

Hugo, Susan, Public Health, EHS
From: Todd Taylor [todd@baseline-env.com]
Sent: Thursday, July 27, 2000 2:38 PM
To: SHugo@co.alameda.ca.us
Subject: Risk Calculations for Mortenson Project

Attached please find two Excel 97 spreadsheets:

Mortenson-LeadSpread-95UCL calculates risk for the 95% UCL scenario

Mortenson-LeadSpread-Max calculates risk for the maximum concentration scenario

Please let me know if you have any difficulty with the files.



Mortenson-LeadSprea
d-95UCL.xls...



Mortenson-LeadSprea
d-Max.xls



ATT520791.txt

95% wet

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT					
MEDIUM	LEVEL	percentiles					PRG-99
LEAD IN AIR (ug/m ³)	0.01	50th	90th	95th	98th	99th	(ug/g)
LEAD IN SOIL (ug/g)	1035.9	3.4	5.4	6.1	7.0	7.7	1652.5
LEAD IN WATER (ug/l)	15	7.4	11.7	13.2	45.3	16.9	321.4
PLANT UPTAKE? 1=YES 0=N	0	45.7	71.7	81.3	94.0	103.5	33.1
RESPIRABLE DUST (ug/m ³)	1000	6.3	9.9	11.2	12.9	14.3	609.4

EXPOSURE PARAMETERS

		residential			industrial
		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2800	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	10.0

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.14	4%	0.23	4%	1036 ug/g
SOIL INGESTION:	0.33	10%	3.13	50%	1036 ug/g
INHALATION:	1.23	36%	1.23	19%	1.05 ug/m ³
WATER INGESTION:	0.84	25%	0.84	13%	15 ug/l
FOOD INGESTION:	0.88	26%	0.88	14%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.11	1%	0.11	0%	1036 ug/g
SOIL INGESTION:	2.87	38%	41.15	90%	1036 ug/g
INHALATION:	1.43	19%	1.43	3%	1.05 ug/m ³
WATER INGESTION:	0.96	13%	0.96	2%	15 ug/l
FOOD INGESTION:	2.08	28%	2.08	5%	10.0 ug Pb/kg diet

RPG's

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT					
MEDIUM	LEVEL	percentiles					PRG-99
		50th	90th	95th	98th	99th	(ug/g)
LEAD IN AIR (ug/m ³)	0.01						
LEAD IN SOIL (ug/g)	1000.0	3.4	5.3	6.0	6.9	7.6	1652.5
LEAD IN WATER (ug/l)	15	7.3	11.4	13.0	15.0	16.5	321.4
PLANT UPTAKE? 1=YES 0=N	0	44.3	69.4	78.7	91.0	100.2	33.1
RESPIRABLE DUST (ug/m ³)	1000	6.1	9.6	10.9	12.6	13.9	609.4

EXPOSURE PARAMETERS

		residential			industrial
units		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2800	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	10.0

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.14	4%	0.22	4%	1000 ug/g
SOIL INGESTION:	0.31	9%	3.02	49%	1000 ug/g
INHALATION:	1.18	35%	1.18	19%	1.01 ug/m ³
WATER INGESTION:	0.84	25%	0.84	14%	15 ug/l
FOOD INGESTION:	0.88	26%	0.88	14%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.11	1%	0.11	0%	1000 ug/g
SOIL INGESTION:	2.77	38%	39.73	90%	1000 ug/g
INHALATION:	1.39	19%	1.39	3%	1.01 ug/m ³
WATER INGESTION:	0.96	13%	0.96	2%	15 ug/l
FOOD INGESTION:	2.08	29%	2.08	5%	10.0 ug Pb/kg diet

