Lead Human Exposure and Health Risk Assessments and Ecological Risk Assessment for Selected Areas

Pilot Phase

EXTERNAL REVIEW DRAFT APPENDICES

December 2006

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Zachary Pekar, Work Assignment Manager
Nancy Riley, Project Officer

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TABLE OF CONTENTS

LIST OF EXHIBITS

Appendix A

Measurement Data Summaries for the Primary and Secondary Pb Smelters

Appendix A presents detailed summaries of the measurement data available for the primary and secondary Pb smelters. For selected media, sampling location figures are also provided. Additional discussion regarding this measurement data is provided in Chapter 3 of the report.

EPA high-volume and AQS/AirData air monitoring locations around the primary Pb smelter are shown in Exhibit A-1. Air monitoring data for these locations are presented in Exhibits A-2 and A-3. Exhibits A-4 through A-7 provide soil data results (pre-excavation, post-excavation and recontamination sampling) associated with locations around the primary Pb smelter. Indoor dust measurement data collected to assess Pb recontamination in select residential areas around the primary Pb smelter are provided in Exhibit A-8. Soil and air deposition monitoring locations around the primary Pb smelter are shown in Exhibit A-9. Soil and air deposition monitoring results for these locations are presented in Exhibits A-10 and A-11, respectively.

AQS/AirData air monitoring locations around the secondary Pb smelter are shown in Exhibit A-12. Air monitoring data for these locations are presented in Exhibit A-13.

Exhibit A-1. Air Monitoring Locations Around the Primary Pb Smelter

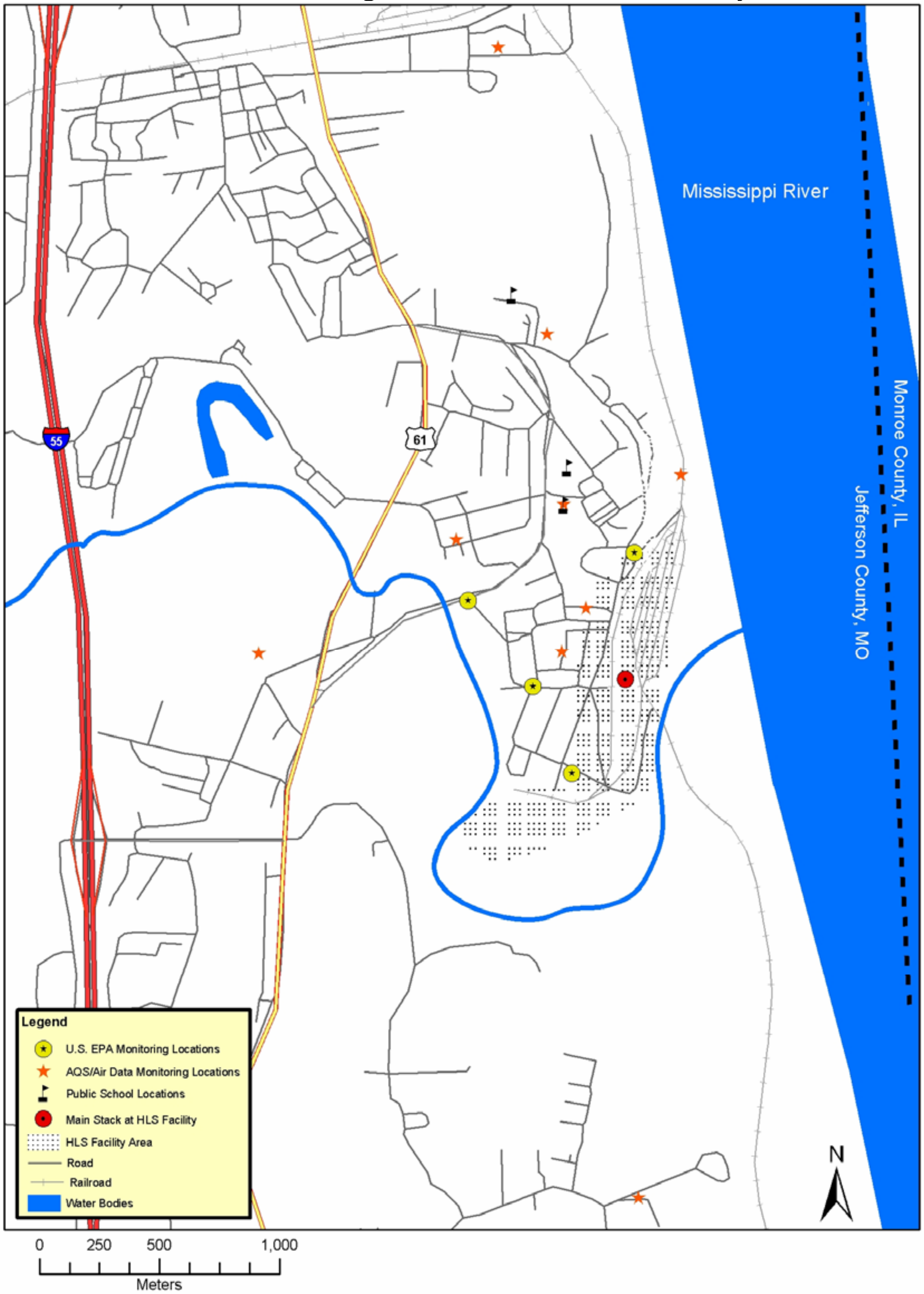


Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (µg/m^3) [b,c]							
	2001		2002			2003		
	Date		Date			Date		
100	--	--	3-Jan-02	0.5		1-Jan-03	0.316	
100	--	--	7-Jan-02	0.52		4-Jan-03	1.26	
100	--	--	10-Jan-02	0.51		7-Jan-03	0.547	
100	--	--	13-Jan-02	4.5		10-Jan-03	0.291	
100	--	--	16-Jan-02	0.97		13-Jan-03	1.03	
100	--	--	19-Jan-02	2.2		16-Jan-03	1.09	
100	--	--	22-Jan-02	2.4		19-Jan-03	0.531	
100	--	--	25-Jan-02	0.75		22-Jan-03	0.095	
100	--	--	28-Jan-02	2		25-Jan-03	0.811	
100	--	--	5-Feb-02	1.5		28-Jan-03	2.28	
100	--	--	8-Feb-02	0.97		31-Jan-03	0.118	
100	--	--	11-Feb-02	0.59		3-Feb-03	0.15	
100	--	--	14-Feb-02	0.33		9-Feb-03	1.29	
100	--	--	18-Feb-02	2.3		12-Feb-03	0.901	
100	--	--	21-Feb-02	0.24		15-Feb-03	0.514	
100	--	--	26-Feb-02	0.23	ND	18-Feb-03	0.406	
100	--	--	1-Mar-02	3.8		21-Feb-03	0.527	
100	--	--	4-Mar-02	0.57		24-Feb-03	0.119	
100	--	--	7-Mar-02	1.7		27-Feb-03	0.05	ND
100	--	--	11-Mar-02	2.3		2-Mar-03	0.095	
100	--	--	14-Mar-02	1.3		5-Mar-03	0.138	
100	--	--	17-Mar-02	0.78		8-Mar-03	1.63	
100	--	--	20-Mar-02	0.24	ND	11-Mar-03	1.99	
100	--	--	23-Mar-02	0.25	ND	14-Mar-03	1.53	
100	--	--	26-Mar-02	0.41		17-Mar-03	2.86	
100	--	--	29-Mar-02	0.76		20-Mar-03	2.07	
100	--	--	1-Apr-02	0.93		23-Mar-03	0.352	
100	--	--	4-Apr-02	0.24	ND	26-Mar-03	0.58	
100	--	--	7-Apr-02	0.61		29-Mar-03	0.05	ND
100	--	--	10-Apr-02	4.9		1-Apr-03	0.399	
100	--	--	16-Apr-02	2		4-Apr-03	0.397	
100	--	--	18-Apr-02	3		7-Apr-03	0.238	
100	--	--	22-Apr-02	0.41		10-Apr-03	0.19	
100	--	--	25-Apr-02	0.23	ND	13-Apr-03	1.95	
100	--	--	28-Apr-02	0.25	ND	16-Apr-03	0.376	
100	--	--	1-May-02	2.2		19-Apr-03	5.48	
100	--	--	4-May-02	0.55		22-Apr-03	0.357	
100	--	--	7-May-02	2		25-Apr-03	0.092	
100	--	--	10-May-02	3.58		28-Apr-03	3.37	
100	--	--	13-May-02	0.144		1-May-03	0.309	
100	--	--	16-May-02	0.932		4-May-03	0.715	
100	--	--	19-May-02	0.091		7-May-03	0.59	
100	--	--	22-May-02	2.33		10-May-03	0.437	
100	--	--	25-May-02	0.193		13-May-03	1.4	
100	--	--	29-May-02	1.59		16-May-03	2.08	
100	--	--	31-May-02	0.397		19-May-03	0.493	
100	--	--	3-Jun-02	0.32		22-May-03	0.108	
100	--	--	6-Jun-02	0.359		25-May-03	0.505	
100	--	--	9-Jun-02	0.326		28-May-03	0.242	
100	--	--	12-Jun-02	0.716		31-May-03	0.165	
100	--	--	15-Jun-02	0.141		3-Jun-03	0.21	
100	--	--	18-Jun-02	1.1		6-Jun-03	0.603	

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results ($\mu g/m^3$) [b,c]					
	2001		2002		2003	
	Date		Date		Date	
100	--	--	21-Jun-02	1.49	9-Jun-03	0.121
100	--	--	24-Jun-02	2.17	12-Jun-03	0.627
100	--	--	27-Jun-02	0.24	15-Jun-03	0.063
100	--	--	30-Jun-02	0.091	18-Jun-03	1.51
100	--	--	3-Jul-02	0.861	21-Jun-03	0.216
100	--	--	6-Jul-02	1.68	24-Jun-03	0.433
100	--	--	9-Jul-02	0.439	27-Jun-03	0.184
100	--	--	12-Jul-02	2.92	30-Jun-03	0.803
100	--	--	15-Jul-02	1.04	6-Jul-03	0.06
100	--	--	18-Jul-02	1.09	--	--
100	--	--	22-Jul-02	0.771	--	--
100	--	--	29-Jul-02	0.553	--	--
100	--	--	4-Aug-02	0.225	--	--
100	--	--	7-Aug-02	0.511	--	--
100	--	--	10-Aug-02	1.28	--	--
100	--	--	13-Aug-02	0.181	--	--
100	--	--	16-Aug-02	0.994	--	--
100	--	--	19-Aug-02	1.27	--	--
100	--	--	22-Aug-02	0.547	--	--
100	--	--	25-Aug-02	0.064	--	--
100	--	--	28-Aug-02	0.204	--	--
100	--	--	31-Aug-02	0.465	--	--
100	--	--	3-Sep-02	0.439	--	--
100	--	--	6-Sep-02	4.11	--	--
100	--	--	9-Sep-02	1.19	--	--
100	--	--	12-Sep-02	0.473	--	--
100	--	--	15-Sep-02	0.088	--	--
100	--	--	18-Sep-02	0.739	--	--
100	--	--	21-Sep-02	0.107	--	--
100	--	--	24-Sep-02	0.223	--	--
100	--	--	27-Sep-02	0.183	--	--
100	--	--	30-Sep-02	0.395	--	--
100	--	--	3-Oct-02	1.57	--	--
100	--	--	6-Oct-02	0.21	--	--
100	--	--	9-Oct-02	0.983	--	--
100	13-Oct-01	0.41	12-Oct-02	0.498	--	--
100	16-Oct-01	0.24	15-Oct-02	0.256	--	--
100	18-Oct-01	1.7	18-Oct-02	0.457	--	--
100	23-Oct-01	0.32	21-Oct-02	4.63	--	--
100	26-Oct-01	0.24 ND	24-Oct-02	1.89	--	--
100	29-Oct-01	5	27-Oct-02	1.26	--	--
100	1-Nov-01	1.4	30-Oct-02	0.359	--	--
100	4-Nov-01	0.69	2-Nov-02	0.053	--	--
100	8-Nov-01	0.71	5-Nov-02	0.506	--	--
100	11-Nov-01	3.9	8-Nov-02	0.319	--	--
100	14-Nov-01	2.8	11-Nov-02	0.129	--	--
100	16-Nov-01	1	14-Nov-02	0.627	--	--
100	19-Nov-01	0.45	17-Nov-02	0.485	--	--
100	22-Nov-01	1.1	20-Nov-02	0.765	--	--
100	26-Nov-01	2	23-Nov-02	0.498	--	--
100	28-Nov-01	0.24 ND	26-Nov-02	0.818	--	--
100	1-Dec-01	0.66	29-Nov-02	0.518	--	--

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (µg/m³) [b,c]								
	2001			2002			2003		
	Date			Date			Date		
100	4-Dec-01	4.6		2-Dec-02	0.954		--	--	
100	7-Dec-01	2.5		5-Dec-02	0.057		--	--	
100	10-Dec-01	2.5		8-Dec-02	0.112		--	--	
100	13-Dec-01	0.25	ND	11-Dec-02	2.57		--	--	
100	17-Dec-01	0.31		14-Dec-02	0.264		--	--	
100	19-Dec-01	0.23	ND	17-Dec-02	1.89		--	--	
100	22-Dec-01	0.24	ND	20-Dec-02	0.382		--	--	
100	26-Dec-01	0.27		23-Dec-02	0.895		--	--	
100	28-Dec-01	1.3		26-Dec-02	0.086		--	--	
100	31-Dec-01	0.27		29-Dec-02	1.72		--	--	
100 Summary:	**2001**	**Max = 5 Avg = 1.3**		**2002**	**Max = 4.9 Avg = 1**		**2003**	**Max = 5.5 Avg = 0.79**	
101	--	--		3-Jan-02	0.25	ND	--	--	
101	--	--		7-Jan-02	0.25	ND	--	--	
101	--	--		10-Jan-02	0.3		--	--	
101	--	--		13-Jan-02	17		--	--	
101	--	--		16-Jan-02	0.35		--	--	
101	--	--		19-Jan-02	0.6		--	--	
101	--	--		22-Jan-02	0.55		--	--	
101	--	--		25-Jan-02	0.24	ND	--	--	
101	--	--		28-Jan-02	0.34		--	--	
101	--	--		31-Jan-02	0.24	ND	--	--	
101	--	--		5-Feb-02	0.52		--	--	
101	--	--		8-Feb-02	0.3		--	--	
101	--	--		11-Feb-02	0.23	ND	--	--	
101	--	--		14-Feb-02	0.27		--	--	
101	--	--		18-Feb-02	0.6		--	--	
101	--	--		21-Feb-02	0.24	ND	--	--	
101	--	--		26-Feb-02	0.24	ND	--	--	
101	--	--		1-Mar-02	0.65		--	--	
101	--	--		7-Mar-02	1.6		--	--	
101	--	--		11-Mar-02	0.24	ND	--	--	
101	--	--		14-Mar-02	1.2		--	--	
101	--	--		17-Mar-02	0.65		--	--	
101	--	--		20-Mar-02	0.46		--	--	
101	--	--		23-Mar-02	0.25	ND	--	--	
101	--	--		26-Mar-02	0.24	ND	--	--	
101	--	--		29-Mar-02	0.48		--	--	
101	--	--		1-Apr-02	0.26	ND	--	--	
101	--	--		4-Apr-02	1.8		--	--	
101	--	--		7-Apr-02	0.26	ND	--	--	
101	--	--		10-Apr-02	0.69		--	--	
101	--	--		16-Apr-02	1.8		--	--	
101	--	--		18-Apr-02	0.55		--	--	
101	--	--		25-Apr-02	0.25	ND	--	--	
101	--	--		28-Apr-02	0.27	ND	--	--	
101	--	--		1-May-02	0.34		--	--	
101	--	--		4-May-02	0.51		--	--	
101	--	--		7-May-02	0.54		--	--	
101	--	--		10-May-02	2.14		--	--	
101	--	--		13-May-02	0.054		--	--	
101	--	--		16-May-02	0.28		--	--	

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results ($\mu g/m^3$) [b,c]					
	2001		2002		2003	
	Date		Date		Date	
101	--	--	19-May-02	0.062	--	--
101	--	--	22-May-02	0.921	--	--
101	--	--	25-May-02	0.123	--	--
101	--	--	29-May-02	0.562	--	--
101	--	--	31-May-02	0.099	--	--
101	--	--	3-Jun-02	0.677	--	--
101	--	--	6-Jun-02	0.962	--	--
101	--	--	9-Jun-02	0.245	--	--
101	--	--	12-Jun-02	0.085	--	--
101	--	--	15-Jun-02	0.069	--	--
101	--	--	18-Jun-02	0.261	--	--
101	--	--	21-Jun-02	0.375	--	--
101	--	--	24-Jun-02	0.935	--	--
101	--	--	27-Jun-02	0.075	--	--
101	--	--	30-Jun-02	0.05 ND	--	--
101	--	--	3-Jul-02	0.225	--	--
101	--	--	6-Jul-02	1.11	--	--
101	--	--	9-Jul-02	1.66	--	--
101	--	--	12-Jul-02	3.58	--	--
101	--	--	15-Jul-02	0.655	--	--
101	--	--	18-Jul-02	0.131	--	--
101	--	--	22-Jul-02	0.092	--	--
101	--	--	26-Jul-02	1.36	--	--
101	--	--	29-Jul-02	0.213	--	--
101	--	--	1-Aug-02	1.29	--	--
101	--	--	4-Aug-02	0.22	--	--
101	--	--	7-Aug-02	9.13	--	--
101	--	--	10-Aug-02	0.656	--	--
101	--	--	13-Aug-02	0.05 ND	--	--
101	--	--	16-Aug-02	6.68	--	--
101	--	--	19-Aug-02	1.69	--	--
101	--	--	22-Aug-02	0.059	--	--
101	--	--	25-Aug-02	0.701	--	--
101	--	--	28-Aug-02	10	--	--
101	--	--	31-Aug-02	0.378	--	--
101	--	--	3-Sep-02	1.22	--	--
101	--	--	6-Sep-02	1.09	--	--
101	13-Oct-01	0.096	--	--	--	--
101	16-Oct-01	0.075	--	--	--	--
101	18-Oct-01	0.18	--	--	--	--
101	23-Oct-01	0.3 ND	--	--	--	--
101	26-Oct-01	0.23 ND	--	--	--	--
101	29-Oct-01	1.4	--	--	--	--
101	1-Nov-01	0.41	--	--	--	--
101	4-Nov-01	0.23 ND	--	--	--	--
101	8-Nov-01	0.26	--	--	--	--
101	11-Nov-01	2.4	--	--	--	--
101	14-Nov-01	1.5	--	--	--	--
101	16-Nov-01	0.24 ND	--	--	--	--
101	19-Nov-01	0.24 ND	--	--	--	--
101	22-Nov-01	0.38	--	--	--	--
101	26-Nov-01	0.24 ND	--	--	--	--

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results ($\mu g/m^3$) [b,c]					
	2001		2002		2003	
	Date		Date		Date	
101	28-Nov-01	1.7	--	--	--	--
101	1-Dec-01	0.62	--	--	--	--
101	4-Dec-01	0.25 ND	--	--	--	--
101	7-Dec-01	1.7	--	--	--	--
101	10-Dec-01	1.4	--	--	--	--
101	13-Dec-01	0.3	--	--	--	--
101	17-Dec-01	0.24 ND	--	--	--	--
101	19-Dec-01	0.23 ND	--	--	--	--
101	22-Dec-01	0.23 ND	--	--	--	--
101	26-Dec-01	0.22 ND	--	--	--	--
101	28-Dec-01	0.23 ND	--	--	--	--
101	31-Dec-01	0.24 ND	--	--	--	--
101 Summary:	**2001**	**Max = 2.4 Avg = 0.52**	**2002**	**Max = 17 Avg = 1.1**	**2003**	**--**
102	--	--	03-Jan-02	0.59	01-Jan-03	0.147
102	--	--	07-Jan-02	0.65	04-Jan-03	0.326
102	--	--	10-Jan-02	1.4	07-Jan-03	0.63
102	--	--	13-Jan-02	15	10-Jan-03	0.257
102	--	--	16-Jan-02	4.4	13-Jan-03	0.388
102	--	--	19-Jan-02	0.24 ND	16-Jan-03	0.322
102	--	--	22-Jan-02	25	19-Jan-03	0.986
102	--	--	28-Jan-02	8.1	22-Jan-03	0.172
102	--	--	31-Jan-02	0.39	25-Jan-03	0.684
102	--	--	05-Feb-02	2.7	28-Jan-03	1.52
102	--	--	08-Feb-02	5	31-Jan-03	2.33
102	--	--	11-Feb-02	4.4	03-Feb-03	2.69
102	--	--	14-Feb-02	14	06-Feb-03	0.342
102	--	--	18-Feb-02	13	09-Feb-03	0.265
102	--	--	21-Feb-02	0.38	12-Feb-03	0.46
102	--	--	26-Feb-02	0.25	15-Feb-03	0.05 ND
102	--	--	01-Mar-02	6.1	18-Feb-03	0.173
102	--	--	04-Mar-02	4.4	21-Feb-03	0.281
102	--	--	07-Mar-02	11	24-Feb-03	0.279
102	--	--	14-Mar-02	17	27-Feb-03	0.056
102	--	--	17-Mar-02	0.26 ND	02-Mar-03	0.181
102	--	--	20-Mar-02	0.23 ND	05-Mar-03	0.363
102	--	--	23-Mar-02	2.4	08-Mar-03	1.85
102	--	--	26-Mar-02	0.45	11-Mar-03	3.25
102	--	--	29-Mar-02	0.81	14-Mar-03	0.224
102	--	--	01-Apr-02	13	17-Mar-03	1.25
102	--	--	04-Apr-02	0.24 ND	20-Mar-03	0.349
102	--	--	07-Apr-02	6.4	23-Mar-03	0.504
102	--	--	10-Apr-02	0.86	26-Mar-03	0.476
102	--	--	16-Apr-02	11	29-Mar-03	0.107
102	--	--	18-Apr-02	3.1	01-Apr-03	1.56
102	--	--	25-Apr-02	1.1	04-Apr-03	4.11
102	--	--	28-Apr-02	0.25 ND	07-Apr-03	0.184
102	--	--	01-May-02	0.87	10-Apr-03	0.16
102	--	--	04-May-02	0.6	13-Apr-03	0.441
102	--	--	07-May-02	0.98	16-Apr-03	10
102	--	--	10-May-02	0.551	19-Apr-03	4.33
102	--	--	13-May-02	0.679	22-Apr-03	0.215

