.050	0.050	0.050
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	90	90	90	90
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\ adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\ central}$	Calculated central estimate of blood lead concentration in adult women of child-bearing age from site exposures (ug/dL)	2.24	2.34	2.94	2.94
$PbB_{fetal,\ 0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	6.35	8.98	8.15	10.50

Note: According to the cited guidance document, this adult exposure model is not applicable for infrequent site exposures, where the EFs is less than 1 day/week.
[1] The arithmetic mean concentration is the exposure point concentration.

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Appendix F.13

PCB Congeners

Table F.13.1
PCB CONGENER AND TOXICITY EQUIVALENT CONCENTRATIONS
FERRY CREEK, STRATFORD, CT
PAGE 1 OF 2

PCB Congeners	TEF	Area A1 Sediment		Area A3 Sediment		Area A3 Sediment	
		CONC.(ug/kg)	TEQ	CONC.(ug/kg)	TEQ	CONC.(ug/kg)	TEQ
Dioxin-like		OU3-A1-SD03-0002		OU3-A3-SD05-0002		OU3-A3-SD05-0204	
2',3,4,4',5-Pentachlorobiphenyl (123)	0.0001	8.59	0.000859	43.4	0.00434	0.81	0.000081
2,3',4,4',5,5'-Hexachlorbiphenyl (167)	0.00001	0.958	9.58E-06	4.95	4.95E-05	0.0266	2.66E-07
2,3'4,4',5-Pentachlorobiphenyl (118)	0.0001	0.2935	2.935E-05	5.47	0.000547	0.1165	1.165E-05
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	0.0005	4.16	0.00208	8.87	0.004435	0.03665	1.833E-05
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	0.0001	2.15	0.000215	R	R	R	R
2,3,3',4,4',5-Hexachlorobiphenyl (156)	0.0005	2.81	0.001405	42.2	0.0211	0.02535	1.268E-05
2,3,3',4,4'-Pentachlorobiphenyl (105)	0.0001	2.12	0.000212	0.00715	7.15E-07	0.105	0.0000105
2,3,4,4',5-Pentachlorbiphenyl (114)	0.0005	26	0.013	108	0.054	0.565	0.0002825
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0.01	0.131	0.00131	0.64	0.0064	0.0136	0.000136
3,3'4,4',5-Pentachlorobiphenyl (126)	0.1	0.119	0.0119	R	R	0.0329	0.00329
3,3'4,4'-Tetrachlorobiphenyl (77)	0.0001	0.826	0.0000826	8.01	0.000801	0.0615	6.15E-06
Total Dioxin-like TEQ			**0.031**		**0.092**		**0.0038**
Total Dioxin-like Concentration		**48.16**		**221.55**		**1.79**	
Total PCB Congeners							
Decachlorobiphenyl		45.9		382		0.0057	
Total Dichlorobiphenyls		6.87		93.5		0.444	
Total Heptachlorobiphenyls		746		6890		1.575	
Total Hexachlorobiphenyls		302		1770		0.396	
Total Monochlorobiphenyls		0.223		4.92		0.0229	
Total Nonachlorobiphenyls		64.5		554		0.69	
Total Octachlorobiphenyls		805		6270		2.15	
Total Pentachlorobiphenyls		239		995		0.1385	
Total Tetrachlorobiphenyls		191		662		1.16	
Total Trichlorobiphenyls		80.9		404		1.97	
Total PCB Concentration		**2481.39**		**18025.42**		**8.55**	

Calculation of Non Dioxin-like Concentrations

Non Dioxin-like concentrations represent the difference between the Total PCB concentrations and the concentrations of the dioxin-like congeners. The Non Dioxin-like concentrations are calculated as follows:

Total PCB Concentration	2481.39	18025.42	8.55
Total Dioxin-like Concentration	48.16	221.55	1.79
Total Non Dioxin-like Concentration	**2433.23**	**17803.87**	**6.76**

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: COMMERCIAL WORKER - RME
MEDIA: SEDIMENT SAMPLE (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INCIDENTAL INGESTION OF SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{Cs \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

WHERE:	Cs = :		Concentration in soil (mg/kg)
	IR = :	100	Soil Ingestion Rate (mg/day)
	CF = :	1.0E-06	Conversion Factor (kg/mg)
	FI = :	1	Fraction from contaminated source (unitless)
	EF = :	250	Exposure Frequency (days/year)
	ED = :	25	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	9,125	Averaging time for noncarcinogenic exposures (days)

Unit Dose
Lifetime Chronic Daily Intake = : 3.5E-07 kg-soil/kg-wt/day
Chronic Daily Intake = : 9.8E-07 kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL (PAGE TWO)