LEAD RISK ASSESSMENT SPREADSHEET
 CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT					
MEDIUM	LEVEL	percentiles					PRG-99
		50th	90th	95th	98th	99th	(ug/g)
LEAD IN AIR (ug/m ³)	0.01						
LEAD IN SOIL (ug/g)	3300.0	7.1	11.1	12.6	14.6	16.1	1652.5
LEAD IN WATER (ug/l)	15	17.1	26.7	30.9	35.1	38.6	321.4
PLANT UPTAKE? 1=YES 0=N	0	139.0	####	####	####	314.7	33.1
RESPIRABLE DUST (ug/m ³)	1000	16.3	25.5	28.9	33.5	36.8	609.4

EXPOSURE PARAMETERS

	units	residential			industrial
		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2800	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.46	6%	0.72	4%	3300 ug/g
SOIL INGESTION:	1.64	15%	9.96	61%	3300 ug/g
INHALATION:	3.88	55%	3.88	24%	3.31 ug/m ³
WATER INGESTION:	0.84	12%	0.84	5%	15 ug/l
FOOD INGESTION:	0.88	12%	0.88	5%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.35	2%	0.35	0%	3300 ug/g
SOIL INGESTION:	9.13	54%	131.09	94%	3300 ug/g
INHALATION:	4.54	27%	4.54	3%	3.31 ug/m ³
WATER INGESTION:	0.96	6%	0.96	1%	15 ug/l
FOOD INGESTION:	2.08	12%	2.08	1%	10.0 ug Pb/kg diet

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT						
MEDIUM	LEVEL	percentiles					PRG-99	
LEAD IN AIR (ug/m ³)	0.01	50th	90th	95th	98th	99th	(ug/g)	
LEAD IN SOIL (ug/g)	3300.0	BLOOD Pb, ADULT (ug/dl)	7.1	11.1	12.6	14.6	16.4	1652.5
LEAD IN WATER (ug/l)	15	BLOOD Pb, CHILD (ug/dl)	17.1	26.7	30.3	35.1	38.6	321.4
PLANT UPTAKE? 1=YES 0=N	0	BLOOD Pb, PICA CHILD (ug/dl)	139.0	217.9	247.1	285.8	314.7	33.1
RESPIRABLE DUST (ug/m ³)	1000	BLOOD Pb, INDUSTRIAL (ug/dl)	16.3	25.5	28.9	33.5	36.8	609.4

EXPOSURE PARAMETERS

		residential			industrial
units		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2800	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	10.0

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.46	6%	0.72	4%	3300 ug/g
SOIL INGESTION:	1.04	15%	9.96	61%	3300 ug/g
INHALATION:	3.88	55%	3.88	24%	3.31 ug/m ³
WATER INGESTION:	0.84	12%	0.84	5%	15 ug/l
FOOD INGESTION:	0.88	12%	0.88	5%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.35	2%	0.35	0%	3300 ug/g
SOIL INGESTION:	9.13	54%	131.09	94%	3300 ug/g
INHALATION:	4.54	27%	4.54	3%	3.31 ug/m ³
WATER INGESTION:	0.96	6%	0.96	1%	15 ug/l
FOOD INGESTION:	2.08	12%	2.08	1%	10.0 ug Pb/kg diet

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT						
MEDIUM	LEVEL	percentiles					PRG-99	
LEAD IN AIR (ug/m ³)	0.01	50th	90th	95th	98th	99th	(ug/g)	
LEAD IN SOIL (ug/g)	700.0	BLOOD Pb, ADULT (ug/dl)	2.9	4.5	5.1	5.9	6.5	1652.5
LEAD IN WATER (ug/l)	15	BLOOD Pb, CHILD (ug/dl)	6.0	9.4	10.7	12.4	13.6	321.4
PLANT UPTAKE? 1=YES 0=N	0	BLOOD Pb, PICA CHILD (ug/dl)	31.9	50.0	56.7	65.6	72.2	33.1
RESPIRABLE DUST (ug/m ³)	1000	BLOOD Pb, INDUSTRIAL (ug/dl)	4.8	7.6	8.6	9.9	10.9	609.4

EXPOSURE PARAMETERS

		residential			industrial
		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2900	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	10.0