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (µg/m³) [b,c]						
	2001		2002		2003		
	Date		Date		Date		
102	--	--	16-May-02	2.19	28-Apr-03	0.435	
102	--	--	19-May-02	0.148	01-May-03	0.926	
102	--	--	22-May-02	3.84	04-May-03	0.671	
102	--	--	25-May-02	1.72	13-May-03	1.41	
102	--	--	29-May-02	0.645	16-May-03	0.319	
102	--	--	31-May-02	1.26	19-May-03	0.512	
102	--	--	03-Jun-02	2.27	22-May-03	0.11	
102	--	--	06-Jun-02	0.441	25-May-03	0.05	ND
102	--	--	09-Jun-02	1.96	28-May-03	0.245	
102	--	--	12-Jun-02	0.962	31-May-03	0.274	
102	--	--	15-Jun-02	0.365	03-Jun-03	0.188	
102	--	--	18-Jun-02	2.89	06-Jun-03	0.381	
102	--	--	21-Jun-02	1.12	09-Jun-03	1.35	
102	--	--	24-Jun-02	1.72	12-Jun-03	0.418	
102	--	--	27-Jun-02	1.06	15-Jun-03	0.096	
102	--	--	30-Jun-02	0.273	18-Jun-03	0.406	
102	--	--	03-Jul-02	1.23	21-Jun-03	0.475	
102	--	--	06-Jul-02	0.747	24-Jun-03	2.33	
102	--	--	09-Jul-02	0.739	27-Jun-03	0.469	
102	--	--	12-Jul-02	0.616	30-Jun-03	2.29	
102	--	--	15-Jul-02	0.522	03-Jul-03	0.964	
102	--	--	18-Jul-02	0.967	06-Jul-03	1.15	
102	--	--	22-Jul-02	0.667	--	--	
102	--	--	26-Jul-02	6.48	--	--	
102	--	--	29-Jul-02	0.913	--	--	
102	--	--	01-Aug-02	1.18	--	--	
102	--	--	04-Aug-02	0.663	--	--	
102	--	--	07-Aug-02	0.434	--	--	
102	--	--	10-Aug-02	0.932	--	--	
102	--	--	13-Aug-02	2.86	--	--	
102	--	--	16-Aug-02	4.93	--	--	
102	--	--	19-Aug-02	1.04	--	--	
102	--	--	22-Aug-02	3.8	--	--	
102	--	--	25-Aug-02	0.135	--	--	
102	--	--	28-Aug-02	0.262	--	--	
102	--	--	31-Aug-02	0.205	--	--	
102	--	--	03-Sep-02	0.411	--	--	
102	--	--	06-Sep-02	0.586	--	--	
102	--	--	09-Sep-02	0.614	--	--	
102	--	--	12-Sep-02	0.318	--	--	
102	--	--	21-Sep-02	0.29	--	--	
102	--	--	24-Sep-02	0.261	--	--	
102	--	--	27-Sep-02	0.314	--	--	
102	--	--	30-Sep-02	4.56	--	--	
102	--	--	03-Oct-02	1.53	--	--	
102	--	--	06-Oct-02	0.611	--	--	
102	--	--	09-Oct-02	1.77	--	--	
102	--	--	12-Oct-02	0.412	--	--	
102	--	--	15-Oct-02	0.17	--	--	
102	16-Oct-01	0.31	18-Oct-02	2.44	--	--	
102	18-Oct-01	16	21-Oct-02	0.759	--	--	
102	23-Oct-01	2.5	24-Oct-02	0.215	--	--	

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (μg/m³) [b,c]								
	2001			2002			2003		
	Date			Date			Date		
102	26-Oct-01	0.25		27-Oct-02	0.152		--	--	
102	29-Oct-01	14		30-Oct-02	0.125		--	--	
102	01-Nov-01	18		02-Nov-02	0.069		--	--	
102	04-Nov-01	0.48		05-Nov-02	0.099		--	--	
102	08-Nov-01	0.83		08-Nov-02	10.7		--	--	
102	11-Nov-01	0.58		11-Nov-02	0.15		--	--	
102	14-Nov-01	4.2		14-Nov-02	1.07		--	--	
102	16-Nov-01	0.99		17-Nov-02	0.108		--	--	
102	19-Nov-01	0.4		20-Nov-02	0.708		--	--	
102	22-Nov-01	13		23-Nov-02	0.287		--	--	
102	26-Nov-01	65		26-Nov-02	0.145		--	--	
102	28-Nov-01	0.24	ND	29-Nov-02	0.15		--	--	
102	04-Dec-01	7.5		02-Dec-02	0.776		--	--	
102	07-Dec-01	0.85		05-Dec-02	0.896		--	--	
102	10-Dec-01	1.4		08-Dec-02	0.376		--	--	
102	13-Dec-01	0.22	ND	11-Dec-02	0.919		--	--	
102	17-Dec-01	0.23	ND	14-Dec-02	0.568		--	--	
102	19-Dec-01	0.85		17-Dec-02	2.32		--	--	
102	22-Dec-01	5.1		20-Dec-02	0.224		--	--	
102	26-Dec-01	0.49		23-Dec-02	0.233		--	--	
102	28-Dec-01	0.53		26-Dec-02	0.083		--	--	
102	31-Dec-01	0.25		29-Dec-02	5.24		--	--	
102 Summary:	**2001**	**Max = 65 Avg = 6.2**		**2002**	**Max = 25 Avg = 2.4**		**2003**	**Max = 10 Avg = 1**	
103				3-Jan-02	0.92		10-Jan-03	0.402	
103				7-Jan-02	0.43		13-Jan-03	0.621	
103				10-Jan-02	0.73		16-Jan-03	0.23	
103				13-Jan-02	1.3		19-Jan-03	0.155	
103				16-Jan-02	1.5		22-Jan-03	0.058	
103				19-Jan-02	0.25	ND	25-Jan-03	0.326	
103				22-Jan-02	2.1		28-Jan-03	0.864	
103				25-Jan-02	0.59		31-Jan-03	0.075	
103				28-Jan-02	1.9		3-Feb-03	0.069	
103				31-Jan-02	0.46		6-Feb-03	0.283	
103				5-Feb-02	1		9-Feb-03	0.566	
103				8-Feb-02	0.61		12-Feb-03	0.65	
103				11-Feb-02	0.49		15-Feb-03	0.05	ND
103				14-Feb-02	0.38		18-Feb-03	1.22	
103				18-Feb-02	1.4		21-Feb-03	0.104	
103				21-Feb-02	0.32		24-Feb-03	0.135	
103				26-Feb-02	0.24	ND	27-Feb-03	0.05	ND
103				1-Mar-02	6.1		2-Mar-03	0.085	
103				4-Mar-02	0.49		5-Mar-03	0.105	
103				7-Mar-02	0.94		8-Mar-03	0.377	
103				11-Mar-02	1.2		11-Mar-03	0.993	
103				14-Mar-02	1.5		14-Mar-03	0.395	
103				17-Mar-02	0.25	ND	17-Mar-03	2.2	
103				20-Mar-02	0.26	ND	20-Mar-03	0.655	
103				23-Mar-02	0.25	ND	23-Mar-03	0.422	
103				26-Mar-02	0.3		26-Mar-03	0.421	
103				29-Mar-02	2.1		29-Mar-03	0.056	
103				1-Apr-02	0.62		1-Apr-03	0.236	

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (µg/m³) [b,c]					
	2001		2002		2003	
	Date		Date		Date	
103			4-Apr-02	0.24 ND	4-Apr-03	0.169
103			7-Apr-02	1.4	7-Apr-03	0.205
103			10-Apr-02	3.8	10-Apr-03	0.113
103			16-Apr-02	1.2	13-Apr-03	0.908
103			18-Apr-02	1.7	16-Apr-03	0.218
103			22-Apr-02	1.1	19-Apr-03	2.15
103			25-Apr-02	0.23 ND	22-Apr-03	0.145
103			28-Apr-02	0.25 ND	25-Apr-03	0.093
103			1-May-02	1.8	1-May-03	0.242
103			4-May-02	0.4	7-May-03	0.455
103			7-May-02	0.42	10-May-03	0.369
103			10-May-02	1.43	13-May-03	0.679
103			13-May-02	0.082	16-May-03	0.14
103			22-May-02	1.53	19-May-03	0.383
103			25-May-02	0.232	22-May-03	0.078
103			29-May-02	0.906	25-May-03	0.06
103			31-May-02	0.449	28-May-03	0.164
103			3-Jun-02	0.342	31-May-03	0.166
103			6-Jun-02	0.338	3-Jun-03	0.105
103			9-Jun-02	0.35	6-Jun-03	1.15
103			15-Jun-02	0.204	9-Jun-03	0.126
103			18-Jun-02	0.86	12-Jun-03	0.511
103			21-Jun-02	1.11	15-Jun-03	0.05 ND
103			24-Jun-02	1.06	18-Jun-03	0.907
103			27-Jun-02	0.46	21-Jun-03	0.133
103			30-Jun-02	0.097	24-Jun-03	0.32
103			3-Jul-02	0.68	27-Jun-03	0.098
103			6-Jul-02	0.286	30-Jun-03	0.453
103			9-Jul-02	0.342	3-Jul-03	0.159
103			12-Jul-02	0.276	6-Jul-03	0.051
103			15-Jul-02	0.244	--	--
103			18-Jul-02	0.878	--	--
103			22-Jul-02	0.728	--	--
103			26-Jul-02	0.537	--	--
103			29-Jul-02	0.422	--	--
103			1-Aug-02	2.59	--	--
103			4-Aug-02	0.258	--	--
103			7-Aug-02	0.159	--	--
103			10-Aug-02	0.379	--	--
103			13-Aug-02	0.077	--	--
103			16-Aug-02	0.46	--	--
103			19-Aug-02	0.756	--	--
103			22-Aug-02	0.296	--	--
103			25-Aug-02	0.057	--	--
103			28-Aug-02	0.107	--	--
103			31-Aug-02	0.33	--	--
103			3-Sep-02	0.291	--	--
103			6-Sep-02	1.11	--	--
103	13-Oct-01	0.994	--	--	--	--
103	16-Oct-01	0.56	--	--	--	--
103	18-Oct-01	0.96	--	--	--	--
103	23-Oct-01	0.32 ND	--	--	--	--

Exhibit A-2. High-Volume Air Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Dates and Results (µg/m³) [b,c]					
	2001		2002		2003	
	Date		Date		Date	
103	26-Oct-01	0.33	--	--	--	--
103	29-Oct-01	2.5	--	--	--	--
103	01-Nov-01	0.86	--	--	--	--
103	04-Nov-01	0.25	--	--	--	--
103	08-Nov-01	0.87	--	--	--	--
103	11-Nov-01	0.59	--	--	--	--
103	14-Nov-01	3.6	--	--	--	--
103	16-Nov-01	1	--	--	--	--
103	19-Nov-01	0.35	--	--	--	--
103	22-Nov-01	1.1	--	--	--	--
103	26-Nov-01	2.9	--	--	--	--
103	28-Nov-01	0.23 ND	--	--	--	--
103	01-Dec-01	0.85	--	--	--	--
103	04-Dec-01	2.1	--	--	--	--
103	07-Dec-01	1.3	--	--	--	--
103	10-Dec-01	2.3	--	--	--	--
103	13-Dec-01	0.26	--	--	--	--
103	17-Dec-01	0.24 ND	--	--	--	--
103	19-Dec-01	0.39	--	--	--	--
103	22-Dec-01	0.25 ND	--	--	--	--
103	26-Dec-01	0.4	--	--	--	--
103 Summary:	**2001**	**Max = 3.6 Avg = 1**	**2002**	**Max = 6.1 Avg = 0.8**	**2003**	**Max = 2.2 Avg = 0.39**

[a] Data were obtained from EPA Region 7 (2006).

[b] "--" indicates that no sample was collected during that time.

[c] A value qualified with an "ND" represents a non-detect. The value presented is the detection limit. For the purpose of calculating averages, one-half the detection limit was used as the value for non-detects.

Exhibit A-3. Average Annual Pb Concentrations from AirData Monitors Located Around the Primary Pb Smelter

Monitor ID	Average Monitored Pb Concentrations (µg/m^3)[a,b]				
	2001	2002	2003	2004	2005
290990015	3.18	1.29	1.31	1.37	1.56
290990004	--	--	--	1.27	0.94
290990005	2.11	0.4	0.308	0.436	0.28
290990011	1.52	0.51	0.414	0.558	0.28
290990016	--	--	--	0.3	0.20
290990013	0.904	0.240	0.194	0.437	0.20
290990008	0.273	0.070	0.102	0.097	0.14
290990010	0.077	0.070	0.034	0.046	0.06
290990009	0.332	0.050	0.086	0.105	0.07

[a] AirData values are for average annual Pb concentrations in total suspended particulate matter (TSP) and were obtained from the AirData website monitor reports. In some cases, there was more than one monitor at a site.
[b] "--" indicates that data was not available.