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: COMMERCIAL WORKER - RME
MEDIA: SEDIMENT SAMPLE (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congeners	0.000031	1.1E-11	3.0E-11	1.50E+05	NA	1.6E-06	49.2%	NA	NA
Total - Nondioxin-like Congeners	2.4	8.4E-07	2.3E-06	2.00E+00	NA	1.7E-06	50.8%	NA	NA
					Total	**3.3E-06**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: COMMERCIAL WORKER - RME
MEDIA: SEDIMENT SAMPLE (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH DERMAL CONTACT WITH SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Absorbed Dose} = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:	Cs = :		Concentration in soil (mg/kg)
	CF = :	1.0E-06	Conversion factor (kg/mg)
	SA = :	2,500	Skin surface available for contact (cm^2/event)
	AF = :	0.2	Soil to skin adherence factor (mg/cm^2)
	ABS = :		Absorption factor (unitless)
	EF = :	250	Exposure frequency (events/year)
	ED = :	25	Exposure duration (years)
	BW = :	70	Body weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	9,125	Averaging time for noncarcinogenic exposures (days)

Unit Dose
Lifetime Chronic Daily Intake = : 1.7E-06 kg-soil/kg-wt/day
Chronic Daily Intake = : 4.9E-06 kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: COMMERCIAL WORKER - RME
MEDIA: SEDIMENT SAMPLE (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	ABS (unitless)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congeners	0.000031	0.03	1.62E-12	4.55E-12	1.50E+05	NA	2.4E-07	17.2%	NA	NA
Total - Nondioxin-like Congeners	2.4	0.14	5.87E-07	1.64E-06	2.00E+00	NA	1.2E-06	82.8%	NA	NA
						Total	**1.4E-06**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - SUMMARY

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: COMMERCIAL WORKER - RME
MEDIA: SEDIMENT SAMPLE (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

	Lifetime Cancer Risk					Hazard Index				
Chemical	**Incidental Ingestion**	**Dermal Contact**	**Inhalation**	**Total Risk**	**Percent Risk**	**Incidental Ingestion**	**Dermal Contact**	**Inhalation**	**Total HI**	**Percent HI**
Total TEQ - Dioxin-like Congeners	1.6E-06	2.4E-07	NA	1.9E-06	39.6%	NA	NA	NA	NA	NA
Total - Nondioxin-like Congeners	1.7E-06	1.2E-06	NA	2.9E-06	60.4%	NA	NA	NA	NA	NA
Total	**3.3E-06**	**1.4E-06**	**NA**	**4.7E-06**	**100.0%**	**NA**	**NA**	**NA**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INCIDENTAL INGESTION OF SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{Cs \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

WHERE:	Cs = :		Concentration in soil (mg/kg)
	IR = :	100	Soil Ingestion Rate (mg/day)
	CF = :	1.0E-06	Conversion Factor (kg/mg)
	FI = :	1	Fraction from contaminated source (unitless)
	EF = :	150	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	8,760	Averaging time for noncarcinogenic exposures (days)

Unit Dose
Lifetime Chronic Daily Intake = : 2.0E-07 kg-soil/kg-wt/day
Chronic Daily Intake = : 5.9E-07 kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL (PAGE TWO)

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congeners	0.000031	6.2E-12	1.8E-11	1.50E+05	NA	9.4E-07	49.2%	NA	NA
Total - Nondioxin-like Congeners	2.4	4.8E-07	1.4E-06	2.00E+00	NA	9.7E-07	50.8%	NA	NA
					Total	**1.9E-06**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH DERMAL CONTACT WITH SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{Absorbed Dose} = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:			
Cs = :		Concentration in soil (mg/kg)
CF = :	1.0E-06	Conversion factor (kg/mg)
SA = :	5,700	Skin surface available for contact (cm^2/event)
AF = :	0.07	Soil to skin adherence factor (mg/cm^2)
ABS = :		Absorption factor (unitless)
EF = :	150	Exposure frequency (events/year)
ED = :	24	Exposure duration (years)
BW = :	70	Body weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
ATn = :	8,760	Averaging time for noncarcinogenic exposures (days)

Unit Dose
Lifetime Chronic Daily Intake = : 8.0E-07 kg-soil/kg-wt/day
Chronic Daily Intake = : 2.3E-06 kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	ABS (unitless)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congeners	0.000031	0.03	7.47E-13	2.18E-12	1.50E+05	NA	1.1E-07	17.2%	NA	NA
Total - Nondioxin-like Congeners	2.4	0.14	2.70E-07	7.87E-07	2.00E+00	NA	5.4E-07	82.8%	NA	NA
						Total	**6.5E-07**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - SUMMARY

