Attachment B:

Analysis of lead exposure health risk for lead emissions from Veolia Incineration Facility; Sauget, Illinois

ATTACHMENT - Analysis of health risk for lead emissions from Veolia (March 2004)

Output of IEUBK Model runs for scenarios representing lead emissions from Veolia

Scenario 1: Veolia lead emission causes incremental increase in soil lead of 100 ppm (equivalent to 100% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 100 ppm (incremental increase)
Dust level = 250 ppm (background) + 70 ppm (incremental increase from soil)

Scenario 2: Veolia lead emission causes incremental increase in soil lead of 50 ppm (equivalent to 50% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 50 ppm (incremental increase)
Dust level = 250 ppm (background) + 35 ppm (incremental increase from soil)

Scenario 3: Veolia lead emission causes incremental increase in soil lead of 20 ppm (equivalent to 20% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 20 ppm (incremental increase)
Dust level = 250 ppm (background) + 14 ppm (incremental increase from soil)

Scenario 4: Veolia lead emission causes incremental increase in soil lead of 15 ppm (equivalent to 15% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 15 ppm (incremental increase)
Dust level = 250 ppm (background) + 11 ppm (incremental increase from soil)

Scenario 5: Veolia lead emission causes incremental increase in soil lead of 10 ppm (equivalent to 10% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 10 ppm (incremental increase)
Dust level = 250 ppm (background) + 7 ppm (incremental increase from soil)

Scenario 6: Veolia lead emission causes incremental increase in soil lead of 5 ppm (equivalent to 5% of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 5 ppm (incremental increase)
Dust level = 250 ppm (background) + 4 ppm (incremental increase from soil)

Scenario 7: Veolia lead emission causes incremental increase in soil lead of 2.5 ppm (equivalent to 2.5 % of recommended limit in OSW risk management guidelines)

Soil level = 400 ppm (background) + 2.5 ppm (incremental increase)
Dust level = 250 ppm (background) + 2 ppm (incremental increase from soil)

IEUBKwin Run Report

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name: Onyx site (Veolia Site)
Operable Unit: Scenario #1
Run Mode: Research

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	500.000	320.000
1-2	500.000	320.000
2-3	500.000	320.000
3-4	500.000	320.000
4-5	500.000	320.000
6-7	500.000	320.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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CALCULATED BLOOD LEAD AND LEAD UPTAKES:

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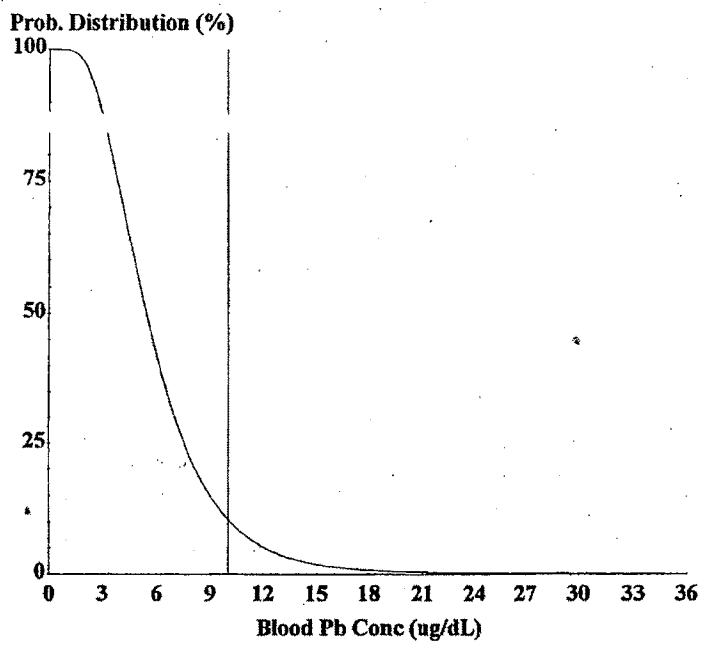
Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
5-1	0.021	2.415	0.000	0.349
1-2	0.034	2.477	0.000	0.857
2-3	0.062	2.834	0.000	0.908
3-4	0.067	2.776	0.000	0.943
4-5	0.067	2.768	0.000	1.013
5-6	0.093	2.958	0.000	1.083
6-7	0.093	3.287	0.000	1.108