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c] Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Property Average (mg/kg) [d]
140	03-Oct-01	920	853	460	1060	**823**
141	03-Oct-01	1500	724	1470	818	**1128**
142	03-Oct-01	377	602	762	731	**618**
143	03-Oct-01	757	1390	1200	563	**978**
144	03-Oct-01	1680	1030	685	719	**1029**
145	03-Oct-01	2770	2210	1070	783	**1708**
146	03-Oct-01	1280	809	433	731	**813**
147	03-Oct-01	2640	1530	596	674	**1360**
148	03-Oct-01	670	1360	13100	465	**3899**
149	03-Oct-01	2820	2080	1540	1400	**1960**
150	03-Oct-01	403	1330	350	748	**708**
151	03-Oct-01	783	913	736	1240	**918**
152	04-Oct-01	803	1140	660	696	**825**
153	04-Oct-01	270	5530	1140	486	**1857**
154	04-Oct-01	4220	2160	1440	1360	**2295**
155	04-Oct-01	1260	873	1360	612	**1026**
156	04-Oct-01	1260	1450	636	2190	**1384**
157	05-Oct-01	1330	1550	1460	1630	**1493**
158	04-Oct-01	3100	9390	756	781	**3507**
159	04-Oct-01	1660	5780	428	440	**2077**
160	04-Oct-01	1150	853	927	269	**800**
161	04-Oct-01	1720	1790	1420	846	**1444**
162	04-Oct-01	1670	1800	526	2320	**1579**
163	04-Oct-01	13600	4870	2190	8450	**7278**
164	04-Oct-01	6900	10700	8360	5270	**7808**
165	04-Oct-01	6640	6500	7760	6200	**6775**
166	05-Oct-01	16600	11800	5970	8860	**10808**
167	05-Oct-01	28000	32100	8490	14200	**20698**
168	05-Oct-01	16700	18600	10400	2130	**11958**
169	05-Oct-01	12800	5640	4610	15800	**9713**
170	05-Oct-01	8670	4140	3950	4060	**5205**
171	10-Oct-01	1400	2120	461	1470	**1363**
172	10-Oct-01	851	1530	1270	728	**1095**
173	10-Oct-01	1160	1090	751	1570	**1143**
174	10-Oct-01	1270	1260	2530	1320	**1595**
175	10-Oct-01	2750	2580	5200	1260	**2948**
176	10-Oct-01	1720	2030	1620	515	**1471**
177	10-Oct-01	2760	3370	2190	7510	**3958**
178	08-Oct-01	4950	3690	1040	649	**2582**
179	08-Oct-01	1010	1800	1270	1250	**1333**
180	08-Oct-01	1330	2010	1220	899	**1365**
181	08-Oct-01	1070	2260	1160	976	**1367**
182	08-Oct-01	22500	5110	886	302	**7200**
183	08-Oct-01	1980	3020	1210	1050	**1815**
184	08-Oct-01	5830	4370	1510	1520	**3308**
185	09-Oct-01	2230	1670	796	936	**1408**
186	09-Oct-01	1020	1220	652	366	**815**
187	09-Oct-01	833	898	795	1050	**894**
188	09-Oct-01	2350	1820	1100	886	**1539**
189	09-Oct-01	1110	1070	1680	849	**1177**
190	09-Oct-01	930	818	922	910	**895**
191	09-Oct-01	1730	2180	24000	3600	**7878**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
192	09-Oct-01	3150	1230	710	1180	**1568**
193	10-Oct-01	5740	1590	14600	11200	**8283**
194	10-Oct-01	3670	998	1360	3520	**2387**
195	10-Oct-01	7240	1820	906	1880	**2962**
196	10-Oct-01	1180	2310	1550	979	**1505**
197	11-Oct-01	2210	5630	2430	1870	**3035**
198	11-Oct-01	857	850	423	112	**561**
199	11-Oct-01	648	330	310	117	**351**
200	11-Oct-01	559	156	710	296	**430**
201	11-Oct-01	373	86	95	212	**192**
202	12-Oct-01	211	160	389	203	**241**
203	12-Oct-01	870	579	1090	--	**846**
204	12-Oct-01	183	308	174	184	**212**
205	11-Oct-01	326	157	251	66	**200**
206	11-Oct-01	234	236	201	220	**223**
207	09-Oct-01	1040	1140	1150	826	**1039**
208	10-Oct-01	3050	2150	1890	1800	**2223**
209	10-Oct-01	1510	2030	1390	1100	**1508**
210	10-Oct-01	7490	546	1870	3830	**3434**
211	10-Oct-01	2400	2200	952	642	**1549**
212	10-Oct-01	163	273	341	642	**355**
213	10-Oct-01	8500	1640	3340	1020	**3625**
214	11-Oct-01	2100	2010	1150	1010	**1568**
215	11-Oct-01	1320	1020	1160	1420	**1230**
216	11-Oct-01	948	1070	1010	962	**998**
217	10-Oct-01	541	754	826	668	**697**
218	11-Oct-01	1320	671	588	562	**785**
219	11-Oct-01	685	858	1150	773	**867**
220	11-Oct-01	1050	1770	714	1020	**1139**
221	02-Aug-04	395	470	202.7	--	**356**
222	11-Oct-01	1340	676	469	1610	**1024**
223	11-Oct-01	424	555	474	199	**413**
224	11-Oct-01	772	504	459	581	**579**
225	11-Oct-01	1170	592	511	651	**731**
226	11-Oct-01	323	381	357	606	**417**
227	11-Oct-01	475	526	124	612	**434**
228	11-Oct-01	324	680	343	479	**457**
229	11-Oct-01	374	511	307	5430	**1656**
230	11-Oct-01	333	423	492	148	**349**
231	09-Oct-01	501	706	889	873	**742**
232	09-Oct-01	1580	1870	1060	1220	**1433**
233	09-Oct-01	1640	3810	900	686	**1759**
234	09-Oct-01	1100	2350	721	600	**1193**
235	09-Oct-01	1200	1480	636	599	**979**
236	12-Oct-01	1420	614	731	1280	**1011**
237	09-Oct-01	1250	792	1810	981	**1208**
238	11-Oct-01	--	492	1300	3420	**1737**
239	09-Oct-01	9820	2440	1630	2730	**4155**
240	09-Oct-01	2320	3070	4230	1460	**2770**
241	12-Oct-01	691	4130	392	634	**1462**
242	12-Oct-01	495	860	525	460	**585**
243	12-Oct-01	313	354	539	638	**461**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
244	12-Oct-01	671	547	530	731	**620**
245	12-Oct-01	586	785	595	700	**667**
246	12-Oct-01	703	801	468	760	**683**
247	12-Oct-01	498	813	537	484	**583**
248	12-Oct-01	431	368	670	524	**498**
249	12-Oct-01	279	568	1020	1690	**889**
250	12-Oct-02	914	864	830	1200	**952**
251	12-Oct-01	4130	2980	2540	857	**2627**
252	12-Oct-01	2330	1160	1360	1430	**1570**
253	11-Oct-01	413	1180	2140	964	**1174**
254	11-Oct-01	1010	1700	1100	1090	**1225**
255	11-Oct-01	756	890	1360	1290	**1074**
256	11-Oct-01	2090	2480	1130	1800	**1875**
257	09-Oct-01	967	1400	993	933	**1073**
258	11-Oct-01	1680	1420	1430	1660	**1548**
259	11-Oct-01	1290	3420	1670	4400	**2695**
260	11-Oct-01	1200	1460	1470	807	**1234**
261	11-Oct-01	934	1550	1730	1830	**1511**
262	11-Oct-01	1990	1980	1040	1280	**1573**
263	09-Oct-01	1890	1160	1220	1430	**1425**
264	11-Oct-01	1650	2220	1360	1300	**1633**
265	09-Oct-01	1090	1010	1060	885	**1011**
266	11-Oct-01	2390	2460	1210	1850	**1978**
267	11-Oct-01	1440	1770	1230	1930	**1593**
268	11-Oct-01	1040	1080	1220	1040	**1095**
269	11-Oct-01	1230	981	1050	1160	**1105**
270	11-Oct-01	4270	909	917	1030	**1782**
271	11-Oct-01	1360	1060	897	709	**1007**
272	11-Oct-01	612	2060	658	687	**1004**
273	09-Oct-01	315	340	630	232	**379**
274	09-Oct-01	703	719	520	664	**652**
275	09-Oct-01	694	731	660	393	**620**
276	09-Oct-01	254	443	136	216	**262**
277	09-Oct-01	868	797	349	522	**634**
278	09-Oct-01	245	204	59	48	**139**
279	10-Oct-01	1230	1330	982	822	**1091**
280	10-Oct-01	21100	893	475	441	**5727**
281	08-Oct-01	1120	1910	1090	957	**1269**
282	08-Oct-01	7650	6940	3380	4920	**5723**
283	08-Oct-01	4400	3060	2250	2010	**2930**
284	08-Oct-01	4690	6760	3270	4850	**4893**
285	08-Oct-01	4690	6760	3270	4850	**4893**
286	08-Oct-01	8380	8590	6850	6870	**7673**
287	08-Oct-01	6020	5650	2420	3580	**4418**
288	08-Oct-01	19900	20500	9766	9020	**14797**
289	08-Oct-01	1880	602	950	596	**1007**
290	08-Oct-01	887	636	2220	1750	**1373**
291	08-Oct-01	662	398	538	1240	**710**
292	08-Oct-01	2510	1510	3510	2530	**2515**
293	08-Oct-01	436	698	682	528	**586**
294	08-Oct-01	189	330	534	409	**366**
295	10-Oct-01	1130	3180	1580	1070	**1740**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
296	08-Oct-01	3100	3180	2240	1680	**2550**
297	08-Oct-01	1630	1650	1940	1810	**1758**
298	08-Oct-01	993	1080	3700	2010	**1946**
299	10-Oct-01	129	7280	2880	2160	**3112**
300	10-Oct-01	688	1190	1670	1800	**1337**
301	09-Oct-01	4130	6070	1220	989	**3102**
302	10-Oct-01	223	13000	5320	2230	**5193**
303	09-Oct-01	1220	1120	180	640	**790**
304	09-Oct-01	500	667	381	203	**438**
305	09-Oct-01	569	506	650	630	**589**
306	09-Oct-01	818	664	917	1170	**892**
307	10-Oct-01	498	465	492	744	**550**
308	10-Oct-01	954	1360	1050	695	**1015**
309	10-Oct-01	824	581	529	580	**629**
310	09-Oct-01	648	714	809	838	**752**
311	09-Oct-01	977	875	808	926	**897**
312	09-Oct-01	657	728	593	619	**649**
313	10-Oct-01	890	720	612	607	**707**
314	10-Oct-01	11200	1110	177	159	**3162**
315	10-Oct-01	590	858	393	375	**554**
316	10-Oct-01	825	957	794	854	**858**
317	10-Oct-01	658	436	533	503	**533**
318	10-Oct-01	509	578	484	1470	**760**
319	10-Oct-01	1100	1540	1320	397	**1089**
320	10-Oct-01	827	962	--	--	**895**
321	10-Oct-01	1200	1040	1160	2790	**1548**
322	10-Oct-01	2570	3400	1590	2190	**2438**
323	10-Oct-01	814	720	1320	1220	**1019**
324	10-Oct-01	2130	2490	2650	1810	**2270**
325	02-Oct-01	2970	2470	1300	916	**1914**
326	08-Oct-01	20700	10600	8880	2590	**10693**
327	08-Oct-01	6490	8670	2650	3930	**5435**
328	08-Oct-01	8080	6010	3470	2990	**5138**
329	08-Oct-01	5160	2510	996	1040	**2427**
330	09-Oct-01	1040	1900	1330	2040	**1578**
331	12-Oct-01	1800	1480	1470	1400	**1538**
332	12-Oct-01	1530	1720	594	1810	**1414**
333	12-Oct-01	1150	1620	1730	1540	**1510**
334	12-Oct-01	831	619	1360	1210	**1005**
335	12-Oct-01	1630	4470	944	1600	**2161**
336	19-Oct-01	11400	11600	8180	7050	**9558**
337	18-Oct-01	1080	1770	563	854	**1067**
338	18-Oct-01	999	1050	753	772	**894**
339	18-Oct-01	660	3900	1600	1060	**1805**
340	15-Oct-01	945	814	953	954	**917**
341	15-Oct-01	742	2060	1010	778	**1148**
342	15-Oct-01	1290	807	562	244	**726**
343	15-Oct-01	959	1080	1566	1220	**1206**
344	15-Oct-01	801	364	637	472	**569**
345	15-Oct-01	1230	59	419	1080	**697**
346	15-Oct-01	730	348	396	281	**439**
347	19-Oct-01	371	726	964	394	**614**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
348	15-Oct-01	860	527	892	430	**677**
349	15-Oct-01	388	334	266	210	**300**
350	15-Oct-01	128	490	488	161	**317**
351	17-Oct-01	624	869	316	379	**547**
352	17-Oct-01	1250	857	425	1480	**1003**
353	19-Oct-01	2320	2740	1160	2860	**2270**
354	17-Oct-01	1370	3900	1350	1050	**1918**
355	17-Oct-01	180	392	413	413	**350**
356	17-Oct-01	300	263	144	100	**202**
357	17-Oct-01	826	798	496	960	**770**
358	17-Oct-01	919	560	288	771	**635**
359	17-Oct-01	886	617	128	143	**444**
360	17-Oct-01	1110	549	806	--	**822**
361	17-Oct-01	624	886	257	544	**578**
362	15-Oct-01	907	9421	699	1110	**3034**
363	15-Oct-01	890	2160	947	--	**1332**
364	15-Oct-01	372	1110	1240	1060	**946**
365	15-Oct-01	564	913	1220	521	**805**
366	15-Oct-01	231	838	926	244	**560**
367	15-Oct-01	173	330	250	915	**417**
368	18-Oct-01	302	480	688	319	**447**
369	16-Oct-01	12100	5170	9140	4290	**7675**
370	18-Oct-01	1380	855	480	519	**809**
371	16-Oct-01	2740	977	1300	1850	**1717**
372	18-Oct-01	65	210	169	135	**145**
373	16-Oct-01	237	209	197	200	**211**
374	16-Oct-01	691	228	354	197	**368**
375	16-Oct-01	510	341	159	434	**361**
376	16-Oct-01	179	666	1080	41	**492**
377	16-Oct-01	257	229	113	151	**188**
378	16-Oct-01	435	382	498	391	**427**
379	16-Oct-01	237	413	330	309	**322**
380	16-Oct-01	342	448	614	281	**421**
381	17-Oct-01	466	618	532	529	**536**
382	17-Oct-01	454	559	726	629	**592**
383	19-Oct-01	270	383	311	433	**349**
384	19-Oct-01	294	288	815	768	**541**
385	16-Oct-01	367	1690	391	1080	**882**
386	16-Oct-01	4970	4250	3700	2680	**3900**
387	16-Oct-01	3130	2750	3180	2010	**2768**
388	16-Oct-01	1280	1570	5100	1170	**2280**
389	18-Oct-01	1120	8100	159	756	**2534**
390	18-Oct-01	1800	1750	1400	1400	**1588**
391	16-Oct-01	1380	1010	1150	936	**1119**
392	18-Oct-01	977	1330	758	1500	**1141**
393	16-Oct-01	1130	1923	425	741	**1055**
394	16-Oct-01	319	904	584	396	**551**
395	18-Oct-01	523	782	758	766	**707**
396	18-Oct-01	634	800	903	452	**697**
397	18-Oct-01	377	60	658	529	**406**
398	18-Oct-01	289	155	263	868	**394**
399	18-Oct-01	691	464	408	416	**495**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
400	18-Oct-01	451	1010	391	440	**573**
401	15-Oct-01	814	1040	567	969	**848**
402	15-Oct-01	2970	3080	396	513	**1740**
403	18-Oct-01	1670	2290	1440	1230	**1658**
404	15-Oct-01	655	636	401	545	**559**
405	18-Oct-01	679	516	688	519	**601**
406	15-Oct-01	748	1110	311	896	**766**
407	15-Oct-01	440	514	324	346	**406**
408	15-Oct-01	470	682	--	573	**575**
409	15-Oct-01	1010	1060	489	1620	**1045**
410	15-Oct-01	928	1090	682	1500	**1050**
411	15-Oct-01	982	541	791	444	**690**
412	15-Oct-01	768	867	--	649	**761**
413	16-Oct-01	874	1110	1340	767	**1023**
414	16-Oct-01	1160	1150	621	814	**936**
415	16-Oct-01	1160	1130	609	245	**786**
416	16-Oct-01	1240	866	1070	1260	**1109**
417	16-Oct-01	9530	3450	537	2060	**3894**
418	16-Oct-01	1640	1290	331	329	**898**
419	19-Oct-01	332	560	165	440	**374**
420	18-Oct-01	733	455	524	529	**560**
421	18-Oct-01	774	559	341	307	**495**
422	18-Oct-01	492	800	281	639	**553**
423	18-Oct-01	530	804	793	440	**642**
424	18-Oct-01	562	1320	578	619	**770**
425	16-Oct-01	1040	1360	1030	1139	**1142**
426	16-Oct-01	949	1240	850	1110	**1037**
427	18-Oct-01	1230	4410	2010	2230	**2470**
428	17-Oct-01	836	1540	778	934	**1022**
429	17-Oct-01	1710	1490	1160	1940	**1575**
430	17-Oct-01	1530	1170	597	471	**942**
431	17-Oct-01	1990	1820	426	321	**1139**
432	17-Oct-01	945	1250	560	323	**770**
433	17-Oct-01	2050	2990	1970	9410	**4105**
434	17-Oct-01	1270	2660	3930	1140	**2250**
435	19-Oct-01	2670	594	1520	1170	**1489**
436	17-Oct-01	556	1880	1090	1460	**1247**
437	05-Oct-01	3850	5830	5610	3240	**4633**
438	17-Oct-01	515	2150	285	228	**795**
439	18-Oct-01	1880	1220	1960	3230	**2073**
440	16-Oct-01	1380	1070	1480	1880	**1453**
441	16-Oct-01	3780	3230	2240	2430	**2920**
442	19-Oct-01	13500	5180	5590	6500	**7693**
443	16-Oct-01	3500	5010	1630	754	**2724**
444	18-Oct-01	1890	1540	1830	1920	**1795**
445	18-Oct-01	710	719	998	1650	**1019**
446	18-Oct-01	3670	645	1050	1290	**1664**
447	18-Oct-01	564	775	352	631	**581**
448	18-Oct-01	436	854	516	2010	**954**
449	18-Oct-01	858	446	544	719	**642**
450	18-Oct-01	322	635	527	491	**494**
451	18-Oct-01	781	821	661	800	**766**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
452	18-Oct-01	435	249	726	657	**517**
453	18-Oct-01	403	740	556	552	**563**
454	18-Oct-01	682	618	578	788	**667**
455	18-Oct-01	422	402	690	577	**523**
456	19-Oct-01	697	4780	858	408	**1686**
457	18-Oct-01	674	430	390	509	**501**
458	18-Oct-01	124	333	1610	638	**676**
459	18-Oct-01	566	732	406	240	**486**
460	18-Oct-01	865	562	453	670	**638**
461	18-Oct-01	489	386	599	487	**490**
462	18-Oct-01	518	950	548	552	**642**
463	17-Oct-01	829	416	100	194	**385**
464	17-Oct-01	342	718	424	580	**516**
465	17-Oct-01	357	530	343	487	**429**
466	17-Oct-01	553	596	401	581	**533**
467	19-Oct-01	778	33	370	495	**419**
468	17-Oct-01	1330	1310	707	381	**932**
469	17-Oct-01	89	286	464	230	**267**
470	19-Oct-01	1770	903	398	1350	**1105**
471	19-Oct-01	1230	1390	624	379	**906**
472	19-Oct-01	815	835	494	720	**716**
473	15-Oct-01	1670	534	933	1520	**1164**
474	15-Oct-01	569	158	1030	884	**660**
475	15-Oct-01	98	168	299	280	**211**
476	19-Oct-01	603	744	592	607	**637**
477	16-Oct-01	264	1670	2730	1900	**1641**
478	16-Oct-01	1390	999	560	878	**957**
479	16-Oct-01	412	439	570	613	**509**
480	16-Oct-01	669	110	854	602	**559**
481	16-Oct-01	156	862	335	189	**386**
482	16-Oct-01	2280	1340	1860	2820	**2075**
483	16-Oct-01	795	661	1660	1020	**1034**
484	17-Oct-01	2440	2340	1330	1210	**1830**
485	17-Oct-01	1620	1830	826	1390	**1417**
486	17-Oct-01	2450	1240	809	702	**1300**
487	18-Oct-01	1060	3930	1810	974	**1944**
488	17-Oct-01	887	847	1370	625	**932**
489	18-Oct-01	489	618	2760	904	**1193**
490	16-Oct-01	529	721	399	550	**550**
491	18-Oct-01	1400	353	956	784	**873**
492	17-Oct-01	434	903	608	634	**645**
493	17-Oct-01	429	399	492	542	**466**
494	17-Oct-01	592	986	955	1270	**951**
495	17-Oct-01	1640	440	641	749	**868**
496	23-Oct-01	1560	1170	2020	1170	**1480**
497	23-Oct-01	2440	3120	1460	1700	**2180**
498	23-Oct-01	1190	775	1590	1810	**1341**
499	23-Oct-01	313	372	396	365	**362**
500	23-Oct-01	453	301	2820	518	**1023**
501	23-Oct-01	6830	1260	3470	4900	**4115**
502	23-Oct-01	2250	3100	2000	2000	**2338**
503	23-Oct-01	3120	2370	3350	2030	**2718**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
504	23-Oct-01	2530	1550	5480	3190	**3188**
505	23-Oct-01	1110	1570	2250	1380	**1578**
506	23-Oct-01	1020	1100	1010	1250	**1095**
507	23-Oct-01	2640	7230	1120	2030	**3255**
508	23-Oct-01	534	464	988	1040	**757**
509	23-Oct-01	837	755	1560	1170	**1081**
510	23-Oct-01	716	617	768	888	**747**
511	23-Oct-01	2830	2550	1060	--	**2147**
512	23-Oct-01	2130	3110	1390	1420	**2013**
513	23-Oct-01	5350	3330	1090	1300	**2768**
514	23-Oct-01	1020	1690	1290	1500	**1375**
515	23-Oct-01	970	1420	2260	2070	**1680**
516	23-Oct-01	1400	1570	1630	1090	**1423**
517	23-Oct-01	1120	1370	1350	1270	**1278**
518	23-Oct-01	972	1510	1480	1460	**1356**
519	23-Oct-01	1110	797	1110	1590	**1152**
520	23-Oct-01	5490	1770	--	--	**3630**
521	23-Oct-01	3590	2150	12700	7510	**6488**
522	23-Oct-01	505	1040	852	420	**704**
523	23-Oct-01	32800	13300	24100	23200	**23350**
524	23-Oct-01	2530	1860	3070	3400	**2715**
525	23-Oct-01	863	2150	2110	2440	**1891**
526	24-Oct-01	2950	2470	1600	1610	**2158**
527	24-Oct-01	1480	1400	1040	684	**1151**
528	24-Oct-01	642	601	533	619	**599**
529	24-Oct-01	720	1300	903	1070	**998**
530	24-Oct-01	1050	749	801	1700	**1075**
531	24-Oct-01	511	438	641	882	**618**
532	24-Oct-01	1640	1490	8220	8520	**4968**
533	24-Oct-01	215	659	677	624	**544**
534	24-Oct-01	12100	8330	5310	11700	**9360**
535	24-Oct-01	1130	2540	2240	2270	**2045**
536	24-Oct-01	213	211	530	373	**332**
537	24-Oct-01	197	171	--	--	**184**
538	24-Oct-01	1780	2070	1290	1750	**1723**
539	24-Oct-01	408	203	171	529	**328**
540	24-Oct-01	1180	1370	870	644	**1016**
541	24-Oct-01	518	386	831	381	**529**
542	24-Oct-01	806	594	1150	747	**824**
543	24-Oct-01	1180	1280	868	942	**1068**
544	24-Oct-01	2020	814	304	353	**873**
545	25-Oct-01	8630	7640	7030	4840	**7035**
546	25-Oct-01	615	1150	430	930	**781**
547	25-Oct-01	1020	1650	1920	686	**1319**
548	25-Oct-01	1890	2250	1770	3750	**2415**
549	25-Oct-01	2110	2650	3260	3690	**2928**
550	25-Oct-01	1860	2820	2930	1530	**2285**
551	25-Oct-01	7670	14600	308	1120	**5925**
552	25-Oct-01	11500	7460	2620	5670	**6813**
553	25-Oct-01	11300	5310	4030	3570	**6053**
554	25-Oct-01	772	1870	1700	1440	**1446**
555	26-Oct-01	1570	340	4260	2730	**2225**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c] Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Property Average (mg/kg) [d]
556	26-Oct-01	705	645	578	416	**586**
557	26-Oct-01	916	1100	394	662	**768**
558	26-Oct-01	671	389	352	438	**463**
559	26-Oct-01	539	616	576	824	**639**
560	26-Oct-01	4690	7370	7580	6990	**6658**
561	26-Oct-01	942	247	432	817	**610**
562	26-Oct-01	1570	1320	632	501	**1006**
563	26-Oct-01	993	772	1090	859	**929**
564	26-Oct-01	462	313	539	558	**468**
565	26-Oct-01	332	1000	2290	1750	**1343**
566	26-Oct-01	690	366	928	1210	**799**
567	26-Oct-01	478	298	1080	1310	**792**
568	26-Oct-01	917	475	466	1490	**837**
569	26-Oct-01	427	420	468	546	**465**
570	26-Oct-01	2170	2120	3600	4110	**3000**
571	26-Oct-01	1010	599	2870	2170	**1662**
572	26-Oct-01	2520	1380	2850	4000	**2688**
573	27-Sep-01	904	632	684	553	**693**
574	07-Nov-00	1800	5000	2000	1700	**2625**
576	08-Nov-00	1400	1600	2000	1000	**1500**
577	19-Jul-02	1977	1657	1620	1717	**1743**
578	02-Nov-01	241	292	195	111	**210**
579	24-Sep-01	1920	1170	1490	1530	**1528**
580	11-Oct-01	--	492	1300	3420	**1737**
581	31-Oct-01	1170	795	618	764	**837**
582	30-Oct-01	1120	1770	1020	1100	**1253**
583	31-Oct-01	450	281	354	207	**323**
584	31-Oct-01	2550	1920	1170	774	**1604**
585	01-Nov-01	1880	2130	1550	1960	**1880**
586	02-Nov-01	1490	2260	1630	1320	**1675**
587	02-Nov-01	3710	1520	1440	2050	**2180**
588	02-Nov-01	460	489	102	294	**336**
589	02-Nov-01	5540	2410	--	--	**3975**
590	02-Nov-01	267	396	143	165	**243**
591	02-Nov-01	1740	835	538	441	**889**
592	02-Nov-01	538	540	365	381	**456**
593	02-Nov-01	204	407	360	203	**294**
594	02-Nov-01	298	466	375	214	**338**
595	02-Nov-01	894	399	625	1090	**752**
596	02-Nov-01	4480	3670	2000	2440	**3148**
597	02-Nov-01	3020	1450	2350	1160	**1995**
598	02-Nov-01	1850	1620	1450	1640	**1640**
599	02-Nov-01	519	428	858	343	**537**
600	02-Nov-01	994	1360	1730	542	**1157**
601	02-Nov-01	2050	1990	2910	2540	**2373**
602	02-Nov-01	421	458	705	1100	**671**
603	02-Nov-01	622	844	3170	1400	**1509**
604	02-Nov-01	1230	1230	1250	1210	**1230**
605	02-Nov-01	515	321	520	293	**412**
606	02-Nov-01	539	703	849	729	**705**
607	02-Nov-01	761	937	839	1120	**914**
608	02-Nov-01	1470	1130	1110	956	**1167**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
609	02-Nov-01	1070	958	946	299	**818**
610	02-Nov-01	870	1160	1140	938	**1027**
611	02-Nov-01	1860	2090	2200	2100	**2063**
612	02-Nov-01	1160	4770	2280	1160	**2343**
613	02-Nov-01	1840	2680	1190	1170	**1720**
614	02-Nov-01	1380	1830	2170	794	**1544**
615	02-Nov-01	1030	1340	1420	1660	**1363**
616	31-Oct-01	941	446	531	256	**544**
617	31-Oct-01	1320	1300	1060	1500	**1295**
618	31-Oct-01	1020	635	1060	1210	**981**
619	05-Nov-01	179	181	283	571	**304**
620	05-Nov-01	1370	410	221	311	**578**
621	05-Nov-01	2200	2820	4800	1880	**2925**
622	05-Nov-01	815	1460	186	238	**675**
623	05-Nov-01	977	110	199	185	**368**
624	05-Nov-01	393	126	195	672	**347**
625	06-Nov-01	1680	1350	1020	868	**1230**
626	06-Nov-01	488	657	554	717	**604**
627	06-Nov-01	2650	2580	1300	1240	**1943**
628	06-Nov-01	822	745	633	901	**775**
629	06-Nov-01	1240	906	476	555	**794**
630	06-Nov-01	803	562	502	769	**659**
631	06-Nov-01	685	498	--	--	**592**
632	06-Nov-01	441	355	1710	719	**806**
633	06-Nov-01	910	587	653	428	**645**
634	06-Nov-01	965	760	584	421	**683**
635	06-Nov-01	788	682	274	351	**524**
636	06-Nov-01	721	330	449	444	**486**
637	08-Nov-01	1360	1140	1220	1050	**1193**
638	08-Nov-01	492	682	605	367	**537**
639	08-Nov-01	725	706	647	696	**694**
640	08-Nov-01	346	368	122	170	**252**
641	08-Nov-01	--	496	462	662	**540**
642	08-Nov-01	1370	2020	2270	1180	**1710**
643	08-Nov-01	644	944	--	--	**794**
644	08-Nov-01	747	515	--	--	**631**
645	06-Nov-01	596	702	1190	854	**836**
646	06-Nov-01	766	621	626	518	**633**
647	06-Nov-01	1040	846	413	882	**795**
648	06-Nov-01	480	760	795	1010	**761**
649	06-Nov-01	1060	631	532	862	**771**
650	06-Nov-01	384	600	491	566	**510**
651	06-Nov-01	522	690	565	490	**567**
652	06-Nov-01	619	704	587	623	**633**
653	06-Nov-01	256	180	--	160	**199**
654	06-Nov-01	1450	1190	808	844	**1073**
655	06-Nov-01	1040	816	541	647	**761**
656	06-Nov-01	328	409	316	263	**329**
657	06-Nov-01	765	356	952	892	**741**
658	06-Nov-01	556	580	517	261	**479**
659	06-Nov-01	530	890	318	368	**527**
660	08-Nov-01	695	815	771	450	**683**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
661	08-Nov-01	1030	244	2320	3030	**1656**
662	08-Nov-01	920	1410	588	715	**908**
663	08-Nov-01	380	470	690	753	**573**
664	08-Nov-01	1030	776	677	534	**754**
665	08-Nov-01	2590	1880	2350	2780	**2400**
666	08-Nov-01	408	283	--	--	**346**
667	08-Nov-01	822	874	831	895	**856**
668	08-Nov-01	1760	1050	1080	1500	**1348**
669	08-Nov-01	588	255	607	502	**488**
670	31-Oct-01	505	651	545	256	**489**
671	31-Oct-01	448	555	422	580	**501**
672	31-Oct-01	1210	3070	1380	2090	**1938**
673	31-Oct-01	1660	1580	1980	2340	**1890**
674	07-Nov-00	2400	1000	1400	2600	**1850**
675	17-Oct-01	525	657	584	533	**575**
676	06-Feb-02	1633	1440	1173	1210	**1364**
677	26-Nov-02	1197	1220	2857	3177	**2113**
678	26-Nov-02	1747	1210	3680	--	**2212**
679	22-Feb-02	655	287	241	594	**444**
680	05-Mar-02	552	315	641	580	**522**
681	05-Mar-02	541	524	525	801	**598**
682	06-Mar-02	2247	1350	551	615	**1191**
683	06-Mar-02	552	634	650	740	**644**
684	04-Mar-02	4037	4443	4647	14300	**6857**
685	08-Mar-02	1487	916	538	568	**877**
686	07-Mar-02	585	1129	2103	3797	**1904**
687	20-Mar-02	466	1477	547	587	**769**
688	20-Mar-02	1009	2147	805	563	**1131**
689	20-Mar-02	827	1075	322	378	**651**
690	22-Mar-02	464	298	164	203	**282**
691	22-Mar-02	148	205	358	184	**224**
692	22-Mar-02	1627	1753	1370	1357	**1527**
693	22-Mar-02	1147	2900	2562	2217	**2207**
699	04-Oct-01	13600	4870	2190	8450	**7278**
703	15-Apr-02	474	295	599	286	**414**
706	22-Mar-02	6780	1070	--	--	**3925**
707	15-Apr-02	961	906	--	--	**934**
708	08-Aug-02	653	1040	693	443	**707**
709	19-Dec-02	754	469	347	332	**476**
710	15-Aug-03	730	672	773	1036	**803**
711	15-Apr-02	1360	1343	1183	2577	**1616**
714	15-Aug-03	853	1347	901	779	**970**
718	22-Jul-04	1363	--	--	--	**1363**
723	08-Aug-02	967	536	590	999	**773**
725	15-Apr-02	1177	1920	1893	1327	**1579**
726	18-Jul-02	3200	2583	2253	2630	**2667**
728	08-May-02	482	328	422	538	**443**
729	30-Jan-02	329	411	311	282	**333**
730	31-Jan-02	209	433	236	295	**293**
731	08-Mar-02	183	196	211	132	**181**
732	08-Mar-02	462	340	212	243	**314**
733	31-Jan-02	231	191	190	165	**194**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]								Property Average (mg/kg) [d]
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4		
734	22-Mar-02	148		133		73		64		**105**
735	31-Jan-02	128		96		235		56		**129**
736	31-Jan-02	62		55		47		49		**53**
737	05-Feb-02	72		53		57		61		**61**
738	06-Jun-02	110	ND	130	ND	154		130	ND	**85**
739	06-Jun-02	140	ND	140	ND	150	ND	181		**99**
740	06-Jun-02	152		130	ND	159		120	ND	**109**
741	06-Jun-02	150	ND	140	ND	130	ND	192		**101**
742	06-Jun-02	185		159		170	ND	140	ND	**125**
743	06-Jun-02	140	ND	130	ND	202		140	ND	**102**
744	06-Jun-02	165		415		220		152		**238**
745	06-Jun-02	227		130	ND	140	ND	172		**134**
746	06-Jun-02	200		267		140	ND	130	ND	**151**
747	06-Jun-02	130	ND	154		120	ND	120	ND	**85**
748	10-Jun-02	120	ND	155		140	ND	352		**159**
749	10-Jun-02	397		142		287		140	ND	**224**
750	10-Jun-02	523		296		194		342		**339**
751	10-Jun-02	130	ND	149		157		141		**128**
752	10-Jun-02	130	ND	175		186		150	ND	**125**
753	10-Jun-02	150	ND	212		140	ND	140	ND	**107**
754	11-Jun-02	231		207		257		193		**222**
755	11-Jun-02	207		378		131		140	ND	**197**
756	11-Jun-02	283		201		224		140	ND	**195**
757	11-Jun-02	181		150	ND	140	ND	140	ND	**99**
758	11-Jun-02	140	ND	219		140	ND	140	ND	**107**
759	11-Jun-02	150	ND	140	ND	150	ND	140	ND	**73**
760	11-Jun-02	130	ND	140	ND	140	ND	120	ND	**66**
761	11-Jun-02	140	ND	250		150	ND	288		**171**
762	11-Jun-02	146		170	ND	130	ND	175		**118**
763	11-Jun-02	355		624		130	ND	140	ND	**279**
764	26-Jul-04	332		124		145		193		**199**
765	12-Jun-02	167		163		133		130	ND	**132**
766	31-May-02	159		169		120	ND	197		**146**
767	31-May-02	156		163		156		110	ND	**133**
768	31-May-02	469		118		163		110	ND	**201**
769	31-May-02	370		339		153		216		**270**
770	31-May-02	305		232		150	ND	128		**185**
771	31-May-02	264		173		168		178		**196**
772	31-May-02	465		279		140		132		**254**
773	31-May-02	686		576		288		171		**430**
774	31-May-02	120	ND	220		160		120	ND	**125**
775	31-May-02	256		299		131		107		**198**
776	31-May-02	120	ND	221		182		127		**148**
777	31-May-02	192		328		133		144		**199**
778	31-May-02	1120		398		436		393		**587**
779	31-May-02	224		232		110	ND	177		**172**
780	31-May-02	291		213		100	ND	257		**203**
781	31-May-02	238		215		187		214		**214**
782	31-May-02	178		142		110	ND	120	ND	**109**
783	31-May-02	253		268		110	ND	195		**193**
784	03-Jun-02	458		306		149		144		**264**
785	03-Jun-02	201		201		121		110	ND	**145**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c] Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4		Property Average (mg/kg) [d]
786	03-Jun-02	250		130	ND	120	ND	170		**136**
787	04-Jun-02	170		140	ND	130	ND	150	ND	**95**
788	04-Jun-02	147		166		130	ND	140	ND	**112**
789	04-Jun-02	140	ND	150	ND	150	ND	139		**90**
790	04-Jun-02	358		165		289		316		**282**
791	04-Jun-02	140	ND	150	ND	149		130	ND	**90**
792	05-Jun-02	130	ND	140	ND	140	ND	152		**89**
793	06-Jun-02	142		100	ND	226		338		**189**
794	11-Jun-02	183		144		150	ND	150	ND	**119**
796	19-Jun-02	205		182		282		135		**201**
797	20-Jun-02	--		265		161		150	ND	**167**
798	12-Jun-02	182		158		--		180	ND	**143**
799	22-Jun-02	213		150	ND	148		140	ND	**127**
800	19-Jun-02	140	ND	169		170	ND	203		**132**
801	20-Jun-02	288		300		170	ND	157	ND	**188**
802	20-Jun-02	150	ND	170		150	ND	150	ND	**99**
803	18-Jun-02	218		150	ND	165		150	ND	**133**
804	18-Jun-02	150	ND	150	ND	180	ND	180	ND	**83**
805	19-Jun-02	170	ND	140	ND	250		170	ND	**123**
806	18-Jun-02	170	ND	170	ND	150	ND	130	ND	**78**
807	18-Jun-02	187		150	ND	212		150	ND	**137**
808	19-Jun-02	204		147	ND	173		170	ND	**134**
809	19-Jun-02	184		189		228		148		**187**
810	18-Jun-02	245		217		346		371		**295**
811	19-Jun-02	140	ND	150	ND	151		160		**114**
812	20-Jun-02	231		189		150	ND	170	ND	**145**
813	18-Jun-02	173		183		140	ND	140	ND	**124**
814	19-Jun-02	257		163	ND	140		130	ND	**136**
815	19-Jun-02	184		150	ND	170	ND	193		**134**
816	20-Jun-02	588		270		272		365		**374**
817	20-Jun-02	197		263		150	ND	150	ND	**153**
818	27-Jun-02	203		274		207		199		**221**
819	27-Jun-02	140	ND	170	ND	170	ND	222		**116**
820	27-Jun-02	202		298		376		244		**280**
821	27-Jun-02	520		335		277		156		**322**
822	27-Jun-02	205		333		132		194		**216**
823	27-Jun-02	252		212		212		205		**220**
824	27-Jun-02	367		286		180	ND	194		**234**
825	27-Jun-02	221		249		192		192		**214**
826	27-Jun-02	221		191		153		163		**182**
827	26-Jun-02	269		180		199		150	ND	**181**
828	26-Jun-02	384		451		308		150	ND	**305**
829	26-Jun-02	144		188		161		130	ND	**140**
830	26-Jun-02	140		149		179		140	ND	**135**
831	26-Jun-02	130	ND	130	ND	130	ND	120	ND	**64**
832	26-Jun-02	304		110	ND	467		727		**388**
833	26-Jun-02	150	ND	150	ND	197		150	ND	**106**
834	03-Jul-02	2080		5770		1270		1490		**2653**
835	09-Jul-02	185		247		155		198		**196**
836	09-Jul-02	264		181		113		117		**169**
837	09-Jul-02	176		247		218		170		**203**
838	09-Jul-02	148		223		161		185		**179**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
839	03-Jul-02	52.7	129	93	218	**123**
840	03-Jul-02	207	118	169	272	**192**
841	03-Jul-02	--	164	151	134	**150**
842	09-Jul-02	172	80	91	41	**96**
843	09-Jul-02	150	110	86	214	**140**
844	03-Jul-02	99	111	169	211	**148**
845	09-Jul-02	198	135	122	115	**143**
846	03-Jul-02	149	35	35	56	**69**
847	09-Jul-02	109	92	304	583	**272**
848	12-Jul-02	340	743	119	81	**321**
849	12-Jul-02	347	62	195	273	**219**
850	11-Jul-02	73	121	51	36	**70**
851	11-Jul-02	78	101	61	32	**68**
852	11-Jul-02	184	140	121	116	**140**
853	11-Jul-02	518	1210	156	252	**534**
854	11-Jul-02	343	653	199	107	**326**
855	11-Jul-02	418	483	305	361	**392**
856	11-Jul-02	236	164	82	161	**161**
857	11-Jul-02	330	371	164	208	**268**
858	11-Jul-02	191	83	207	150	**158**
859	12-Jul-02	104	107	140	96	**112**
860	12-Jul-02	223	230	284	226	**241**
861	12-Jul-02	193	233	167	236	**207**
862	11-Jul-02	228	261	50	81	**155**
863	11-Jul-02	154	173	111	173	**153**
864	11-Jul-02	25	56	85	71	**59**
865	17-Jul-02	248	277	197	251	**243**
866	12-Jul-02	96	341	141	128	**177**
867	12-Jul-02	129	417	120	85	**188**
868	15-Jul-02	159	277	223	165	**206**
869	15-Jul-02	274	299	206	188	**242**
870	15-Jul-02	298	--	143	186	**209**
871	15-Jul-02	199	341	212	130	**221**
872	15-Jul-02	287	298	220	285	**273**
873	17-Jul-02	127	183	219	152	**170**
874	17-Jul-02	143	150	116	118	**132**
875	18-Jul-02	254	232	91	246	**206**
876	11-Jul-02	177	280	311	526	**324**
877	11-Jul-02	148	89	11	111	**90**
878	18-Jul-02	326	330	297	329	**321**
879	11-Jul-02	168	242	181	116	**177**
880	17-Jul-02	271	441	569	443	**431**
881	17-Jul-02	265	218	303	265	**263**
882	15-Jul-02	441	328	120	207	**274**
883	12-Jul-02	352	355	289	243	**310**
884	18-Jul-02	200	238	109	249	**199**
885	09-Jul-02	228	500	230	235	**298**
886	09-Jul-02	395	293	179	188	**264**
887	09-Jul-02	257	214	181	191	**211**
888	09-Jul-02	215	274	295	252	**259**
889	09-Jul-02	175	385	206	308	**269**
890	09-Jul-02	268	293	311	193	**266**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]								Property Average (mg/kg) [d]
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4		
891	12-Jul-02	342		370		387		374		**368**
892	12-Jul-02	436		454		359		244		**373**
893	12-Jul-02	303		230		287		310		**283**
894	12-Jul-02	498		342		314		548		**426**
895	16-Jul-02	307		244		147		122		**205**
896	16-Jul-02	156		192		70		98		**129**
897	16-Jul-02	86		133		16		90		**81**
898	15-Jul-02	174		187		186		155		**176**
899	15-Jul-02	194		211		190		163		**190**
900	15-Jul-02	133		108		15		186		**111**
901	15-Jul-02	129		69		235		164		**149**
902	16-Jul-02	185		201		104		135		**156**
903	11-Jul-02	170		83		82		137		**118**
904	18-Jul-02	100		179		248		289		**204**
905	11-Jul-02	177		207		243		130		**189**
906	15-Jul-02	239		217		196		183		**209**
907	15-Jul-02	134		265		234		190		**206**
908	16-Jul-02	133		206		171		130		**160**
909	16-Jul-02	229		162		140		84		**154**
910	15-Jul-02	33		127		128		194		**121**
911	16-Jul-02	116		184		192		155		**162**
912	16-Jul-02	55		163		121		186		**131**
913	16-Jul-02	243		225		141		227		**209**
914	18-Jul-02	296		276		295		235		**276**
915	18-Jul-02	348		361		213		173		**274**
916	18-Jul-02	515		635		175		281		**402**
917	18-Jul-02	513		369		287		295		**366**
918	18-Jul-02	337		208		207		293		**261**
919	18-Jul-02	181		165		391		214		**238**
920	18-Jul-02	363		361		287		367		**345**
921	18-Jul-02	446		360		221		343		**343**
922	03-Jul-02	1220		879		1480		621		**1050**
923	11-Jul-02	4810		3970		--		--		**4390**
924	26-Jun-02	150	ND	120	ND	140	ND	140	ND	**69**
925	07-Aug-02	199		121		112		108		**135**
926	07-Aug-02	538		291		173		235		**309**
927	07-Aug-02	262		156		37		97		**138**
928	07-Aug-02	318		296		247		152		**253**
929	06-Aug-02	317		195		184		264		**240**
930	06-Aug-02	344		266		223		157		**248**
931	06-Aug-02	292		317		239		153		**250**
932	06-Aug-02	279		258		154		205		**224**
933	07-Aug-02	504		314		205		381		**351**
934	07-Aug-02	279		304		141		306		**258**
935	07-Aug-02	269		181		183		145		**195**
936	07-Aug-02	299		210		209		217		**234**
937	06-Aug-02	357		371		262		196		**297**
938	06-Aug-02	148		141		137		179		**151**
939	06-Aug-02	193		268		171		117		**187**
940	06-Aug-02	119		197		210		118		**161**
941	07-Aug-02	314		417		167		236		**284**
942	06-Aug-02	283		362		148		119		**228**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