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.10	3%	0.15	3%	700 ug/g
SOIL INGESTION:	0.22	8%	2.11	44%	700 ug/g
INHALATION:	0.83	29%	0.83	17%	0.71 ug/m ³
WATER INGESTION:	0.84	29%	0.84	17%	15 ug/l
FOOD INGESTION:	0.88	31%	0.88	18%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.07	1%	0.07	0%	700 ug/g
SOIL INGESTION:	1.94	32%	27.81	87%	700 ug/g
INHALATION:	0.97	16%	0.97	3%	0.71 ug/m ³
WATER INGESTION:	0.96	16%	0.96	3%	15 ug/l
FOOD INGESTION:	2.08	35%	2.08	7%	10.0 ug Pb/kg diet

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT						
MEDIUM	LEVEL	percentiles					PRG-99	
		50th	90th	95th	98th	99th	(ug/g)	
LEAD IN AIR (ug/m ³)	0.01							
LEAD IN SOIL (ug/g)	350.0	BLOOD Pb, ADULT (ug/dl)	2.3	3.6	4.1	4.7	5.2	1652.5
LEAD IN WATER (ug/l)	15	BLOOD Pb, CHILD (ug/dl)	4.5	7.1	8.1	9.3	10.3	321.4
PLANT UPTAKE? 1=YES 0=N	0	BLOOD Pb, PICA CHILD (ug/dl)	17.5	27.4	31.1	35.9	39.6	33.1
RESPIRABLE DUST (ug/m ³)	1000	BLOOD Pb, INDUSTRIAL (ug/dl)	3.3	5.1	5.8	6.7	7.4	609.4

EXPOSURE PARAMETERS

	units	residential			industrial
		adults	children	children with pica	adults
General					
Days per week	days/wk	5	5	5	5
Dermal Contact					
Skin area	cm ²	3700	2800	2900	5800
Soil adherence	mg/cm ²	0.5	0.5	0.5	0.5
Route-specific constant	(ug/dl)/(ug/day)	0.00011	0.00011	0.00011	0.00011
Soil ingestion					
Soil ingestion	mg/day	25	55	790	240
Route-specific constant	(ug/dl)/(ug/day)	0.0176	0.0704	0.0704	0.0176
Inhalation					
Breathing rate	m ³ /day	20	10	10	20
Route-specific constant	(ug/dl)/(ug/day)	0.082	0.192	0.192	0.082
Water ingestion					
Water ingestion	l/day	1.4	0.4	0.4	1.4
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Food ingestion					
Food ingestion	kg/day	2.2	1.3	1.3	2.2
Route-specific constant	(ug/dl)/(ug/day)	0.04	0.16	0.16	0.04
Dietary concentration	ug/kg	10.0	10.0	10.0	10.0
Lead in produce	ug/kg	10.0	10.0	10.0	

PATHWAYS, ADULTS

Pathway	Residential		Industrial		Concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.05	2%	0.08	2%	350 ug/g
SOIL INGESTION:	0.11	5%	1.06	32%	350 ug/g
INHALATION:	0.42	18%	0.42	13%	0.36 ug/m ³
WATER INGESTION:	0.84	37%	0.84	26%	15 ug/l
FOOD INGESTION:	0.88	38%	0.88	27%	10.0 ug Pb/kg diet

PATHWAYS, CHILDREN

Pathway	Typical		with pica		concentration in medium
	Blood Pb ug/dl	percent of total	Blood Pb ug/dl	percent of total	
SOIL CONTACT:	0.04	1%	0.04	0%	350 ug/g
SOIL INGESTION:	0.97	21%	13.90	80%	350 ug/g
INHALATION:	0.49	11%	0.49	3%	0.36 ug/m ³
WATER INGESTION:	0.96	21%	0.96	5%	15 ug/l
FOOD INGESTION:	2.08	46%	2.08	12%	10.0 ug Pb/kg diet