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	8.933	11.719	6.3
1-2	13.922	17.291	7.1
2-3	14.182	17.985	6.7

IEUBKwin Run Report

3-4	14.447	18.233	6.3
4-5	11.082	14.930	5.3
5-6	10.104	14.238	4.5
6-7	9.604	14.093	4.0



Cutoff = 10.000 ug/dl
Geo Mean = 5.683
% Above = 10.595

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 + 100

Dust = 320 (250 + 70)

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

Onyx Site (Veolia Site)
Scenario #2

The time step used in child model run - [illegible]

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	450.000	285.000
1-2	450.000	285.000
2-3	450.000	285.000
3-4	450.000	285.000
4-5	450.000	285.000
6-7	450.000	285.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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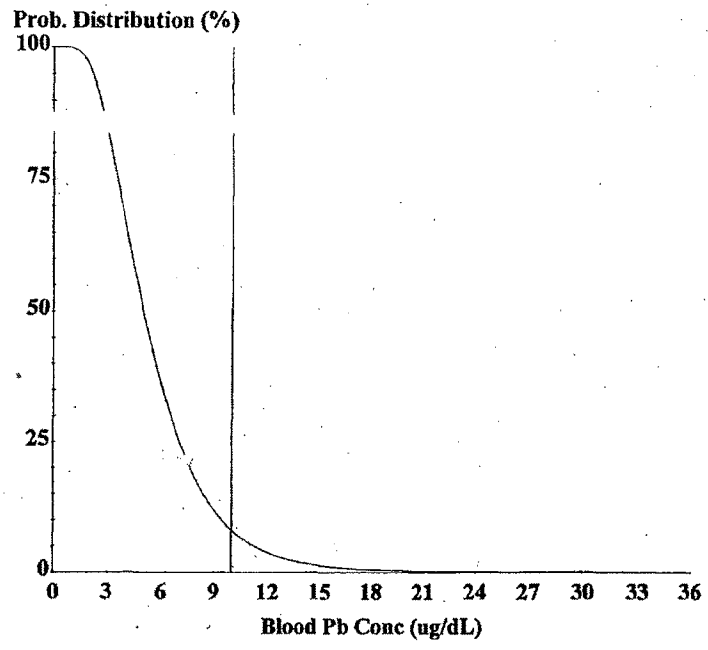
CALCULATED BLOOD LEAD AND LEAD UPTAKES:

****

Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
5-1	0.021	2.439	0.000	0.353
1-2	0.034	2.506	0.000	0.867
2-3	0.062	2.863	0.000	0.917
3-4	0.067	2.800	0.000	0.951
4-5	0.067	2.785	0.000	1.019
5-6	0.093	2.973	0.000	1.088
6-7	0.093	3.301	0.000	1.113

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	8.081	10.894	5.8
1-2	12.618	16.026	6.6
2-3	12.835	16.677	6.2

3-4	13.059	16.878	5.9
4-5	9.988	13.859	4.9
5-6	9.096	13.250	4.2
6-7	8.641	13.149	3.8



Cutoff = 10.000 ug/dl
Geo Mean = 5.286
% Above = 8.240

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 +50

Dust = 285 (250 + 35)

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

Onyx Site (Veolia Site)
Scenario #3

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	420.000	264.000
1-2	420.000	264.000
2-3	420.000	264.000
3-4	420.000	264.000
4-5	420.000	264.000
5-6	[illegible]	[illegible]
6-7	420.000	264.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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CALCULATED BLOOD LEAD AND LEAD UPTAKES:

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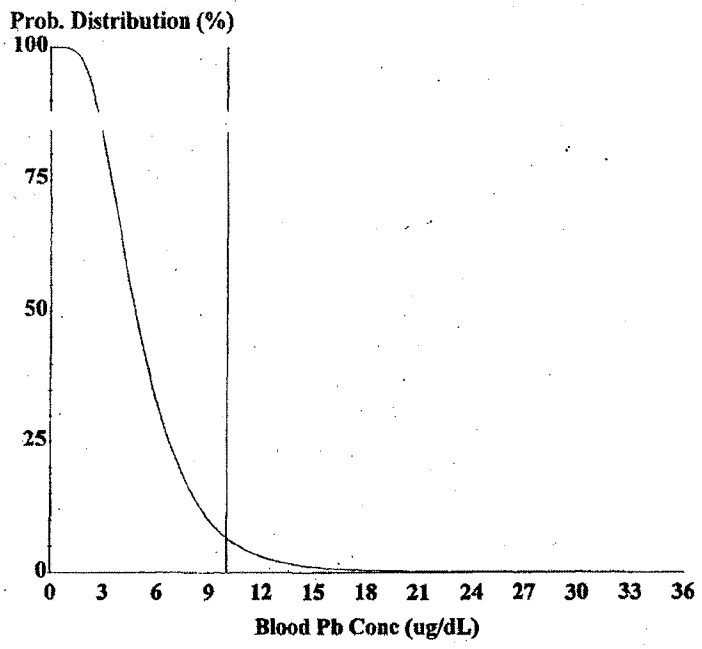
Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
5-1	0.021	2.454	0.000	0.355
1-2	0.034	2.524	0.000	0.873
2-3	0.062	2.880	0.000	0.923
3-4	0.067	2.816	0.000	0.957
4-5	0.067	2.795	0.000	1.023
5-6	0.093	2.982	0.000	1.091
6-7	0.093	3.310	0.000	1.116

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	7.562	10.392	5.6
1-2	11.821	15.253	6.3
2-3	12.014	15.879	5.9

3-4	12.214	16.053	5.6
4-5	9.326	13.210	4.7
5-6	8.487	12.653	4.0
6-7	8.059	12.579	3.6



Cutoff = 10.000 ug/dl
Geo Mean = 5.044
% Above = 6.826

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 +20
Dust = 264

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name: Onyx Site (Veolia Site)
Operable Unit: Scenario #4
Run Mode: Research

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	415.000	261.000
1-2	415.000	261.000
2-3	415.000	261.000
3-4	415.000	261.000
4-5	415.000	261.000
6-7	415.000	261.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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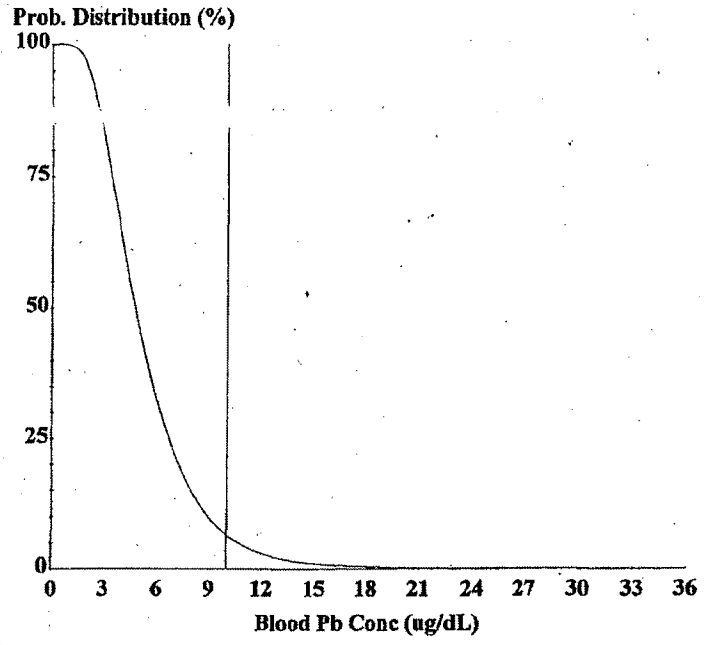
CALCULATED BLOOD LEAD AND LEAD UPTAKES:

****

Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.456	0.000	0.355
1-2	0.034	2.527	0.000	0.874
2-3	0.062	2.883	0.000	0.924
3-4	0.067	2.818	0.000	0.957
4-5	0.067	2.797	0.000	1.024
5-6	0.093	2.983	0.000	1.092
6-7	0.093	3.311	0.000	1.116

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	7.481	10.313	5.5
1-2	11.696	15.132	6.2
2-3	11.885	15.754	5.8

3-4	12.082	15.924	5.6
4-5	9.222	13.109	4.6
5-6	8.392	12.560	4.0
6-7	7.969	12.490	3.6