		RESULTS (mg/kg) [b, c]								
Pilot Analysis ID	Sampling Date	Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4		Property Average (mg/kg) [d]
943	06-Aug-02	368		196		148		225		**234**
944	26-Jun-02	150	ND	140	ND	137		140	ND	**88**
945	11-Jun-02	210		257		150	ND	133		**169**
946	12-Jun-02	140	ND	158		720		150	ND	**256**
947	05-Jun-02	150	ND	133	ND	154		140	ND	**91**
948	29-Aug-02	280		325		332		183		**280**
949	29-Aug-02	597		351		299		259		**377**
950	29-Aug-02	79.6		148		107		166		**125**
951	29-Aug-02	348		223		120		185		**219**
952	29-Aug-02	264		276		167		83.5		**198**
953	27-Aug-02	295		536		482		616		**482**
954	29-Aug-02	247		391		374		295		**327**
955	27-Aug-02	313		343		244		376		**319**
956	27-Aug-02	278		302		316		283		**295**
957	27-Aug-02	216		225		134		331		**227**
958	27-Aug-02	374		202		282		160		**255**
959	27-Aug-02	333		113		182		289		**229**
960	27-Aug-02	385		310		234		115		**261**
961	27-Aug-02	230		245		106		219		**200**
962	27-Aug-02	186		349		238		127		**225**
963	27-Aug-02	288		315		368		222		**298**
964	27-Aug-02	319		433		206		313		**318**
965	27-Aug-02	225		198		333		388		**286**
966	27-Aug-02	225		210		225		305		**241**
967	27-Aug-02	166		235		240		240		**220**
968	27-Aug-02	197		425		229		177		**257**
969	27-Aug-02	478		416		284		164		**336**
970	27-Aug-02	241		235		104		210		**198**
971	27-Aug-02	409		244		188		182		**256**
972	27-Aug-02	263		184		188		303		**235**
973	27-Aug-02	157		268		262		243		**233**
974	27-Aug-02	337		183		367		189		**269**
975	04-Sep-02	284		330		373		374		**340**
976	04-Sep-02	160		246		203		138		**187**
977	04-Sep-02	433		279		124		222		**265**
978	04-Sep-02	210		285		366		237		**275**
979	04-Sep-02	289		264		136		212		**225**
980	04-Sep-02	319		710		252		312		**398**
981	03-Sep-02	14		109		130		89		**86**
982	03-Sep-02	243		160		266		187		**214**
983	03-Sep-02	142		74		197		130		**136**
984	03-Sep-02	215		138		116		163		**158**
985	03-Sep-02	68		64		155		118		**101**
986	03-Sep-02	234		255		226		169		**221**
987	03-Sep-02	188		271		142		211		**203**
988	03-Sep-02	148		66		42		25		**70**
989	03-Sep-02	110		185		195		26		**129**
990	03-Sep-02	201		182		260		195		**210**
991	03-Sep-02	25		--		135		223		**128**
992	30-Aug-02	207		233		229		125		**199**
993	30-Aug-02	95		149		130		106		**120**
994	30-Aug-02	239		171		234		202		**212**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]				Property Average (mg/kg) [d]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
995	30-Aug-02	276	215	152	298	**235**
996	30-Aug-02	464	230	213	312	**305**
997	30-Aug-02	99	13	50	184	**87**
998	30-Aug-02	62	88	192	218	**140**
999	11-Sep-02	229	350	145	184	**227**
1000	12-Sep-02	311	513	370	231	**356**
1001	11-Sep-02	117	187	146	123	**143**
1002	12-Sep-02	251	200	121	59	**158**
1003	12-Sep-02	167	201	164	108	**160**
1004	12-Sep-02	342	168	128	114	**188**
1005	12-Sep-02	237	157	74	124	**148**
1006	12-Sep-02	203	160	177	55	**149**
1007	12-Sep-02	602	309	329	185	**356**
1008	12-Sep-02	192	224	262	188	**217**
1009	12-Sep-02	104	141	172	272	**172**
1010	10-Sep-02	236	193	139	108	**169**
1011	11-Sep-02	253	179	287	318	**259**
1012	11-Sep-02	84	260	146	119	**152**
1013	11-Sep-02	64	123	19	81	**72**
1014	11-Sep-02	156	170	111	139	**144**
1015	10-Sep-02	256	222	207	95	**195**
1016	06-Sep-02	149	133	36	120	**110**
1017	11-Sep-02	198	215	98	157	**167**
1018	10-Sep-02	137	58	40	122	**89**
1019	10-Sep-02	197	203	221	245	**217**
1020	11-Sep-02	--	92	219	121	**144**
1021	15-Jul-02	170	114	208	175	**167**
1022	06-Sep-02	206	160	230	138	**184**
1023	30-Aug-02	158	169	165	174	**167**
1024	06-Sep-02	355	381	170	186	**273**
1025	06-Sep-02	37	41	72	96	**62**
1026	30-Aug-02	108	60	155	115	**110**
1027	30-Aug-02	24	70	82	137	**78**
1028	06-Sep-02	48	115	113	48	**81**
1029	30-Aug-02	131	177	126	174	**152**
1030	30-Aug-02	212	199	128	163	**176**
1031	30-Aug-02	215	7	51	129	**101**
1032	06-Sep-02	123	123	114	180	**135**
1033	06-Sep-02	10	89	131	137	**92**
1034	06-Sep-02	27	122	159	156	**116**
1035	06-Sep-02	125	119	136	26	**102**
1036	30-Aug-02	504	389	173	282	**337**
1037	06-Sep-02	175	285	139	175	**194**
1038	06-Sep-02	92	151	175	241	**165**
1039	06-Sep-02	170	300	241	228	**235**
1040	10-Sep-02	113	106	268	174	**165**
1041	10-Sep-02	118	199	192	56	**141**
1042	10-Sep-02	314	166	185	335	**250**
1043	11-Sep-02	175	166	299	206	**212**
1044	10-Sep-02	221	170	65	152	**152**
1045	11-Sep-02	783	59	125	45	**253**
1046	11-Sep-02	107	264	133	191	**174**

Exhibit A-4. Pre-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c] Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Property Average (mg/kg) [d]
1047	11-Sep-02	145	33	--	67	**82**
1048	10-Sep-02	194	281	215	343	**258**
1049	11-Sep-02	64	27	43	107	**60**
1050	10-Sep-02	204	239	153	224	**205**
1051	11-Sep-02	135	155	119	137	**137**
1052	10-Sep-02	169	216	210	--	**198**
1053	11-Sep-02	326	267	172	304	**267**
1054	10-Sep-02	122	152	170	106	**138**
1055	10-Sep-02	221	200	80	150	**163**
1056	10-Sep-02	215	217	136	224	**198**
1057	10-Sep-02	151	237	91	206	**171**
1058	10-Sep-02	225	129	183	207	**186**
1059	10-Sep-02	202	170	200	247	**205**
1060	10-Sep-02	133	58	143	101	**109**
1061	10-Sep-02	114	173	178	96	**140**
1062	10-Sep-02	74	37	101	140	**88**
1063	16-Oct-02	122	92	98	142	**114**
1064	30-Oct-02	86	42	49	74	**63**
1065	30-Oct-02	85	92	117	77	**93**
1066	12-Mar-03	91.4	101.6	77	75.6	**86**
1067	11-Mar-03	1033	1070	506	--	**870**
1068	19-Jun-03	717	542	162	--	**474**
1069	15-Jul-03	2137	1230	1203	1217	**1447**
1074	07-Aug-03	859	787	530	810	**747**
1075	08-Nov-01	1760	1050	1080	1500	**1348**
1076	15-Oct-01	982	541	791	444	**690**
1079	02-Nov-01	16300	2800	11300	6290	**9173**
1080	08-Nov-01	2110	6090	606	680	**2372**
1081	02-Nov-01	5260	10000	8750	6390	**7600**
1082	11-Apr-03	100	133	--	--	**117**
1084	02-Nov-01	5680	1580	4460	1160	**3220**
1086	08-Nov-01	606	--	--	--	**606**
1088	01-Apr-04	935	814	781	715	**811**
1090	22-Jul-04	--	--	--	632	**632**

[a] Data were obtained from the EPA Region 7 (2006).

[b] A value qualified with an "ND" represents a non-detect. The value presented is the detection limit.
For the purpose of calculating the property average, one-half the detection limit will be used as the value for non-detects.

[c] "--" indicates that no sample was collected for that quadrant.

[d] Not provided by EPA Region 7. Averages were calculated by ICF.