SITE NAME: AREA A-1, MORGAN FRANCIS PROPERTIES
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

	Lifetime Cancer Risk					Hazard Index				
Chemical	Incidental Ingestion	Dermal Contact	Inhalation	Total Risk	Percent Risk	Incidental Ingestion	Dermal Contact	Inhalation	Total HI	Percent HI
Total TEQ - Dioxin-like Congeners	9.4E-07	1.1E-07	NA	1.0E-06	41.0%	NA	NA	NA	NA	NA
Total - Nondioxin-like Congeners	9.7E-07	5.4E-07	NA	1.5E-06	59.0%	NA	NA	NA	NA	NA
Total	**1.9E-06**	**6.5E-07**	**NA**	**2.6E-06**	**100.0%**	**NA**	**NA**	**NA**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL

SITE NAME: AREA A-3, RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH INCIDENTAL INGESTION OF SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION: $$\text{Intake} = \frac{Cs \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

WHERE:	Cs = :		Concentration in soil (mg/kg)
	IR = :	100	Soil Ingestion Rate (mg/day)
	CF = :	1.0E-06	Conversion Factor (kg/mg)
	FI = :	1	Fraction from contaminated source (unitless)
	EF = :	90	Exposure Frequency (days/year)
	ED = :	24	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	8,760	Averaging time for noncarcinogenic exposures (days)

Unit Dose

Lifetime Chronic Daily Intake = :	1.2E-07	kg-soil/kg-wt/day
Chronic Daily Intake = :	3.5E-07	kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - INCIDENTAL INGESTION OF SOIL (PAGE TWO)

SITE NAME: AREA A-3, RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congeners	0.000092	1.1E-11	3.2E-11	1.50E+05	NA	1.7E-06	27.9%	NA	NA
Total - Nondioxin-like Congeners	17.8	2.1E-06	6.3E-06	2.00E+00	NA	4.3E-06	72.1%	NA	NA
					Total	**6.0E-06**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL

SITE NAME: AREA A-3, RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH DERMAL CONTACT WITH SOIL ARE CONSIDERED.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{AbsorbedDose} = \frac{Cs \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Where:	Cs = :		Concentration in soil (mg/kg)
	CF = :	1.0E-06	Conversion factor (kg/mg)
	SA = :	5,700	Skin surface available for contact (cm^2/event)
	AF = :	0.3	Soil to skin adherence factor (mg/cm^2)
	ABS = :		Absorption factor (unitless)
	EF = :	90	Exposure frequency (events/year)
	ED = :	24	Exposure duration (years)
	BW = :	70	Body weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	ATn = :	8,760	Averaging time for noncarcinogenic exposures (days)

Unit Dose
Lifetime Chronic Daily Intake = : 2.1E-06 kg-soil/kg-wt/day
Chronic Daily Intake = : 6.0E-06 kg-soil/kg-wt/day

RISK ASSESSMENT SPREADSHEET - DIRECT DERMAL CONTACT WITH SOIL (PAGE TWO)

SITE NAME: AREA A-3, RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

CHEMICAL	Cs (mg/kg)	ABS (unitless)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
Total TEQ - Dioxin-like Congener	0.000092	0.001	1.90E-13	5.54E-13	1.50E+05	NA	2.8E-08	0.3%	NA	NA
Total - Nondioxin-like Congeners	17.8	0.14	5.15E-06	1.50E-05	2.00E+00	NA	1.0E-05	99.7%	NA	NA
						Total	**1.0E-05**	**100.0%**	**NA**	**NA**

RISK ASSESSMENT SPREADSHEET - SUMMARY

SITE NAME: AREA A-3, RESIDENTIAL PROPERTIES ON HOUSATONIC AVENUE
LOCATION: FERRY CREEK, STRATFORD, CT
EXPOSURE SCENARIO: FREQUENT RECREATIONAL USER - ADULT - RME
MEDIA: SEDIMENT SAMPLES (PCB CONGENER DATA ONLY)
DATE: SEPTEMBER 22, 1999

	Lifetime Cancer Risk					Hazard Index				
Chemical	Incidental Ingestion	Dermal Contact	Inhalation	Total Risk	Percent Risk	Incidental Ingestion	Dermal Contact	Inhalation	Total HI	Percent HI
Total TEQ - Dioxin-like Congeners	1.7E-06	2.8E-08	NA	1.7E-06	10.4%	NA	NA	NA	NA	NA
Total - Nondioxin-like Congeners	4.3E-06	1.0E-05	NA	1.5E-05	89.6%	NA	NA	NA	NA	NA
Total	**6.0E-06**	**1.0E-05**	**NA**	**1.6E-05**	**100.0%**	**NA**	**NA**	**NA**	**NA**	**NA**