Cutoff = 10.000 ug/dl
Geo Mean = 5.006
% Above = 6.412

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 +15
Dust = 261

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Fed 24386

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

Onyx site (Veolia Site)
Scenario #5

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	410.000	257.000
1-2	410.000	257.000
2-3	410.000	257.000
3-4	410.000	257.000
4-5	410.000	257.000
5-6	410.000	
6-7	410.000	257.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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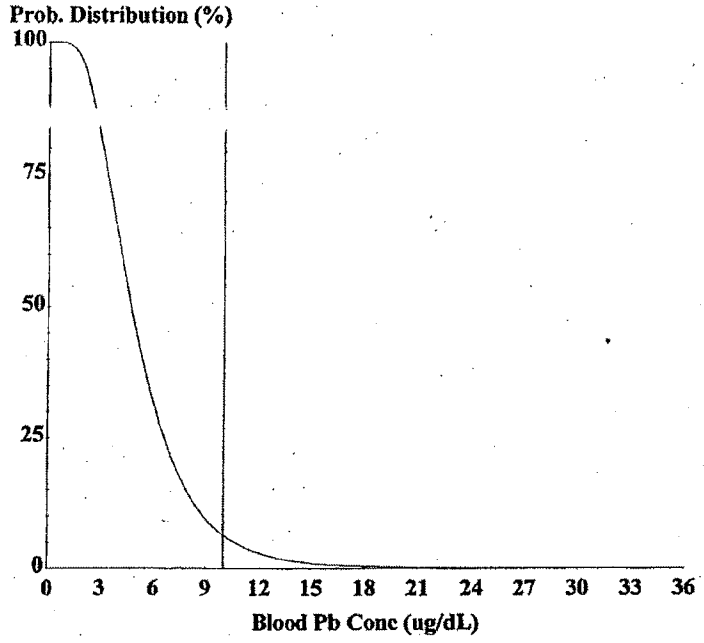
CALCULATED BLOOD LEAD AND LEAD UPTAKES:

****

Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.458	0.000	0.356
1-2	0.034	2.530	0.000	0.875
2-3	0.062	2.886	0.000	0.925
3-4	0.067	2.821	0.000	0.958
4-5	0.067	2.798	0.000	1.024
5-6	0.093	2.985	0.000	1.092
6-7	0.093	3.313	0.000	1.117

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	7.388	10.223	5.5
1-2	11.553	14.993	6.2
2-3	11.738	15.611	5.8

3-4	11.931	15.777	5.5
4-5	9.104	12.993	4.6
5-6	8.283	12.453	3.9
6-7	7.865	12.388	3.5



Cutoff = 10.000 ug/dl
Geo Mean = 4.962
% Above = 6.412

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 +10
Dust = 257

Fed 24390

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

Onyx site (Veolia Site)
Scenario #6

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	405.000	254.000
1-2	405.000	254.000
2-3	405.000	254.000
3-4	405.000	254.000
4-5	405.000	254.000
6-7	405.000	254.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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CALCULATED BLOOD LEAD AND LEAD UPTAKES:

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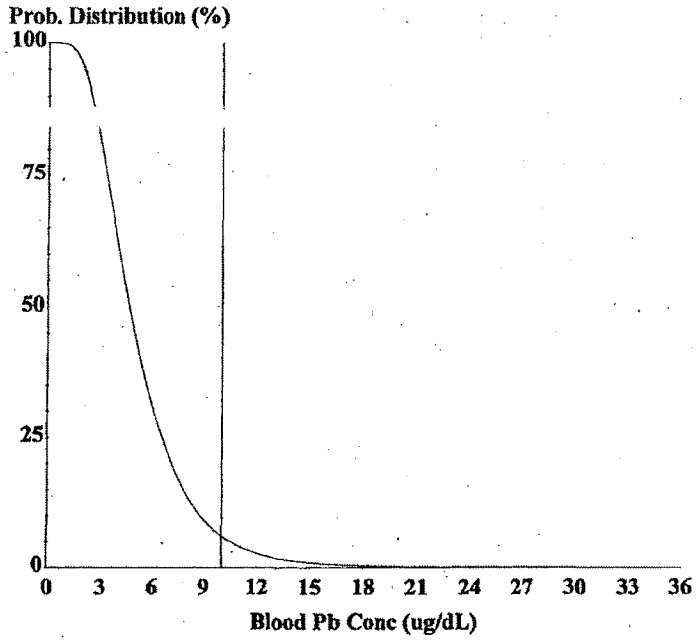
Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
5-1	0.021	2.461	0.000	0.356
1-2	0.034	2.533	0.000	0.876
2-3	0.062	2.889	0.000	0.926
3-4	0.067	2.823	0.000	0.959
4-5	0.067	2.800	0.000	1.025
5-6	0.093	2.986	0.000	1.093
6-7	0.093	3.314	0.000	1.117