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
141	17-Jun-02	944	523	1170	587	**806**
142	16-Jun-03	157	215	212	237	**205**
143	16-Jun-03	197	265	207	264	**233**
145	03-Apr-02	880	598	445	493	**604**
146	19-May-03	206	146	270	309	**233**
147	03-Apr-02	368	349	201	247	**291**
148	21-May-02	193	296	208	290	**247**
149	16-Apr-02	1370	612	462	308	**688**
150	16-Dec-02	198	225	--	260	**228**
151	14-Jan-02	281	463	483	279	**377**
153	15-Jun-04	280	295	218	127	**230**
154	17-Jan-02	1550	1457	764	786	**1139**
155	03-Jun-03	109	288	283	378	**265**
156	10-Dec-02	540	332	195	505	**393**
157	08-Jul-02	778	895	876	353	**726**
158	19-Jan-02	675	288	455	539	**489**
159	27-Jun-02	280	193	217	196	**222**
160	26-Jun-02	398	216	188	232	**259**
161	28-Jun-02	490	1297	502	534	**706**
162	12-Jul-02	2630	2137	1400	766	**1733**
163	13-May-02	1898	2946	2078	1688	**2153**
172	21-Oct-02	466	189	769	1010	**609**
175	28-Mar-02	549	104	391	601	**411**
176	22-Jan-02	1217	687	1018	633	**889**
177	13-Nov-02	690	1001	1021	860	**893**
178	27-Nov-02	307	153	71	48	**145**
179	05-Nov-01	334	397	447	254	**358**
180	03-Jun-02	572	240	285	288	**346**
181	20-Nov-01	907	401	771	603	**671**
182	14-Dec-01	1347	1273	911	697	**1057**
183	09-Nov-01	560	834	659	562	**654**
184	07-Feb-02	716	167	475	321	**420**
185	25-Apr-02	125	208	127	123	**146**
191	10-Mar-04	--	--	500	129	**315**
196	07-Dec-01	643	981	760	243	**657**
197	09-Jan-02	872	825	680	847	**806**
200	27-Feb-02	155	--	311	--	**233**
207	11-Jan-02	978	890	485	648	**750**
208	07-Oct-02	499	714	490	1057	**690**
211	07-Oct-03	794	857	693	672	**754**
212	23-Jan-02	--	--	--	568	**568**
213	29-Aug-02	567	684	457	645	**588**
214	05-Mar-02	564	517	1076	496	**663**
215	22-Aug-03	647	386	487	762	**571**
216	23-Mar-04	358	661	400	249	**417**
217	11-Apr-03	627	473	553	271	**481**
218	16-Sep-03	473	300	294	445	**378**
220	19-Aug-03	451	475	592	394	**478**
222	15-Mar-02	139	85	152	166	**136**
225	02-Jun-04	104	110	286	186	**172**
226	20-May-02	--	--	--	155	**155**
230	15-Feb-02	--	119	190	--	**155**
231	21-Mar-02	203	415	429	281	**332**

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
232	25-Jun-02	520	840	946	275	**645**
233	13-Feb-02	578	238	357	285	**365**
234	13-Nov-02	74	669	369	254	**342**
235	06-Aug-03	440	532	701	485	**540**
237	21-Aug-03	454	551	589	641	**559**
238	17-Oct-02	2693	--	1095	1100	**1629**
239	04-Mar-02	1400	690	976	1487	**1138**
240	15-Apr-02	488	451	798	220	**489**
241	07-May-04	342	270	--	--	**306**
242	23-Aug-04	49	58	168	271	**137**
246	12-Aug-04	261	258	--	336	**285**
251	26-Aug-02	678	813	793	246	**633**
253	17-Dec-03	599	652	411	563	**556**
254	16-Sep-03	178	668	557	400	**451**
255	16-Sep-03	922	463	446	543	**594**
256	19-Sep-03	536	1040	679	1663	**980**
257	17-Oct-01	523	660	294	333	**453**
258	26-Sep-03	907	972	976	689	**886**
259	29-Aug-02	615	376	527	656	**544**
260	16-Oct-03	292	1143	705	213	**588**
261	11-Mar-02	246	244	721	849	**515**
262	16-Jan-02	395	1110	913	822	**810**
263	15-Oct-01	1197	497	603	1243	**885**
264	18-Sep-03	790	345	1097	860	**773**
265	28-Jan-02	1083	939	694	571	**822**
266	02-Oct-03	1563	653	871	747	**959**
267	22-Oct-03	1620	1830	1123	1280	**1463**
268	26-Sep-03	1087	463	922	842	**829**
269	07-Oct-03	1087	1026	940	702	**939**
272	16-Jan-04	248	444	432	450	**394**
273	14-Mar-02	--	--	165	--	**165**
277	01-Apr-04	205	251	--	181	**212**
279	19-May-03	116	203	252	321	**223**
280	14-Jul-04	221	165	264	269	**230**
282	19-Jun-02	1640	3900	1270	1227	**2009**
283	21-Jun-02	1487	356	597	605	**761**
284	15-Mar-04	355	474	209	296	**334**
285	15-Mar-04	355	474	209	296	**334**
287	15-May-02	1990	1815	1550	1432	**1697**
295	18-Jul-02	1900	2953	1093	895	**1710**
299	24-Jul-02	--	2930	850	195	**1325**
300	09-Aug-02	1260	1150	310	1033	**938**
301	18-Jul-02	239	162	235	210	**212**
302	07-Nov-01	232	270	64	136	**176**
303	15-Mar-04	660	277	--	214	**384**
304	08-Apr-04	326	538	--	--	**432**
306	14-Oct-02	1290	492	192	223	**549**
308	15-Aug-03	1011	532	784	444	**693**
311	10-Aug-04	568	272	417	291	**387**
314	28-Mar-02	575	430	--	--	**503**
316	06-May-04	471	444	129	536	**395**
319	20-Apr-04	927	551	--	--	**739**
320	04-May-04	727	811	--	--	**769**

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
321	01-Apr-02	402	604	645	1107	**690**
323	26-Sep-02	1536	1540	556	334	**992**
324	19-Aug-02	111	539	394	317	**340**
325	09-Apr-04	2757	--	--	--	**2757**
326	07-Jun-02	1340	1313	884	1253	**1198**
327	07-Jun-02	921	1011	2223	373	**1132**
328	06-Jun-02	2047	648	1663	756	**1279**
330	24-Jan-02	220	195	146	234	**199**
331	24-Jan-02	416	731	724	360	**558**
337	01-Jul-03	623	833	509	467	**608**
339	08-Feb-02	147	259	124	80	**153**
340	17-Jan-02	823	1277	944	--	**1015**
341	21-Nov-02	371	1530	310	565	**694**
344	01-Apr-02	958	--	1058	6177	**2731**
347	20-Dec-01	--	113	88	--	**101**
353	18-Oct-02	100	210	152	317	**195**
354	23-Feb-04	--	625	147	411	**394**
355	08-Feb-02	--	130	193	179	**167**
357	30-Apr-04	291	393	369	262	**329**
358	30-Apr-04	369	490	--	576	**478**
360	04-May-04	240	142	335	--	**239**
361	22-Apr-04	629	233	568	--	**477**
363	30-Jun-04	331	596	482	--	**470**
364	02-Jul-04	393	517	563	--	**491**
365	08-Jun-04	331	684	173	426	**404**
371	09-Oct-02	96	241	84	60	**120**
384	25-Mar-04	--	--	544	153	**349**
385	20-Dec-01	--	60	--	79	**70**
386	20-Feb-04	1274	837	1267	1072	**1113**
387	27-Feb-04	1253	1001	838	--	**1031**
388	22-Aug-02	292	123	267	425	**277**
389	07-Mar-02	304	324	239	254	**280**
390	04-Aug-03	684	1167	519	530	**725**
391	29-Jan-02	706	709	1220	752	**847**
392	08-Nov-02	401	187	191	376	**289**
395	07-Mar-02	344	435	550	449	**445**
396	11-Sep-03	401	687	792	317	**549**
398	18-Feb-02	--	--	--	160	**160**
400	21-May-04	155	210	--	174	**180**
403	28-Feb-02	445	209	149	376	**295**
404	19-Jul-02	1113	408	--	--	**761**
405	29-Jul-03	356	885	589	341	**543**
406	19-Jul-02	229	--	--	--	**229**
407	22-Feb-02	318	312	--	--	**315**
408	03-Jul-02	339	164	320	308	**283**
410	10-Apr-02	653	862	1490	532	**884**
411	15-Aug-03	632	564	564	353	**528**
412	13-Aug-03	417	442	719	456	**509**
413	29-Jan-02	382	546	267	343	**385**
416	12-Apr-04	398	2000	--	--	**1199**
418	17-Jun-02	186	154	--	--	**170**
419	17-Jun-02	--	263	--	169	**216**
422	04-May-04	97	163	--	108	**123**

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
425	21-Feb-02	287	285	112	146	**208**
426	18-Jan-02	1180	1913	987	710	**1198**
428	29-Jul-03	525	148	159	237	**267**
430	30-Apr-03	704	469	282	286	**435**
431	10-Dec-02	478	1527	114	--	**706**
432	02-Jun-03	118	234	220	--	**191**
433	20-Jun-02	64	532	1423	4100	**1530**
435	10-Jul-02	2253	592	1807	835	**1372**
436	10-Jul-02	872	3163	--	--	**2018**
440	09-Aug-02	880	328	1380	1650	**1060**
442	16-Feb-04	859	111	768	608	**587**
444	18-Feb-02	224	321	488	294	**332**
445	27-Apr-04	568	365	820	942	**674**
446	29-Aug-02	1372	1073	596	884	**981**
447	13-Mar-02	178	222	--	89	**163**
448	20-Dec-02	315	616	366	165	**366**
449	27-Apr-04	162	304	227	258	**238**
450	13-May-02	--	130	176	163	**156**
451	14-Apr-04	266	209	235	222	**233**
454	13-Feb-02	274	191	206	63	**184**
456	18-Aug-04	184	123	212	175	**174**
458	29-Apr-04	--	--	228	170	**199**
468	22-Apr-04	264	238	323	--	**275**
470	29-Jul-04	1550	439	--	305	**765**
477	23-Oct-02	1070	733	1210	2233	**1312**
484	16-Jan-02	395	1110	913	822	**810**
485	22-Jul-04	628	713	961	688	**748**
486	24-Sep-03	734	963	779	791	**817**
491	02-Jun-04	358	--	508	395	**420**
492	30-Apr-04	164	257	446	231	**275**
493	05-Feb-02	72	159	129	144	**126**
495	25-Jun-04	303	304	418	328	**338**
496	04-Jun-03	287	279	--	204	**257**
497	22-Aug-02	148	60	429	--	**212**
498	09-Aug-02	1042	686	608	482	**705**
500	18-Feb-04	--	--	310	--	**310**
501	23-Jan-04	1930	675	1180	811	**1149**
503	25-Feb-04	1323	797	--	--	**1060**
504	13-Jun-02	353	177	83	174	**197**
511	03-Apr-02	863	1773	204	209	**762**
512	15-Nov-01	688	752	777	567	**696**
513	15-Nov-01	736	824	743	245	**637**
514	24-Jan-02	209	605	233	840	**472**
517	06-May-04	604	584	471	439	**525**
518	10-Jun-04	380	493	313	602	**447**
520	23-Feb-04	224	--	--	--	**224**
526	16-Jul-02	1007	891	1117	944	**990**
528	03-Aug-04	--	--	130	--	**130**
531	11-Jan-02	567	--	--	--	**567**
532	10-Mar-04	481	1840	114	244	**670**
535	05-May-03	274	148	283	118	**206**
540	10-Sep-03	307	502	1018	568	**599**
542	13-Jan-04	762	357	426	318	**466**

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
544	08-May-03	479	223	681	--	**461**
557	27-Aug-03	878	789	467	523	**664**
558	15-Feb-02	53	--	--	90	**72**
564	11-Feb-02	57	335	114	55	**140**
573	30-Oct-01	273	236	214	202	**231**
574	09-Oct-01	614	1057	1363	507	**885**
575	21-Sep-01	1670	1947	186	905	**1177**
576	26-Sep-01	1160	654	512	619	**736**
577	30-Sep-02	1523	1187	469	594	**943**
579	02-Oct-01	1180	937	343	382	**711**
580	17-Oct-02	2693	--	1095	1100	**1629**
581	12-Mar-02	731	403	90	192	**354**
584	23-Feb-04	436	1027	153	--	**539**
585	03-Dec-03	371	669	632	574	**562**
588	11-Feb-02	202	159	--	--	**181**
593	11-Feb-02	--	123	--	--	**123**
596	20-Feb-04	796	235	--	--	**516**
597	15-Apr-03	1257	854	618	893	**906**
600	09-Aug-02	264	866	--	--	**565**
601	22-Jul-02	1333	445	848	2010	**1159**
604	13-Oct-03	809	380	719	680	**647**
605	03-Aug-04	378	--	--	--	**378**
606	03-Aug-04	--	333	--	--	**333**
608	06-Mar-02	847	372	764	882	**716**
609	24-Jun-04	435	402	827	--	**555**
612	07-Mar-02	304	324	239	254	**280**
613	15-Aug-02	432	476	130	661	**425**
614	04-Aug-03	1753	432	904	427	**879**
615	08-Sep-03	641	802	268	548	**565**
617	17-Oct-02	654	1247	535	781	**804**
622	11-Feb-02	553	878	--	--	**716**
625	21-Mar-02	182	434	425	651	**423**
626	29-Jan-02	220	217	172	221	**208**
627	28-Jan-02	989	511	192	2177	**967**
628	07-Aug-03	536	288	238	440	**376**
629	28-Mar-02	506	351	248	219	**331**
632	06-Apr-04	100	--	91	155	**115**
635	21-May-03	182	341	--	--	**262**
636	01-Jul-02	168	--	92	154	**138**
637	19-Dec-02	245	277	1497	320	**585**
642	20-Jun-03	395	881	739	425	**610**
644	29-Jul-03	338	399	152	272	**290**
655	08-Jun-04	623	473	975	769	**710**
657	06-May-04	151	--	279	228	**219**
658	16-Aug-04	70	220	243	--	**178**
660	05-Sep-03	126	165	297	149	**184**
663	11-Mar-02	--	102	244	218	**188**
664	15-Apr-04	431	420	325	305	**370**
668	15-Aug-03	716	753	606	409	**621**
670	12-Apr-02	388	492	519	372	**443**
672	12-Dec-02	623	779	289	375	**517**
674	01-Oct-01	627	854	1413	--	**965**
676	19-Dec-02	589	277	273	771	**478**

Exhibit A-5. Post-Excavation Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b]				Property Average (mg/kg) [c]
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	
677	28-Jun-02	922	605	1253	2840	**1405**
678	28-Jun-02	1247	897	1025	--	**1056**
681	26-Apr-04	343	214	381	377	**329**
684	17-Jul-03	63	388	209	193	**213**
688	14-May-03	458	703	560	618	**585**
692	13-Oct-03	1147	930	--	--	**1039**
693	08-Oct-02	1004	802	1683	1513	**1251**
699	13-May-02	1898	2800	2055	1688	**2110**
711	02-Oct-02	566	533	427	301	**457**
714	08-Sep-03	1010	307	740	363	**605**
718	03-Aug-04	628	--	--	--	**628**
725	09-Aug-04	669	810	779	782	**760**
726	15-Oct-02	402	300	429	496	**407**
729	14-Mar-02	192	237	--	131	**187**
795	11-Jul-02	1273	626	1207	1293	**1100**
820	06-May-04	135	186	--	--	**161**
821	23-Dec-02	180	--	--	--	**180**
832	16-Jan-03	--	--	77	101	**89**
847	09-Jan-03	--	--	--	76	**76**
853	13-May-04	84	146	--	--	**115**
889	09-Jan-03	--	419	--	--	**419**
996	10-Jan-03	--	91	--	--	**91**
1074	22-Aug-03	317	307	635	650	**477**
1075	15-Aug-03	575	607	489	476	**537**
1076	15-Aug-03	433	576	723	--	**577**
1079	30-May-02	81	95	--	--	**88**
1080	26-Sep-02	--	514	--	--	**514**
1081	22-May-02	361	109	741	768	**495**
1083	11-Jul-03	102	685	309	194	**323**
1084	26-Jul-02	856	2150	462	--	**1156**
1087	05-Apr-04	1723	843	667	863	**1024**
1088	19-Apr-04	380	197	263	295	**284**
1090	03-Aug-04	--	--	--	463	**463**

[a] Data were obtained from EPA Region 7 (2006).

[b] "--" indicates that no sample was collected for that quadrant.

[c] Not provided by EPA Region 7. Averages were calculated by ICF.

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
184	16-Apr-02	62		69		58	ND	57	ND
184	21-May-02	54		67		61		49	ND
184	24-Jun-02	92		69		67		48	ND
184	23-Jul-02	48		48	ND	58		49	ND
184	23-Aug-02	86		60		47	ND	50	
579	16-Apr-02	109		125		105		79	
579	21-May-02	95		101		75		55	
579	21-Jun-02	92		92		137		109	
579	23-Jul-02	93		87		67		61	
579	22-Aug-02	80		157		83		100	
579	23-Sep-02	69		92		67		66	
151	11-Feb-02	67	ND	84		65	ND	63	ND
151	14-Mar-02	56		60	ND	75		56	ND
151	16-Apr-02	58	ND	62	ND	60	ND	64	
151	22-May-02	51	ND	50	ND	54		50	ND
151	24-Jun-02	54	ND	64		58		49	ND
151	22-Jul-02	56		54		66		57	
151	23-Aug-02	62		58		50		47	ND
151	25-Sep-02	64		52	ND	64		59	
151	07-Nov-02	60		63		41		55	
151	10-Dec-02	50		49		53		53	
151	15-Jan-03	53	ND	53	ND	61		55	
151	12-Mar-03	53		48		57		57	
151	20-Jun-03	142		59		49	ND	70	
151	22-Sep-03	74		127		70		61	
151	22-Dec-03	49.7		52.8		37.5		43.5	
151	22-Mar-04	53	ND	92		85.9		83.6	
151	21-Jun-04	67		75.2		50.8		67.6	
151	23-Sep-04	96.8		100.3		38.2		60	
151	16-Dec-04	43	ND	69.8		51.4		58.8	
151	28-Mar-05	127		146		85		86	
151	07-Jul-05	83.6		106.1		79		85	
151	03-Oct-05	81		83		67		139	
151	02-May-06	59		83		67		101	
493	17-Apr-02	47	ND	53	ND	49	ND	51	ND
493	21-May-02	48	ND	60		44	ND	45	ND
493	24-Jun-02	53	ND	63		60		51	ND
493	24-Jul-02	45	ND	46	ND	41	ND	41	ND
493	22-Aug-02	45	ND	38	ND	38		55	
493	25-Sep-02	45	ND	58		45	ND	42	ND
493	07-Nov-02	49		54	ND	57	ND	60	
493	09-Dec-02	51	ND	50	ND	53	ND	51	
493	21-Jan-03	72		46	ND	45		50	ND
493	14-Mar-03	37	ND	43		47		53	
340	06-Feb-02	59	ND	58	ND	61		55	ND
340	14-Mar-02	74		56	ND	82		69	
340	16-Apr-02	53	ND	66		59		397	
340	22-May-02	45	ND	47	ND	54	ND	48	
340	24-Jun-02	54		54	ND	55		62	ND
340	24-Jul-02	54		47	ND	68		51	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
340	26-Aug-02	49	ND	47		80		66	
340	24-Sep-02	48	ND	53		65		65	
340	07-Nov-02	44	ND	50	ND	56		99	
340	10-Dec-02	63		69		67		111	
340	17-Mar-03	74		58		80		126	
340	23-Jun-03	63		62		101		106	
340	23-Sep-03	117		96		105		91	
340	22-Dec-03	66		55		119		124	
340	22-Mar-04	67.4		91.9		199		91.7	
340	22-Jun-04	77.1		78.8		153		163	
340	23-Sep-04	134.7		116		141.6		324	
340	16-Dec-04	107.1		128.9		163.3		223	
340	29-Mar-05	97		161		107		155	
340	08-Jul-05	214		97		146		156	
340	03-Oct-05	187		172		258		302	
340	02-May-06	161		261		201		300	
197	11-Feb-02	73		62	ND	63	ND	69	ND
197	14-Mar-02	97		74		66	ND	65	
197	17-Apr-02	96		51		64	ND	48	ND
197	21-May-02	100		60		54		48	ND
197	24-Jun-02	74		95		65		172	
197	22-Jul-02	183		61		75		51	ND
197	23-Aug-02	89		62		60		55	
197	24-Sep-02	164		61		155		53	
197	07-Nov-02	130		81		208		123	
197	10-Dec-02	281		127		302		172	
197	17-Mar-03	78		103		179		82	
197	23-Jun-03	76		133		69		67	
197	23-Sep-03	104		122		130		66	
197	22-Dec-03	81		131		184		105	
197	22-Mar-04	120		188		363		108	
197	21-Jun-04	132		152.7		124		76.7	
197	23-Sep-04	145.4		261.7		332.8		124	
197	16-Dec-04	201.3		63.7		130.1		69.2	
197	30-Mar-05	283		235		145		112	
197	07-Jul-05	143		252		209		91	
197	04-Oct-05	186		182		145		130	
197	02-May-06	148		205		156		181	
531	17-Apr-02	63	ND	65	ND	67	ND	57	ND
531	22-May-02	54	ND	58		56	ND	54	ND
531	24-Jun-02	50	ND	50	ND	51		53	
531	22-Jul-02	164		80		52	ND	41	ND
531	23-Aug-02	73		53		58		49	ND
531	24-Sep-02	51		65		43		46	
531	07-Nov-02	85		50		53	ND	46	ND
531	10-Dec-02	53		44	ND	44	ND	41	ND
531	15-Jan-03	63		56	ND	59		58	ND
531	12-Mar-03	62		94		38	ND	47	
531	20-Jun-03	48		67		83		60	
531	23-Sep-03	64		60		68		77	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c] Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
531	22-Dec-03	57.6		61.5		41.9		35	
531	22-Mar-04	63.8		64.6		56		67.6	
531	21-Jun-04	56.1		92.5		55.9		50.6	
531	23-Sep-04	192.3		123.3		90.9		67.9	
531	16-Dec-04	179.7		131		92.1		72.1	
531	28-Mar-05	127		103		67		99	
531	07-Jul-05	73		130		128		75	
531	04-Oct-05	101		111		57	ND	65	
531	02-May-06	47		87		65		46	ND
626	11-Feb-02	65	ND	64	ND	56	ND	71	
626	14-Mar-02	55	ND	58	ND	98		69	
626	16-Apr-02	60		58	ND	69	ND	56	ND
626	20-May-02	52	ND	65		51		47	ND
626	24-Jun-02	74		48	ND	49	ND	51	ND
626	23-Jul-02	47		41	ND	43		40	ND
626	23-Aug-02	45	ND	45	ND	48		41	ND
626	24-Sep-02	45	ND	45	ND	59		49	
626	30-Oct-02	43	ND	50	ND	40	ND	48	ND
626	10-Dec-02	43	ND	50		50		49	ND
626	15-Jan-03	52		48	ND	50		53	
626	17-Mar-03	60		53	ND	58	ND	45	ND
212	20-May-02	61		49	ND	90		116	
212	21-Jun-02	77		323		103		66	
212	23-Jul-02	56		141		127		117	
212	22-Aug-02	54		75		116		116	
212	23-Sep-02	53		57		113		88	
212	01-Nov-02	65		63		101		88	
212	12-Dec-02	78		77		84		76	
212	14-Mar-03	66		122		88		121	
212	23-Jun-03	112		61		156		115	
212	22-Sep-03	131		95		242		145	
212	22-Dec-03	87		122		100		147	
212	22-Mar-04	56.6		69.7		187		77	ND
212	21-Jun-04	131		93.6		175		150	
212	23-Sep-04	88.5		201.7		696.3		235.7	
212	16-Dec-04	87.2		117		406.3		153	
212	29-Mar-05	99		94		210		119	
212	07-Jul-05	147		178		461		215	
212	04-Oct-05	98		157		412		214	
212	01-May-06	109		185		271		229	
454	17-Apr-02	52	ND	53	ND	51	ND	50	ND
454	20-May-02	48	ND	44	ND	50	ND	46	ND
454	24-Jun-02	95		42	ND	49	ND	49	ND
454	24-Jul-02	50	ND	40	ND	48	ND	57	
454	22-Aug-02	46		49	ND	45	ND	46	ND
454	25-Sep-02	45	ND	46	ND	46	ND	48	ND
454	07-Nov-02	56		52	ND	43	ND	52	ND
454	09-Dec-02	53	ND	42	ND	52	ND	49	ND
454	13-Jan-03	47		53		59		54	
454	14-Mar-03	43		34	ND	39		38	ND

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
239	20-May-02	89	ND	63		54	ND	71	
239	25-Jun-02	284		51		44	ND	48	
239	23-Jul-02	52		50		42	ND	43	ND
239	26-Aug-02	208		87		45	ND	89	
239	23-Sep-02	254		64		48		50	
239	07-Nov-02	159		55		56		63	ND
239	10-Dec-02	160		104		70		63	
239	17-Mar-03	104		93		59		52	
444	16-Apr-02	58	ND	65		55	ND	60	ND
444	21-May-02	44	ND	50	ND	49		50	ND
444	25-Jun-02	118		56		47	ND	45	ND
444	24-Jul-02	61		51		62		69	
444	23-Aug-02	56		49	ND	47		98	
444	25-Sep-02	133	ND	130	ND	137	ND	119	ND
444	07-Nov-02	50	ND	54	ND	52	ND	95	
444	12-Dec-02	47	ND	52		58		54	
444	20-Jan-03	57		48		79		63	
444	14-Mar-03	76		47		57		62	
444	23-Jun-03	3187		43	ND	84		131	
444	22-Sep-03	60		46		51		83	
444	22-Dec-03	513		57.2		54		107	
444	22-Mar-04	256		62		74.5		55.4	
444	21-Jun-04	128		51.4	ND	57.4		81	
444	23-Sep-04	160.3		237.7		196.7		209	
444	16-Dec-04	203.7		280.5		96		259.3	
444	28-Mar-05	123		123		109		186	
674	31-May-02	99		92		--		88	
674	25-Jun-02	109		63		83		85	
674	23-Jul-02	62		136		99		77	
674	23-Aug-02	95		98		--		90	
674	25-Sep-02	140		138		--		127	ND
674	07-Nov-02	137		191		--		178	
674	12-Dec-02	183		231		--		177	
674	15-Jan-03	201		166		--		133	
674	14-Mar-03	205		104		--		175	
674	23-Jun-03	175		118		--		134	
263	16-Sep-02	74		44	ND	50		93	
263	01-Nov-02	63		49	ND	58		79	
263	09-Dec-02	73		46		45		44	ND
263	17-Mar-03	65		50	ND	81		63	
263	23-Jun-03	58		57		68		60	
581	16-Sep-02	67		69		134		63	
581	01-Nov-02	55	ND	69		55	ND	44	ND
581	09-Dec-02	54		55		65		67	
581	25-Jul-05	78		113		134		107	
581	04-Oct-05	65		132		109		103	
581	02-May-06	80		122		171		119	
240	16-Sep-02	90		61	ND	91	ND	114	ND
240	30-Oct-02	99		78	ND	80	ND	81	ND
240	10-Dec-02	78	ND	76	ND	81	ND	84	ND

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
240	14-Mar-03	79	ND	80	ND	77		145	
240	23-Jun-03	128		100	ND	98	ND	98	ND
240	23-Sep-03	84		76	ND	122		129	
240	22-Dec-03	79.4		121.5		62.5		165.5	
240	22-Mar-04	110		139.5		85.4		117.5	
240	21-Jun-04	107.3	ND	147		91.5	ND	131.5	
240	23-Sep-04	93.7		177		91.3		196.5	
240	16-Dec-04	103.4	ND	179		97		193.5	
240	28-Mar-05	106		163		80	ND	184	
240	07-Jul-05	242		232		138		266	
240	04-Oct-05	125		224		115		275	
240	01-May-06	124		177		120		157	
257	11-Feb-02	52		54		62		87	
257	14-Mar-02	71		70		79		75	
257	15-Apr-02	63		60		71		74	
257	21-May-02	122		76		69		57	
257	21-Jun-02	79		76		73		99	
257	23-Jul-02	54		50		57		54	
257	22-Aug-02	60		54		65		46	ND
257	23-Sep-02	81		103		66		59	
257	01-Nov-02	81		77		88		64	
257	12-Dec-02	61		58		179		120	
257	14-Mar-03	61		60		63		57	
257	23-Jun-03	98		56		120		74	
257	23-Sep-03	133		151		72		85	
257	22-Dec-03	75		68		76		68	
257	22-Mar-04	89		73		92		68	ND
257	21-Jun-04	101.6		123		107.4		70.7	
257	23-Sep-04	107.5		222		126		136	
257	16-Dec-04	162.3		128.7		78.9		79.3	
257	29-Mar-05	90		143		127		97	
576	06-Feb-02	71		67		55		120	
576	14-Mar-02	68		62		74		69	ND
576	17-Apr-02	64		63		69		69	
576	21-May-02	74		77		76		68	
576	25-Jun-02	140		76		55		63	
576	23-Jul-02	69		44	ND	53		65	
576	23-Aug-02	55		63		74		65	
576	25-Sep-02	78		79		75		59	
576	07-Nov-02	104		54		75		62	
576	12-Dec-02	111		62		76		60	
576	15-Jan-03	63		71		60		79	
576	14-Mar-03	100		68		85		94	
576	23-Jun-03	68		53		81		57	
576	22-Sep-03	91		45		94		101	
576	22-Dec-03	64.8		56.6		85.7		78	
576	22-Mar-04	83.7		53	ND	71.9		78.9	
576	21-Jun-04	85.7		69.3		78.5		76.5	
576	23-Sep-04	127.8		112.4		101		91.3	
576	16-Dec-04	85.9		99.8		80.9		85.8	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
576	28-Mar-05	121		120		76.7		89	
576	07-Jul-05	192		169		145		163	
576	03-Oct-05	147		141		105		137	
576	02-May-06	97		71		92		127	
207	06-Feb-02	53	ND	58	ND	67	ND	82	
207	14-Mar-02	177	ND	160	ND	230	ND	150	ND
207	16-Apr-02	59		67		59		93	
207	22-May-02	54	ND	52	ND	53	ND	95	
207	21-Jun-02	69		54		52	ND	50	ND
207	23-Jul-02	65		52		52		45	ND
207	22-Aug-02	46	ND	75		53		68	
207	23-Sep-02	70		59		52	ND	51	
207	23-Oct-02	51		54	ND	55		56	ND
207	09-Dec-02	50		51	ND	46	ND	56	
207	14-Mar-03	65		49		48		47	
207	23-Jun-03	50		46		44		74	
207	22-Sep-03	110		106		40		107	
207	22-Dec-03	87		51.6		45.1		68	
207	22-Mar-04	63.6		69.2		63.3		157.7	
207	21-Jun-04	61.7		70.2	ND	80.9		70.2	
207	23-Sep-04	111.3		104		179		169	
207	16-Dec-04	126		83.3		75.1		100.4	
207	29-Mar-05	120		123		65	ND	133	
207	14-Jul-05	100		100		75		115	
207	04-Oct-05	69		90		84		107	
207	01-May-06	98		166		83		137	
347	15-Feb-02	61	ND	62	ND	68		59	
347	14-Mar-02	160		58	ND	59		64	ND
347	16-Apr-02	53	ND	59	ND	57	ND	56	ND
347	20-May-02	107		58		57		56	
347	25-Jun-02	98		56		63		55	
347	24-Jul-02	55		62		66		54	
347	26-Aug-02	60		57		56		121	
347	24-Sep-02	67		71		69		138	
347	07-Nov-02	86		90		126		61	
347	10-Dec-02	74		84		125		113	
347	17-Mar-03	121		164		152		140	
347	23-Jun-03	150		88		179		137	
347	23-Sep-03	245		210		212		132	
347	22-Dec-03	224		128.5		181.5		295	
347	22-Mar-04	175		100		311		216	
347	21-Jun-04	138		76.1		170.3		233	
347	23-Sep-04	268		404.3		338		423.3	
347	16-Dec-04	163		358.3		331.7		290.3	
347	30-Mar-05	239		426		207		177	
347	07-Jul-05	298		376		235		341	
347	04-Oct-05	154		271		357		447	
347	01-May-06	250		382		264		515	
176	13-Feb-02	116		72	ND	67	ND	73	ND
176	14-Mar-02	78		67		69		79	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
176	17-Apr-02	59		81		62	ND	59	ND
176	22-May-02	45	ND	57		50	ND	54	
176	25-Jun-02	53	ND	98		55		53	
176	24-Jul-02	60		140		56		54	
176	23-Aug-02	70		102		50		42	
176	25-Sep-02	73		114		75		66	
176	07-Nov-02	60	ND	50		69		54	
176	12-Dec-02	56		88		59		70	
176	15-Jan-03	50	ND	97		61		67	
176	23-Mar-04	152		244		121		134	
176	21-Jun-04	206.7		103.7		94.7		110.7	
176	23-Sep-04	674		244.7		169.7		170.7	
176	16-Dec-04	139.7		205.3		137.7		151.6	
176	28-Mar-05	241		189		136		150	
176	08-Jul-05	233		360		136		193	
176	03-Oct-05	201		306		301		231	
512	06-Feb-02	51		86		46	ND	64	ND
512	14-Mar-02	135		80		78		61	ND
512	17-Apr-02	60	ND	81		61	ND	65	
512	22-May-02	58		158		61		73	
512	25-Jun-02	60		88		52		57	
512	23-Jul-02	67		127		51		53	
512	26-Aug-02	79		154		59		61	
512	24-Sep-02	71		106		70		57	
512	07-Nov-02	99		131		59		69	
512	10-Dec-02	148		234		82		92	
512	23-Jun-03	114		260		95		85	
512	23-Sep-03	130		281		110		182	
512	22-Dec-03	128		290		150		88	
512	22-Mar-04	116		315		191		94.6	
512	22-Jun-04	112		211.7		84.8		79.4	
512	23-Sep-04	249.3		328.7		202		235	
512	16-Dec-04	102.4		284		75		202.8	
512	30-Mar-05	196		295		188		167	
512	08-Jul-05	184		247		111		180	
512	04-Oct-05	147		259		170		111	
512	02-May-06	275		351		189		187	
398	08-Oct-02	--		--		--		51	ND
398	31-Oct-02	--		--		--		38	ND
398	09-Dec-02	--		--		--		58	
398	13-Jan-03	--		--		--		58	
181	07-Nov-02	193		82		58		73	
181	10-Dec-02	117		64		53		60	
181	17-Mar-03	120		60		99		73	
181	23-Jun-03	141		78		77		57	ND
181	23-Sep-03	163		65		87		131	
181	22-Dec-03	96		72.9		74.5		76.2	
181	22-Mar-04	164		80		92		89.9	
181	22-Jun-04	237.3		112		101.5		106	
181	23-Sep-04	219		141.7		68.2		114.3	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Quadrant 1		Quadrant 2		Quadrant 3		Quadrant 4	
181	16-Dec-04	195		141		68.69		162	
181	30-Mar-05	177		89		90		136	
181	07-Jul-05	140		167		98		113	
181	04-Oct-05	196		218		127		205	
181	02-May-06	220		281		113		95	
328	30-Oct-03	51.7		68.8		--		--	
328	22-Dec-03	173		123		--		--	
328	22-Mar-04	144		169		--		--	
328	22-Jun-04	95.7		137.3		--		--	
328	23-Sep-04	212.3		131.5		--		--	
328	16-Dec-04	173.3		399		--		--	
328	29-Mar-05	196		136		--		--	
328	07-Jul-05	255		144		--		--	
328	03-Oct-05	236		181		--		--	
328	18-May-06	213		248		--		--	
684	22-Dec-03	90.3		53		41		38.8	
684	22-Mar-04	73.6		60.7		77.5		59.9	
684	22-Jun-04	126.4		59.4	ND	75.6		72.4	
684	23-Sep-04	88.9		121.3		126		104.8	
684	16-Dec-04	144.2		227		147		171.3	
684	28-Mar-05	182		171		151		142	
684	08-Jul-05	101		118		116		132	
684	04-Oct-05	91		126		107		109	
684	02-May-06	129		140		169		168	
575	22-Dec-03	257		285		181		250	
575	22-Mar-04	451		530		280		217	
575	21-Jun-04	462		518		208		264	
575	23-Sep-04	495		458.7		325		485	
575	16-Dec-04	837.8		854.5		367.7		299.3	
575	30-Mar-05	551		638		395		296	
575	07-Jul-05	1507		528		557		437	
575	04-Oct-05	390		266		304		512	
575	02-May-06	488		258		258		240	
224	28-Mar-05	44	ND	43	ND	49	ND	55	ND
224	07-Jul-05	52	ND	68		54	ND	54	ND
224	03-Oct-05	42	ND	48	ND	50		422	
224	02-May-06	39		37	ND	44	ND	94	
402	28-Mar-05	76.5		48		--		50	
402	07-Jul-05	57	ND	61	ND	--		60	ND
402	03-Oct-05	62		52	ND	--		47	ND
402	01-May-06	50	ND	48		--		41	ND
1078	31-Jan-02	405		--		--		--	
1078	14-Mar-02	173	ND	--		--		--	
1078	17-Apr-02	138		--		--		--	
1078	21-May-02	107		--		--		--	
1078	25-Jun-02	106		--		--		--	
1078	24-Jul-02	250		--		--		--	
1078	26-Aug-02	102		--		--		--	
1078	24-Sep-02	94		--		--		--	
1078	07-Nov-02	80		--		--		--	

Exhibit A-6. Recontamination Soil Sampling Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]			
		Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
1078	10-Dec-02	100	--	--	--
1078	14-Mar-03	154	--	--	--
1078	23-Jun-03	206	--	--	--
1078	23-Sep-03	164	--	--	--
1078	22-Dec-03	106	--	--	--
1078	22-Mar-04	184	--	--	--
1078	21-Jun-04	263.8	--	--	--
1078	23-Sep-04	845.6	--	--	--
1078	16-Dec-04	130.5	--	--	--
1078	28-Mar-05	151	--	--	--
1078	07-Jul-05	209	--	--	--
1078	03-Oct-05	287	--	--	--
1078	01-May-06	277	--	--	--
1079	22-Dec-03	67	121	--	--
1079	22-Mar-04	111.7	105.6	--	--
1079	22-Jun-04	231.3	227.7	--	--
1079	23-Sep-04	362	329.7	--	--
1079	16-Dec-04	275	338.3	--	--
1079	28-Mar-05	338	230	--	--
1079	07-Jul-05	345	164	--	--
1079	03-Oct-05	622	590	--	--
1079	02-May-06	370	1276	--	--

[a] Data were obtained from EPA Region 7 (2006).

[b] A value qualified with a "ND" represents a non-detect. The value presented is the detection limit. For the purpose of calculating the property average by year, one-half the detection limit was used as the value for non-detects.

[c] "--" indicates that no sample was collected for that quadrant.

Exhibit A-7. Average Soil Pre-Excavation, Post-Excavation, and Recontamination Pb Results for 31 Residential Locations within One Mile of the Primary Pb Smelter

Pilot Analysis ID	Pre-Excavation (mg/kg) [a]	Post-Excavation (mg/kg) [a]	Averages (mg/kg) [b,c]				
			2002	2003	2004	2005	2006
151	918	377	47.3	59.8	65.3	97.3	77.5
176	1471	889	62.1	62.5	191.3	223.1	
181	1367	671	87.5	90.1	130.8	146.3	177.3
184	3308	420	51.1	--	--	--	--
197	3035	806	93.8	106.9	162	176.1	172.5
207	1039	750	52.2	64.9	96.9	95.7	121
212	355	568	93.1	119.4	180.4	200.3	198.5
224	579	--	--	--	--	63.4	43.4
239	4155	1138	81.3	77	--	--	--
240	2770	489	50.1	86.2	119.4	175.8	144.5
257	1073	453	73.1	82.3	108.2	114.3	--
263	1425	885	54.1	59.6	--	--	--
328	5138	1279	--	104.1	182.8	191.3	230.5
340	917	1015	59.2	90.2	141.3	171	230.8
347	614	101	69.2	172.4	249.8	294	352.8
398	394	160	34.2	58	--	--	--
402	1740	--	--	--	--	41.7	31.2
444	1795	332	49.4	244.2	149	135.3	--
454	667	184	28.9	41.4	--	--	--
493	466	126	32.5	40.8	--	--	--
512	2013	696	80	159.4	180.2	187.9	250.5
531	618	567	44.6	56.2	91	92.3	55.5
575	--	1177	--	243.3	440.8	531.8	311
576	1500	736	70.2	74.8	84.7	133.8	96.8
579	1528	711	91.5	--	--	--	--
581	837	354	60	--	--	105.1	123
626	604	208	37.1	39.6	--	--	--
674	1850	965	120.8	156.8	--	--	--
684	6857	213	--	55.8	106.6	128.8	151.5
1078	--	--	146.9	157.5	356	215.7	277
1079	9173	88	--	94	247.7	381.5	823

[a] All available pre-excavation and post-excavation results by quadrant are provided in Exhibits A-4 and A-5, respectively.

[b] Soil samples from up to four quadrants were collected each date. The results for the quadrants were first averaged (using one-half the detection limit as the value for non-detects) before determining the final overall average by year for each location.

[c] During the process of summarizing post-excavation and recontamination Pb results for the 31 locations, it was noted that, in general, post-excavation sampling results (collected during 2001/2002) were higher than the Pb results for recontamination samples collected subsequently in 2002 or 2003. This may be due to the fact that post-excavation samples were collected prior to backfilling the excavated areas with clean soil, but this has yet to be determined.

Exhibit A-8. Indoor Dust/Wipe Sample Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Round No.	Date	Carpet Dust [b]		Wipe	
			Pb Loading (mg/ft^2)	Pb Concentration (mg/kg)	Window Sill Pb Loading (µg/ft^2)	Other Wipe Pb Loading (µg/ft^2)
184	Recon #01	16-Apr-02	43	3300	1385	120
184	Recon #02	29-May-02	28.4	4350	881	47
184	Recon #03	26-Jun-02	25.7	3364	630	54
184	Recon #04	24-Jul-02	46.6	3874	1257	69
579	Recon #01	16-Apr-02	0.54	370	413	17
579	Recon #02	31-May-02	0.402	383	293	12
579	Recon #03	28-Jun-02	0.986	539	173	16
579	Recon #04	2-Aug-02	0.548	728	201	9
579	Recon #05	26-Aug-02	0.216	826	225	6.2
151	Recon #01	16-Apr-02	2.1	1000	165	66
151	Recon #02	28-May-02	2.09	918	75	22
151	Recon #03	28-Jun-02	0.448	786	38	14
151	Recon #04	22-Jul-02	0.468	895	27	12
151	Recon #05	28-Aug-02	0.322	559	49	13
151	Recon #06	30-Sep-02	0.696	655	36	11
151	Recon #07	23-Oct-02	2.17	710	36	4.4
151	Recon #08	4-Dec-02	0.619	642	14	7.7
151	Recon #09	10-Jan-03	0.471	675	13	6.9
151	Recon #10	26-Feb-03	0.437	612	23	5.3
151	Recon #11	1-Apr-03	0.623	644	26	8.5
151	Recon #12	16-Jul-03	0.487	435	40	4.6
151	Recon #13	15-Oct-03	0.567	394	17	3.3
151	Recon #14	7-Jan-04	0.605	477	6.7	3.8
151	Recon #15	14-Apr-04	--	--	60	5.1
151	Recon #16	8-Jul-04	--	--	9.4	3.4
151	Recon #17	8-Oct-04	--	--	55	3.1
151	Recon #18	10-Jan-05	--	--	7.5	2.9
151	Recon #19	19-Apr-05	--	--	28	11
151	Recon #20	5-Jul-05	--	--	17	5.2
151	Recon #21	7-Oct-05	--	--	23	6.6
151	Recon #22	24-Apr-06	--	--	21	7.6
493	Recon #01	17-Apr-02	1.4	600	353	19
493	Recon #02	24-May-02	0.258	695	75	15
493	Recon #03	16-Jul-02	2.38	664	67	18
493	Recon #06	20-Sep-02	0.616	426	32	12
493	Recon #07	24-Oct-02	1.01	629	45	12
493	Recon #08	3-Dec-02	0.523	681	17	11
493	Recon #09	27-Jan-03	2.25	845	31	10
493	Recon #10	25-Feb-03	0.631	313	16	6.1
493	Recon #11	24-Mar-03	1.07	613	28	11
340	Recon #01	17-Apr-02	0.66	2200	352	14
340	Recon #02	30-May-02	2.15	3711	508	24
340	Recon #03	26-Jun-02	0.826	2191	638	19
340	Recon #04	30-Jul-02	0.497	2551	185	22
340	Recon #05	6-Sep-02	0.512	1510	60	6.8
340	Recon #07	14-Nov-02	0.334	900	141	7.3
340	Recon #11	3-Apr-03	0.806	1032	576	16
340	Recon #12	30-Jun-03	0.998	1665	912	8.5
340	Recon #13	17-Oct-03	0.824	1377	156	10
197	Recon #01	22-Apr-02	4.7	1900	264	35
197	Recon #02	4-Jun-02	11.3	2603	109	48
197	Recon #03	18-Jul-02	6.26	1783	105	25
531	Recon #01	22-Apr-02	1.6	950	101	18

Exhibit A-8. Indoor Dust/Wipe Sample Results for Pb - Primary Pb Smelter [a]