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	7.306	10.144	5.5
1-2	11.428	14.872	6.1
2-3	11.608	15.485	5.7

3-4	11.798	15.647	5.5
4-5	9.000	12.891	4.6
5-6	8.188	12.360	3.9
6-7	7.774	12.299	3.5



Cutoff = 10.000 ug/dl
Geo Mean = 4.924
% Above = 6.023

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = 400 +5

Dust = 254

Fed 24394

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0
User Name:
Date:
Site Name:
Operable Unit:
Run Mode: Research

Onyx site (Veolia Site)

Scenario #7

******Air******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc ug Pb/m^3
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

******Diet******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

******Drinking Water******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 4.000 ug Pb/L

******Soil& Dust******

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	402.500	252.000
1-2	402.500	252.000
2-3	402.500	252.000
3-4	402.500	252.000
4-5	402.500	252.000
[illegible]	[illegible]	[illegible]
6-7	402.500	252.000

******Alternate Intake******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

******Maternal Contribution: Infant Model******

Maternal Blood Concentration: 2.500 ug Pb/dL

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CALCULATED BLOOD LEAD AND LEAD UPTAKES:

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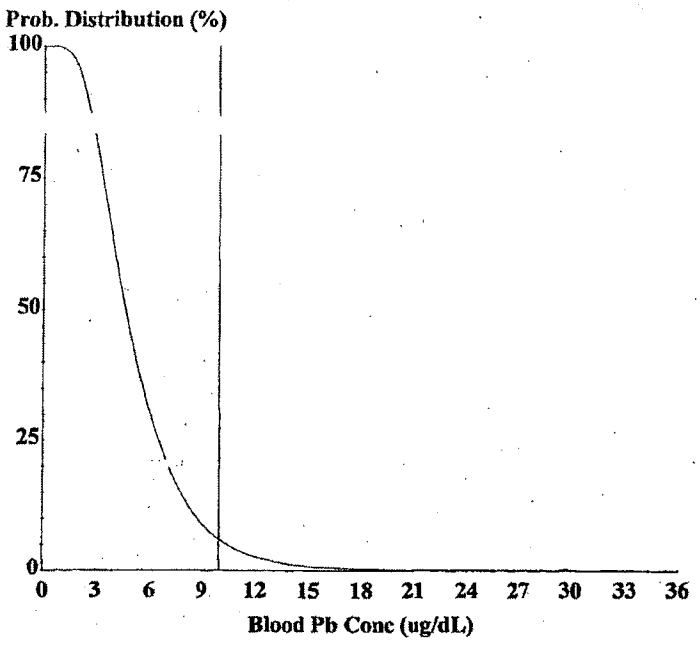
Year	Air (ug/dL)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
5-1	0.021	2.462	0.000	0.356
1-2	0.034	2.535	0.000	0.877
2-3	0.062	2.891	0.000	0.926
3-4	0.067	2.824	0.000	0.960
4-5	0.067	2.801	0.000	1.025
5-6	0.093	2.987	0.000	1.093
6-7	0.093	3.315	0.000	1.118

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	7.260	10.099	5.4
1-2	11.356	14.802	6.1
2-3	11.535	15.414	5.7

3-4	11.722	15.573	5.4
4-5	8.940	12.833	4.5
5-6	8.133	12.306	3.9
6-7	7.722	12.248	3.5



Cutoff = 10.000 ug/dl
Geo Mean = 4.903
% Above = 6.023

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Research

Soil = ~~400~~ 400 + 2.5
Dust = 252 (250 + 2)