			Carpet Dust [b]		Wipe	
Pilot Analysis ID	Round No.	Date	Pb Loading (mg/ft^2)	Pb Concentration (mg/kg)	Window Sill Pb Loading (µg/ft^2)	Other Wipe Pb Loading (µg/ft^2)
531	Recon #02	30-May-02	1.6	1778	35	15
531	Recon #03	27-Jun-02	1.3	1461	10	7.6
531	Recon #04	25-Jul-02	3.19	2477	10	6.1
531	Recon #05	28-Aug-02	1.67	2409	11	7.8
531	Recon #07	24-Oct-02	1.44	860	16	7.2
531	Recon #10	26-Feb-03	1.46	336	23	21
531	Recon #11	9-Apr-03	1.7	579	52	14
531	Recon #12	23-Jul-03	2	428	15	11
531	Recon #14	7-Jan-04	1.85	639	46	11
531	Recon #15	9-Apr-04	2.24	1208	35	14
531	Recon #16	3-Aug-04	0.811	761	21	8.2
531	Recon #17	8-Nov-04	1.02	400	51	9.2
531	Recon #19	22-Mar-05	2.25	647	15	10
531	Recon #20	5-Jul-05	0.56	137	6.9	8.4
531	Recon #21	5-Oct-05	0.106	122	53	11
531	Recon #22	25-Apr-06	0.168	233	41	6.7
626	Recon #01	23-Apr-02	0.53	290	110	44
626	Recon #02	30-May-02	0.393	457	82	6.1
626	Recon #04	26-Jul-02	0.616	410	129	5.5
626	Recon #07	25-Oct-03	0.349	317	71	4.4
212	Recon #01	30-Apr-02	0.46	610	62	10
212	Recon #02	28-May-02	0.327	557	22	14
212	Recon #04	26-Jul-02	0.332	659	62	3.3
212	Recon #05	4-Sep-02	0.578	734	21	3.2
212	Recon #06	2-Oct-02	0.324	531	9	2.6
212	Recon #07	8-Nov-02	0.316	650	6.3	2.2
212	Recon #08	18-Dec-02	0.332	490	6.2	3.2
212	Recon #09	31-Jan-03	0.451	586	12	3.6
212	Recon #10	25-Feb-03	0.524	671	10	4.4
212	Recon #11	8-Apr-03	0.439	512	24	4.4
212	Recon #12	9-Jul-03	0.395	477	6.9	4
212	Recon #14	7-Jan-04	0.283	455	14	2.3
212	Recon #15	15-Apr-04	0.334	457	16	4.6
212	Recon #17	10-Nov-04	0.229	589	11	6
212	Recon #19	29-Mar-05	0.137	321	9	
212	Recon #20	6-Jul-05	0.338	422	6	11
212	Recon #22	25-Apr-06	0.0305	660	22	9.1
454	Recon #01	30-Apr-02	0.22	450	35	8.5
454	Recon #02	3-Jun-02	1.75	1502	33	9.3
454	Recon #03	18-Jul-02	0.22	517	17	8.5
454	Recon #07	28-Oct-02	0.235	526	31	9.2
454	Recon #08	4-Dec-02	0.299	550	28	6.8
454	Recon #09	3-Feb-03	0.0142	247	9	5.9
454	Recon #10	26-Feb-03	0.319	224	16	5.7
239	Recon #01	30-Apr-02	26	3000	405	12
239	Recon #02	28-May-02	22.6	2124	251	18
239	Recon #03	1-Jul-02	25	1944	292	10
239	Recon #04	2-Aug-02	31	2862	85	11
239	Recon #05	27-Aug-02	11.8	1682	56	8.2
444	Recon #01	6-May-02	9.3	2300	905	72
444	Recon #02	7-Jun-02	6.6	2588	1134	41
674	Recon #02	31-May-02	4.62	1669	40	102
674	Recon #03	25-Jun-02	2.15	1394	33	29

Exhibit A-8. Indoor Dust/Wipe Sample Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Round No.	Date	Carpet Dust [b]		Wipe	
			Pb Loading (mg/ft^2)	Pb Concentration (mg/kg)	Window Sill Pb Loading ($\mu g/ft^2$)	Other Wipe Pb Loading ($\mu g/ft^2$)
674	Recon #04	25-Jul-02	3	1482	25	24
674	Recon #05	27-Aug-02	2.06	1459	15	12
674	Recon #07	22-Oct-02	2.88	1273	11	31
674	Recon #08	3-Dec-02	1.54	1056	20	31
674	Recon #09	3-Jan-03	2.28	1088	16	10
674	Recon #10	21-Feb-03	2.28	742	11	5.4
674	Recon #11	15-Apr-03	2.09	927	18	11
263	Recon #06	17-Sep-02	0.378	1336	176	4
263	Recon #07	24-Oct-02	0.673	1786	31	6.4
263	Recon #08	2-Dec-02	0.649	1619	34	5.1
263	Recon #09	7-Jan-03	0.514	1196	104	4.4
263	Recon #10	24-Feb-03	0.182	745	23	4
263	Recon #11	24-Mar-03	0.635	1119	57	9.5
263	Recon #12	30-Jun-03	1.39	980	95	6.9
581	Recon #06	27-Sep-02	0.489	369	124	43
581	Recon #07	31-Oct-02	1.19	566	99	6.3
581	Recon #08	11-Dec-02	1.05	426	34	6.5
581	Recon #09	8-Jan-03	1.51	376	24	7.5
581	Recon #20	25-Jul-05	0.0201	131	32	5.3
581	Recon #21	3-Oct-05	0.0483	143	41	8.4
581	Recon #22	25-Apr-06	0.108	271	155	7
240	Recon #06	26-Sep-02	4.48	1795	505	26
240	Recon #07	23-Oct-02	5.04	1633	199	19
240	Recon #08	4-Dec-02	3.99	1700	159	21
240	Recon #09	3-Jan-03	3.58	1591	96	18
240	Recon #10	20-Feb-03	13.8	2877	68	15
240	Recon #11	20-Mar-03	8.22	1813	62	20
240	Recon #12	3-Jul-03	2.93	1075	409	15
240	Recon #13	1-Oct-03	1.7	873	188	19
240	Recon #14	7-Jan-04	1.12	929	133	11
240	Recon #15	7-Apr-04	1.45	1064	108	14
240	Recon #16	16-Jul-04	0.95	805	171	13
240	Recon #17	18-Oct-04	3.03	1170	455	8.3
240	Recon #18	10-Jan-05	1.06	735	72	11
240	Recon #19	19-Apr-05	1.08	834	84	20
240	Recon #20	7-Jul-05	0.68	816	599	28
240	Recon #21	5-Oct-05	0.585	766	89	18
240	Recon #22	5-May-06	0.843	1040	502	24
398	Recon #06	7-Oct-02	0.49	354	19	5.2
398	Recon #07	28-Oct-02	0.342	244	17	5.5
398	Recon #08	3-Dec-02	0.95	322	10	3.7
398	Recon #09	7-Jan-03	0.499	470	5.6	2.8

[a] Data were obtained from EPA Region 7 (2006).

[b] "--" indicates that no measurement was taken on that date.

Exhibit A-9. Soil and Air Deposition Monitoring Locations Around the Primary Pb Smelter

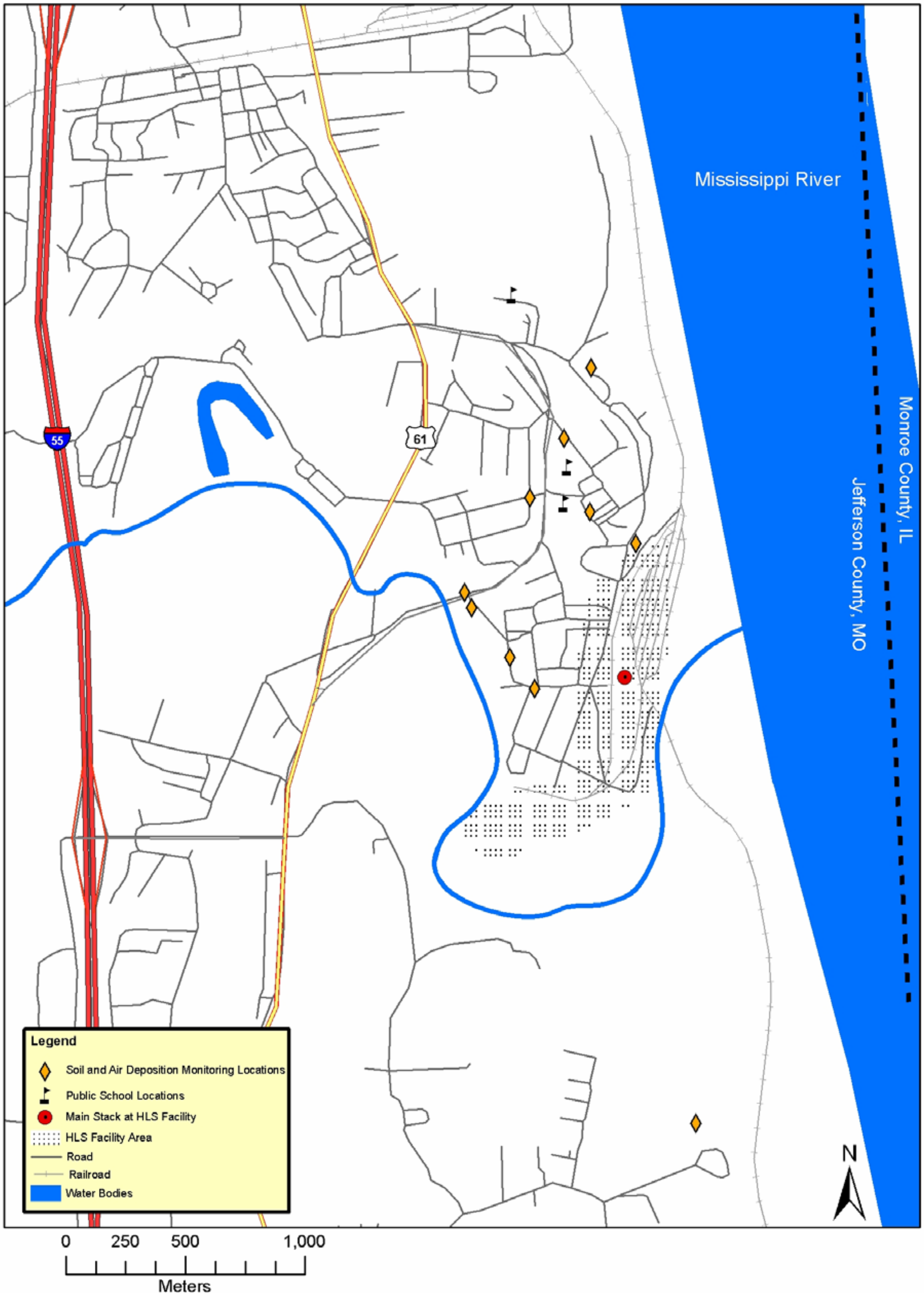


Exhibit A-10. Soil Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Round 1		Round 2		Round 3		Round 4	
181	6-Mar-03	40	ND	39	ND	38	ND	--	
	11-Apr-03	58	ND	119		54	ND	63	ND
	7-May-03	36	ND	42	ND	47	ND	--	
	6-Jun-03	116		58	ND	52	ND	51	ND
	11-Jul-03	79.1		55	ND	67.1		--	
	11-Aug-03	80.3		82.3		54	ND	97.8	
	15-Sep-03	57	ND	89.1		78.1		--	
	15-Oct-03	70.3		51.3		98.9		--	
	18-Nov-03	90.5		90.2		140		111	
	17-Dec-03	165		81.4		107		132	
	19-Jan-04	34.9		80.9		105		52.9	
	19-Feb-04	186		159		87.8		--	
	19-Mar-04	81.9		115		136		--	
	21-Apr-04	95.8		213		177		--	
	24-May-04	142		37	ND	36	ND	--	
	24-Jun-04	130		51	ND	139		105	
	27-Aug-04	50.8		70.4		119		--	
207	6-Mar-03	48	ND	31	ND	44	ND	36	ND
	11-Apr-03	50	ND	50	ND	51	ND	--	
	7-May-03	35	ND	48	ND	35	ND	--	
	6-Jun-03	56	ND	35	ND	31	ND	--	
	11-Jul-03	53	ND	39	ND	46	ND	--	
	11-Aug-03	59	ND	48	ND	56	ND	--	
	15-Sep-03	35	ND	51	ND	39	ND	--	
	15-Oct-03	33.4		39.9		30		--	
	17-Nov-03	34	ND	59.4		46.2		--	
	17-Dec-03	54.4		26	ND	37.3		--	
	19-Jan-04	38	ND	31	ND	32	ND	--	
	19-Feb-04	64.3		30		35		--	
	19-Mar-04	43.4		55		42.1		--	
	21-Apr-04	43.8		48.6		46.1		--	
	24-May-04	59.3		135		27	ND	--	
	24-Jun-04	52	ND	64.5		37	ND	--	
	27-Aug-04	36.2		137		34.1		--	
240	6-Mar-03	30	ND	38	ND	37	ND	--	
	16-Apr-03	49	ND	46	ND	43	ND	--	
	7-May-03	42	ND	48	ND	53	ND	--	
	6-Jun-03	35	ND	65	ND	56	ND	--	
	11-Jul-03	62	ND	74	ND	59	ND	--	
	11-Aug-03	54	ND	64	ND	63	ND	--	
	15-Sep-03	50	ND	45	ND	47	ND	--	
	15-Oct-03	33	ND	44.3		47.4		--	
	18-Nov-03	46.5		45.8		37.9		--	
	17-Dec-03	48.7		58.9		30	ND	--	
	19-Jan-04	63.2		57.7		45	ND	--	
	19-Feb-04	51.1		91		69.9		--	
	19-Mar-04	47	ND	75.5		53.2		--	
	21-Apr-04	52.7		49	ND	64.4		--	
	24-May-04	43	ND	62		94.9		--	
	24-Jun-04	67	ND	46	ND	84.1		--	
	27-Aug-04	46.7		36	ND	37.4		--	

Exhibit A-10. Soil Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]							
		Round 1		Round 2		Round 3		Round 4	
286	14-Feb-03	25	ND	26	ND	21	ND	--	
	11-Apr-03	60.2		65.5		39	ND	--	
	7-May-03	32	ND	27	ND	29	ND	--	
	6-Jun-03	51	ND	27	ND	48	ND	--	
	11-Jul-03	32	ND	40	ND	30	ND	--	
	11-Aug-03	80.4		47	ND	65.7		43	ND
	15-Sep-03	28	ND	30	ND	36	ND	--	
	15-Oct-03	38.4		28.4		92.4		--	
	17-Nov-03	64.8		105		52.9		--	
	17-Dec-03	198		119		129		--	
	19-Jan-04	83.9		90.1		103		--	
	19-Feb-04	161		106		117		--	
	19-Mar-04	58.9		30	ND	39.1		--	
	21-Apr-04	275		190		216		--	
	24-May-04	155		152		217		--	
	24-Jun-04	330		402		302		--	
	27-Aug-04	66.5		278		59.3		289	
444	6-Mar-03	31	ND	32	ND	34	ND	--	
	11-Apr-03	90	ND	47	ND	56	ND	--	
	7-May-03	32	ND	24	ND	53.5		--	
	6-Jun-03	69	ND	50	ND	48	ND	--	
	11-Jul-03	81	ND	71	ND	39	ND	--	
	11-Aug-03	70		65	ND	49	ND	--	
	15-Sep-03	53		50	ND	56.1		--	
	15-Oct-03	47.4		29	ND	29	ND	--	
	17-Nov-03	73.6		65.2		59.2		--	
	17-Dec-03	79.4		62.4		41.9		--	
	19-Jan-04	58.8		38	ND	36	ND	--	
	19-Feb-04	69.3		83.8		63.9		--	
	19-Mar-04	84.3		46.1		96.2		--	
	21-Apr-04	68.4		131		147		--	
	24-May-04	107		89.4		60.4		--	
	24-Jun-04	160		71.5		55	ND	--	
	27-Aug-04	119		50	ND	102		--	
531	6-Mar-03	22	ND	23	ND	22	ND	--	
	11-Apr-03	34	ND	46	ND	35	ND	--	
	7-May-03	20	ND	22	ND	28	ND	--	
	6-Jun-03	33	ND	34	ND	29	ND	--	
	11-Jul-03	28	ND	31	ND	26	ND	--	
	11-Aug-03	49	ND	57	ND	44	ND	--	
	15-Sep-03	22	ND	22	ND	34	ND	--	
	15-Oct-03	19	ND	19	ND	21	ND	--	
	17-Nov-03	19	ND	19	ND	20	ND	--	
	17-Dec-03	24	ND	27	ND	26	ND	--	
	19-Jan-04	28	ND	28	ND	31	ND	--	
	19-Feb-04	19	ND	20	ND	20	ND	--	
	19-Mar-04	23	ND	23	ND	52.2		--	
	21-Apr-04	28	ND	31.8		29.7		--	
	24-May-04	41.4		24	ND	24	ND	--	
	24-Jun-04	24	ND	29	ND	23	ND	--	
	27-Aug-04	25	ND	26	ND	23	ND	--	

Exhibit A-10. Soil Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]						
		Round 1		Round 2		Round 3		Round 4
576	6-Mar-03	36	ND	40	ND	42	ND	--
	11-Apr-03	71	ND	42	ND	46	ND	--
	7-May-03	43	ND	35	ND	40	ND	--
	6-Jun-03	43	ND	55	ND	47	ND	--
	11-Jul-03	38	ND	46	ND	50	ND	--
	11-Aug-03	53	ND	51	ND	44	ND	--
	15-Sep-03	38	ND	50	ND	40	ND	--
	15-Oct-03	24	ND	41	ND	35	ND	--
	17-Nov-03	38.8		32.9		29	ND	--
	17-Dec-03	60.4		34	ND	35.1		--
	19-Jan-04	42	ND	50	ND	45	ND	--
	19-Feb-04	41		30	ND	49.5		--
	19-Mar-04	36	ND	74.6		42	ND	--
	21-Apr-04	68.4		63.3		36	ND	--
	24-May-04	62.6		53.6		35.7		--
	24-Jun-04	49	ND	42	ND	64.9		--
	27-Aug-04	54.4		35.9		28	ND	--
1071	7-Jan-03	23	ND	22	ND	26	ND	--
	14-Feb-03	32	ND	35	ND	28	ND	--
	11-Apr-03	135		119		102		--
	7-May-03	47		37.4		37.8		--
	6-Jun-03	115		73.9		133		--
	11-Jul-03	205		153		144		--
	11-Aug-03	336		622		259		--
	15-Sep-03	288		301		294		--
	15-Oct-03	330		143		219		228
	17-Nov-03	309		218		281		--
	17-Dec-03	265		206		176		189
	19-Jan-04	188		317		188		--
	19-Feb-04	404		271		311		291
	19-Mar-04	278		306		434		--
	21-Apr-04	602		515		464		--
	24-May-04	210		229		360		--
	24-Jun-04	279		285		499		279
	27-Aug-04	166		143		143		--
1072 (Control)	7-Mar-03	24	ND	21	ND	21	ND	--
	11-Apr-03	30	ND	36	ND	39	ND	--
	7-May-03	22	ND	22	ND	20	ND	--
	6-Jun-03	22	ND	26	ND	30	ND	--
	11-Jul-03	33	ND	33	ND	33	ND	--
	11-Aug-03	32	ND	25	ND	26	ND	--
	15-Sep-03	26	ND	28	ND	28	ND	--
	15-Oct-03	17	ND	16	ND	17	ND	--
	18-Nov-03	17	ND	15	ND	19	ND	--
	17-Dec-03	20	ND	13	ND	18	ND	--
	19-Jan-04	24	ND	17	ND	24	ND	--
	19-Feb-04	20		17		20		--
	19-Mar-04	13	ND	19	ND	22	ND	--
	21-Apr-04	28	ND	36	ND	23	ND	--
	24-May-04	21	ND	20	ND	19	ND	--
	24-Jun-04	30	ND	30	ND	31	ND	--
	27-Aug-04	20	ND	21	ND	21	ND	--

Exhibit A-10. Soil Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/kg) [b, c]						
		Round 1		Round 2		Round 3		Round 4
1073	7-Jan-03	25	ND	20	ND	28	ND	--
	14-Feb-03	30	ND	24	ND	25	ND	--
	11-Apr-03	64.1		63	ND	103		77.2
	7-May-03	29	ND	26	ND	28	ND	--
	6-Jun-03	46.1		41.1		57.8		--
	11-Jul-03	93.9		46.4		95.2		--
	11-Aug-03	165		108		190		--
	15-Sep-03	97.6		85.7		125		--
	15-Oct-03	54.5		68.1		75.8		--
	18-Nov-03	74.8		82.3		109		50.8
	17-Dec-03	87		55.2		146		80.3
	19-Jan-04	131		144		107		--
	19-Feb-04	172		125		104		--
	19-Mar-04	36.9		30	ND	187.7		--
	21-Apr-04	207		103		301		--
	24-May-04	95.8		93		189		--
	24-Jun-04	162		114		257		--
	27-Aug-04	205		34.5		136		--

[a] Data were obtained from EPA Region 7 (2006).
[b] "--" indicates that no sample was during that time.
[c] A value qualified with an "ND" represents a non-detect. The value presented is the detection limit.
For the purpose of calculating averages, one-half the detection limit was used as the value for non-detects.

Exhibit A-11. Air Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/ft^2) [b]	
		Height = 1 foot	Height = 10 feet
181	7-Apr-03	0.774	10.318
	7-May-03	10.928	6.041
	6-Jun-03	3.657	5.266
	11-Jul-03	3.826	3.861
	12-Aug-03	2.669	3.543
	15-Sep-03	13.584	15.058
	15-Oct-03	7.877	6.202
	17-Nov-03	5.903	5.32
	17-Dec-03	15.137	11.899
	19-Jan-04	7.203	5.162
	19-Feb-04	8.152	4.927
	19-Mar-04	6.943	10.346
	21-Apr-04	7.852	6.829
	Annual Averages:	*7.3*	*7.3*
207	7-Apr-03	3.343	4.432
	7-May-03	3.684	2.699
	6-Jun-03	0.516	0.459
	11-Jul-03	2.118	1.986
	12-Aug-03	1.006	1.054
	15-Sep-03	2.306	2.591
	15-Oct-03	1.203	1.494
	17-Nov-03	1.497	2.698
	17-Dec-03	2.552	3.163
	19-Jan-04	2.739	3.025
	19-Feb-04	1.093	2.699
	19-Mar-04	5.124	6.831
	21-Apr-04	4.194	4.202
	Annual Averages:	*2.4*	*2.9*
240	7-Apr-03	3.924	4.128
	7-May-03	3.727	4.01
	6-Jun-03	1.131	1.068
	11-Jul-03	1.666	2.045
	12-Aug-03	1.333	1.337
	15-Sep-03	2.418	2.164
	15-Oct-03	1.62	1.676
	17-Nov-03	1.64	2.322
	17-Dec-03	3.769	4.657
	19-Jan-04	3.627	3.698
	19-Feb-04	1.975	1.603
	19-Mar-04	4.521	5.57
	21-Apr-04	3.363	4.105
	Annual Averages:	*2.7*	*3.0*
286	7-Apr-03	11.904	12.295
	7-May-03	10.046	11.758
	6-Jun-03	2.579	2.57
	11-Jul-03	4.09	4.249
	12-Aug-03	1.047	2.624
	15-Sep-03	3.86	2.916
	15-Oct-03	2.488	2.808
	17-Nov-03	5.848	5.581
	17-Dec-03	11.737	14.01
	19-Jan-04	8.328	3.179
	19-Feb-04	4.011	5.487
	19-Mar-04	9.145	20.996
	21-Apr-04	20.312	33.171
	Annual Averages:	*7.3*	*9.4*

Exhibit A-11. Air Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/ft^2) [b]	
		Height = 1 foot	Height = 10 feet
444	7-Apr-03	3.937	4.234
	7-May-03	5.204	3.422
	6-Jun-03	1.122	0.798
	11-Jul-03	2.712	2.333
	12-Aug-03	0.803	0.887
	15-Sep-03	1.765	3.073
	15-Oct-03	2.547	1.371
	17-Nov-03	2.376	3.008
	17-Dec-03	3.757	4.646
	19-Jan-04	2.878	5.938
	19-Feb-04	0.452	1.842
	19-Mar-04	4.835	7.211
	21-Apr-04	7	8.862
	Annual Averages:	*3.0*	*3.7*
531	7-Apr-03	2.645	1.523
	7-May-03	1.035	1.193
	6-Jun-03	0.452	0.263
	11-Jul-03	0.917	0.835
	12-Aug-03	0.341	0.484
	15-Sep-03	0.887	0.606
	15-Oct-03	0.514	0.527
	17-Nov-03	0.877	0.542
	17-Dec-03	1.713	1.644
	19-Jan-04	1.735	2.191
	19-Feb-04	0.822	1.073
	19-Mar-04	3.525	1.922
	21-Apr-04	3.323	2.063
	Annual Averages:	*1.4*	*1.1*
576	7-Apr-03	1.991	1.994
	7-May-03	1.827	1.519
	6-Jun-03	0.716	0.514
	11-Jul-03	1.396	1.417
	12-Aug-03	0.596	0.742
	15-Sep-03	0.972	1.406
	15-Oct-03	0.671	0.966
	17-Nov-03	1.183	1.275
	17-Dec-03	2.02	1.99
	19-Jan-04	2.209	1.786
	19-Feb-04	0.596	1.556
	19-Mar-04	3.777	3.707
	21-Apr-04	3.923	4.399
	Annual Averages:	*1.7*	*1.8*
1071	7-Apr-03	14.764	17.635
	7-May-03	19.453	7.265
	6-Jun-03	4.673	4.611
	11-Jul-03	5.802	4.397
	12-Aug-03	6.804	6.784
	15-Sep-03	16.903	31.997
	15-Oct-03	5.247	8.909
	17-Nov-03	5.925	4.734
	17-Dec-03	16.435	13.384
	19-Jan-04	12.265	10.1
	19-Jan-04	7.927	8.057
	19-Mar-04	22.039	13.635
	21-Apr-04	10.718	12.532
	Annual Averages:	*11*	*11*

Exhibit A-11. Air Deposition Monitoring Results for Pb - Primary Pb Smelter [a]

Pilot Analysis ID	Sampling Date	RESULTS (mg/ft^2) [b]	
		Height = 1 foot	Height = 10 feet
1072 (Control)	7-Apr-03	0.588	12.125
	7-May-03	0.774	0.601
	6-Jun-03	0.268	0.292
	11-Jul-03	0.363	0.317
	12-Aug-03	0.3	0.456
	15-Sep-03	0.236	0.241
	15-Oct-03	0.203	0.238
	17-Nov-03	0.28	0.426
	17-Dec-03	0.805	0.7
	19-Jan-04	0.676	0.313
	19-Feb-04	0.33	0.282
	19-Mar-04	0.718	0.642
	21-Apr-04	2.382	1.771
	Annual Averages:	*0.61*	*1.4*
1073	7-Apr-03	7.798	8.346
	7-May-03	6.195	6.507
	6-Jun-03	2.296	1.677
	11-Jul-03	3.844	6.033
	12-Aug-03	1.722	1.983
	15-Sep-03	7.751	4.782
	15-Oct-03	4.969	4.071
	17-Nov-03	5.051	3.52
	17-Dec-03	7.816	8.113
	19-Jan-04	4.733	5.148
	19-Feb-04	3.601	4.754
	19-Mar-04	6.899	7.082
	21-Apr-04	8.554	5.393
	Annual Averages:	*5.5*	*5.2*

[a] Data were obtained EPA Region 7 (2006).

[b] "--" indicates that no sample was taken during that time.

Exhibit A-12. Air Monitoring Locations Around the Secondary Pb Smelter

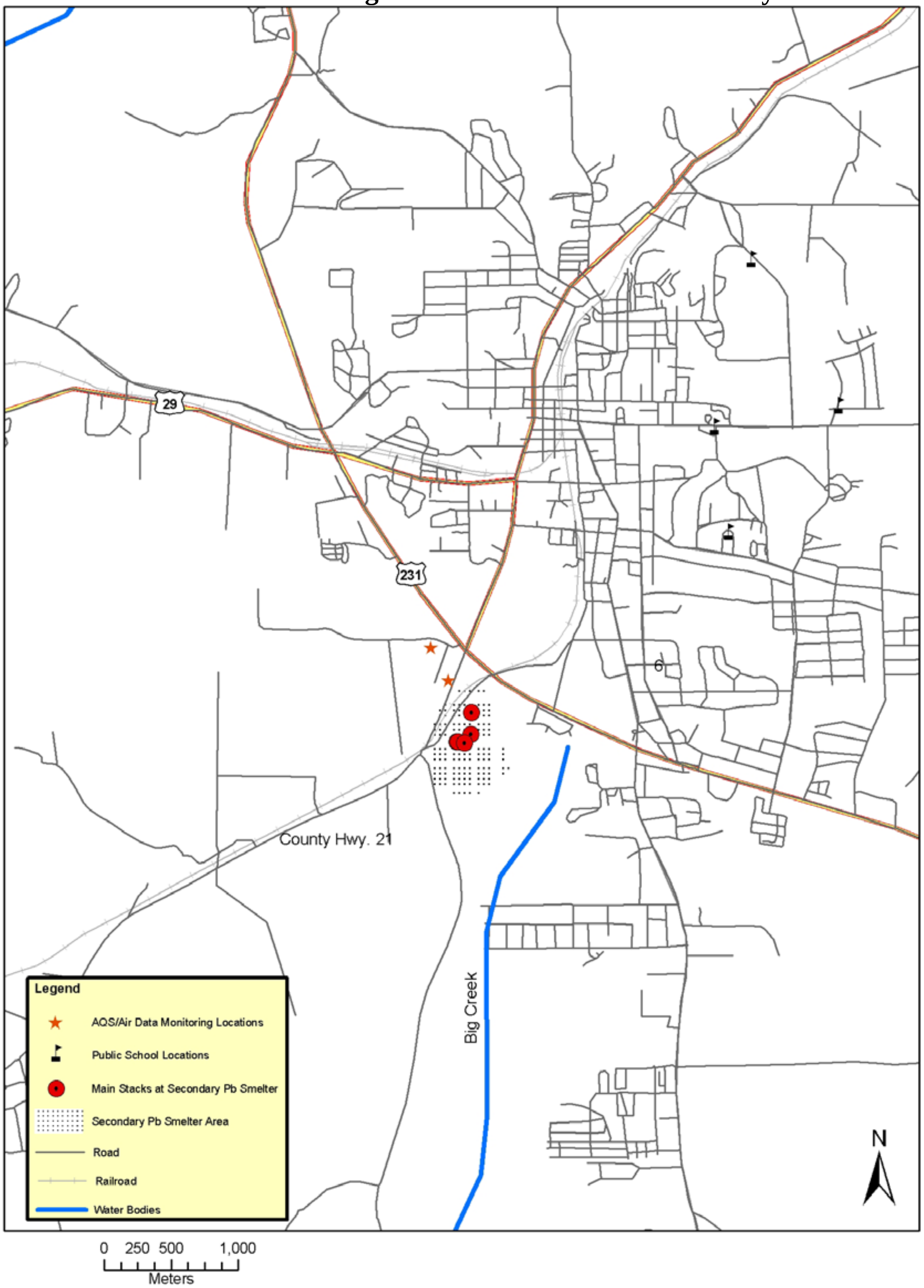


Exhibit A-13. Average Annual Pb Concentrations from AirData Monitors Located Around the Secondary Pb Smelter

Monitor ID	Facility (meters)	Average Annual Pb Concentrations from AirData ($\mu g/m^3$) [a]			
		1997	1998	1999	2000
11090003	290 – 480	0.403	0.468	0.474	0.383
11090006	570 – 750	0.132	0.158	0.178	0.198

[a] AirData values are for average annual Pb concentrations in total suspended particulate matter (TSP) and were obtained from the AirData website monitor reports.

References

U.S. Environmental Protection Agency (USEPA) Region 7. (2006) Herculaneum Lead Master 090804 (Microsoft Access Database). Obtained from Region 7 and Updates with 2005 and 2006 Data.

Appendix B

Emissions and Modeling Parameters for the Primary Pb Smelter

Appendix B includes a summary and discussion of the primary Pb smelter facility's emission and source parameters. Exhibit B-1 presents a summary of the emission release parameters and average annual emission rate for the point sources at the primary Pb smelter. Similarly, Exhibits B-2 and B-3 each present a summary of the average annual emission rates and emission release parameters for volume and area sources, respectively. Particle size distribution inputs for point, volume, and area sources are presented in Exhibits B-4, B-5, and B-6, respectively. These summary tables include the mass fractions, particle diameters, and particle densities associated with each identified emission source. Point source emission release parameters include stack height, stack gas exit temperature and velocity, and stack diameter; volume source emission release parameters include release height and source dimensions (lateral and vertical); and area source emission release parameters include release height, source area, angle from north, and the initial vertical dimension of the area source plume. A discussion of modeling results is provided in Chapter 4 of the report.

Emissions information for the primary Pb smelter was obtained in the form of input files for the Industrial Source Complex - Plume Rise Model Enhancements (ISC-PRIME) air dispersion model. These emissions reflect the 2000 Revision of the State Implementation Plan (SIP) developed for the facility (MDNR 2000). The files included a detailed input runstream file, an hourly emission file, and an on-site meteorological file with 25 consecutive months of data (April 1, 1997 to April 30, 1999). The ISC-PRIME input runstream file included emissions of Pb and release parameters for 99 sources (with four sources having zero emissions). A total of 266 tons/year of Pb emissions from processes at the facility, fugitive emissions from transferring of materials, fugitive emissions from storage at the slag pile, and emissions associated with roadway dust were modeled. Each emission release point has corresponding location coordinates, terrain elevation, and release parameters required for air dispersion modeling. In addition, the input file contained particle size distributions for each source and building downwash parameters (the location and size of each building that may affect the air dispersion of the emissions). Particle sizes for emissions from road segment emission points around the primary Pb smelter ranged from 44 to 210 μm. Particle sizes for emissions from all other emission points at the primary Pb smelter ranged from 6.3 to 45.5 μm. Emissions and release parameters, particle size inputs, and other modeling input information is provided in this appendix.

The location coordinates, provided in Universal Transverse Mercator zone 15 projection in the North American Datum 1927, were confirmed to be accurate by mapping with GIS software and a local aerial photo. The main stack emission release point fell on top of the main stack in the aerial photo, and the other emission release points appeared to be correct based on facility maps and the aerial photo.

Exhibit B-1. Emission Release Parameters and Annual Average Emission Rates for Point Sources

EMISSION POINT ID	Emission Point Description	LOCATION [a]			Point Emission Releases				
		UTMx (m)	UTMy (m)	Elevation (m)	Annual Average Emission Rate (g/s) Pb	Stack Height (m)	Stack Gas Exit Temperature (K)	Stack Gas Exit Velocity (m/s)	Stack Diameter (m)
30001	Main Stack - GEP stack height (167.67 is actual stack ht)	729534	4237767	128.970	7.15	100.75	425	6	10.52
40001A	Drossing	729553	4237849	129.040	0.0103	15.24	297	13.4	3.35
40004	Dross Kettle Heat Stack	729588	4237885	128.280	0.00344	21.3	391.5	0.69	0.76
40005	Dross Kettle Heat Stack	729587	4237895	129.070	0.00344	21.3	391.5	0.69	0.76
50001A	Refinery	729553	4237840	128.820	0.00188	15.24	297	13.4	3.35
50001B	Refinery	729563	4237801	127.810	0.00113	18.29	297	9.1	2.44
50011	Kettle Setting Heat Stack	729579	4237787	126.630	0.0033	18.8	989.3	5.96	0.61
50012	Kettle Setting Heat Stack	729579	4237796	126.990	0.0033	18.8	989.3	5.96	0.61
50013	Kettle Setting Heat Stack	729579	4237805	127.030	0.0033	18.8	989.3	5.96	0.61
50014	Kettle Setting Heat Stack	729579	4237813	126.800	0.0033	18.8	989.3	5.96	0.61
50015	Kettle Setting Heat Stack	729579	4237822	126.990	0.0033	18.8	989.3	5.96	0.61
50016	Kettle Setting Heat Stack	729579	4237831	127.380	0.0033	18.8	989.3	5.96	0.61
50017	Kettle Setting Heat Stack	729579	4237840	127.080	0.0033	18.8	989.3	5.96	0.61
50018	Kettle Setting Heat Stack	729579	4237849	127.100	0.0033	18.8	989.3	5.96	0.61
60001	Strip Mill Heat Stack	729434	4237560	127.360	0.000113	21.3	699.8	2.73	0.56
60002	Strip Mill Heat Stack	729475	4237560	124.730	0.000113	21.3	699.8	2.73	0.56
60003	Strip Mill Baghouse	729456	4237562	124.990	5.93E-06	7.6	297	7.7	1.08
60004	Low Alpha Baghouse	729477	4237483	125.580	0.00158	6.1	327.6	17.5	0.25
60005	Strip Mill Vent	729440	4237549	126.100	0.00117	16.8	297	5	0.56
60006	Strip Mill Vent	729450	4237549	125.530	0.00117	16.8	297	5	0.56
60007	Strip Mill Vent	729460	4237549	124.970	0.00117	16.8	297	5	0.56
60008	Strip Mill Vent	729470	4237549	124.660	0.00117	16.8	297	5	0.56

[a] Locations confirmed by ICF International using aerial photography from USGS.

Exhibit B-2. Emission Release Parameters and Annual Average Emission Rates for Volume Sources

EMISSION POINT ID	Emission Point Description	LOCATION [a]			Volume Emission Releases			
		UTMx (m)	UTMy (m)	Elevation (m)	Annual Average Emission Rate (g/s) Pb	Release Height above ground-level (m)	Lateral Dimension (m)	Vertical Dimension (m)
10001A	Railcar Rotary Dump Fugitives	729547	4238029	131.45	0.00685	6.4	2.33	10.6
10001B	Railcar Rotary Dump Fugitives	729547	4238029	131.45	0.00685	6.4	2.33	10.6
10001C	Railcar Rotary Dump Fugitives	729547	4238029	131.45	0.01483	6.4	2.33	10.6
10001D	Railcar Rotary Dump Fugitives	729518	4237469	123.87	0.00685	2	2.33	0
20001T	Transfer to Trestle Building	729557	4237919	131.25	1.80E-05	18.6	3.1	8.65
20001S	Transfer to Trestle Building	729544	4237468	120.36	1.80E-05	2	2.33	0
20002	Sinter Unloading (NE corner of Sinter Building)	729547	4237919	131.610	1.03E-05	3	4.7	19.1
20003	Sinter Loading/Unloading (Truck/Rail) (At Sinter Building)	729545	4237931	131.550	1.03E-05	2	4.7	0.93
20004	Fume Loading	729511	4237971	131.980	0.001236	3	4.7	12.7
20005A	Sinter Mix Room	729519	4237854	130.53	0.00683	18.3	5.11	8.5
20005B	Sinter Mix Room	729519	4237843	130.21	0.00683	18.3	5.11	8.5
20005C	Sinter Mix Room	729519	4237832	130.05	0.00683	18.3	5.11	8.5
20005D	Sinter Mix Room	729519	4237821	129.82	0.00683	18.3	5.11	8.5
20005E	Sinter Mix Room	729519	4237810	129.68	0.00683	18.3	5.11	8.5
20005F	Sinter Mix Room	729519	4237799	129.74	0.00683	18.3	5.11	8.5
20006	Sinter Building Fugitives	729546	4237904	131.360	0.00962	20	0.2	18
20007	#3 Baghouse Roof Vents	729540	4237699	128.490	0.000372	21.3	0.3	10.1
30002	Blast Furnace	729583	4237960	130.240	0.0024	9.3	18.6	8.65
30011	#5 Baghouse Roof Vent	729524	4238016	132.010	0.000248	21.3	0.3	12.7
30012	#5 Baghouse Roof Vent	729524	4237999	131.940	0.000248	21.3	0.3	12.7
30013	#5 Baghouse Roof Vent	729524	4237982	131.870	0.000248	21.3	0.3	12.7
40001	Drossing	729578	4237885	129.810	0.00173	7.62	15.12	7.09
50001	Drossing	729578	4237810	126.950	0.0317	5.49	18.6	5.1
70001	Fugitive Dross Handling	729636	4238220	127.940	0.00089891	2	2.33	0
70003	Fugitive Concentrate Handling	729518	4237469	123.870	0.003499896	2	2.33	0
70007	Fugitive Slag Handling	729239	4237241	116.430	0.00034757	2	2.33	0
70009	Fugitive Secondaries Handling	729492	4237630	128.130	0.00016254	2	2.33	0

[a] Locations confirmed by ICF International using aerial photography from USGS.

Exhibit B-3. Emission Release Parameters and Annual Average Emission Rates for Area Sources

EMISSION POINT ID	Emission Point Description	Hourly emissions or emission factors?	LOCATION [a]			Area Emission Releases					
			UTMx (m)	UTMy (m)	Elevation (m)	Annual Average Emission Rate ($g/s\text{-}m^2$) Pb	Release Height (m)	Length of x side of area (m)	Length of y side of area (m)	Angle (° from N)	Initial vertical dimension of the area source plume (m)
70002	Fugitive Dross Wind Erosion	yes - emission in this table is an average	729620	4238201	128.850	0	2	30	40	0	0
70004	Fugitive Concentrate Wind Erosion	yes - emission in this table is an average	729515	4237391	119.120	0	2	15	150	0	0
70006	Fugitive Sinter Wind Erosion	yes - emission in this table is an average	729537	4237395	118.500	0	2	15	150	0	0
70008	Fugitive Slag Wind Erosion	yes - emission in this table is an average	728966	4237118	117.730	1.48614E-06	2	465	200	21	0
70010	Fugitive Secondaries Wind Erosion	yes - emission in this table is an average	729482	4237609	127.830	0	2	20	40	0	0
70020	Road Segment A		729383	4237563	132.990	9.57E-06	0	100	10	4	1.395
70021	Road Segment A		729385	4237458	126.750	9.57E-06	0	10	100	0	1.395
70022	Road Segment A		729381	4237452	127.000	9.57E-06	0	100	10	72	1.395
70023	Road Segment A		729413	4237354	120.180	9.57E-06	0	100	10	55	1.395
70024	Road Segment A		729482	4237281	118.720	9.57E-06	0	10	100	45	1.395
70025	Road Segment A		729552	4237355	117.240	9.57E-06	0	10	100	8	1.395
70026	Road Segment A		729565	4237458	118.260	9.57E-06	0	10	100	10	1.395
70027	Road Segment A		729569	4237561	121.320	9.57E-06	0	23	45	0	1.395
70040	Road Segment B1		729586	4238044	129.750	7.08E-06	0	10	100	5	1.395
70041	Road Segment B1		729599	4238140	130.150	7.08E-06	0	10	25	348	1.395
70042	Road Segment B1		729590	4238163	130.650	7.08E-06	0	10	25	0	1.395
70043	Road Segment B1		729570	4238186	131.370	7.08E-06	0	25	10	0	1.395
70044	Road Segment B1		729531	4238090	132.150	7.08E-06	0	10	100	16	1.395
70045	Road Segment B1		729515	4238071	132.560	7.08E-06	0	25	10	340	1.395
70046	Road Segment B1		729500	4238031	132.380	7.08E-06	0	10	50	6	1.395
70047	Road Segment B1		729505	4237982	132.000	7.08E-06	0	10	50	359	1.395
70048	Road Segment B1		729493	4237884	131.220	7.08E-06	0	10	100	9	1.395
70049	Road Segment B1		729465	4237791	130.760	7.08E-06	0	10	100	15	1.395
70050	Road Segment B1		729472	4237717	129.150	7.08E-06	0	10	75	355	1.395
70051	Road Segment B1		729474	4237693	128.620	7.08E-06	0	10	25	0	1.395

Exhibit B-3. Emission Release Parameters and Annual Average Emission Rates for Area Sources

EMISSION POINT ID	Emission Point Description	Hourly emissions or emission factors?	LOCATION [a] UTMx (m)	UTMy (m)	Elevation (m)	Area Emission Releases: Annual Average Emission Rate ($g/s\text{-}m^2$) Pb	Release Height (m)	Length of x side of area (m)	Length of y side of area (m)	Angle (° from N)	Initial vertical dimension of the area source plume (m)
70052	Road Segment B1		729473	4237682	128.350	7.08E-06	0	25	10	0	1.395
70053	Road Segment B1		729518	4237593	125.200	7.08E-06	0	10	100	348	1.395
70054	Road Segment B1		729525	4237568	124.860	7.08E-06	0	10	25	345	1.395
70055	Road Segment B1		729532	4237559	124.800	7.08E-06	0	75	10	0	1.395
70060	Road Segment B2		729565	4237459	118.260	4.06E-06	0	10	100	11	1.395
70061	Road Segment B2		729547	4237355	117.490	4.06E-06	0	10	100	11	1.395
70062	Road Segment B2		729489	4237288	118.670	4.06E-06	0	10	100	41	1.395
70063	Road Segment B2		729415	4237240	116.430	4.06E-06	0	10	100	56	1.395
70064	Road Segment B2		729423	4237225	116.430	4.06E-06	0	100	10	59	1.395
70070	Road Segment C		729513	4237936	131.810	1.04E-06	0	50	10	0	1.395
70071	Road Segment C		729488	4237879	131.170	1.04E-06	0	10	75	12	1.395
70072	Road Segment C		729463	4237789	130.800	1.04E-06	0	10	100	16	1.395
70073	Road Segment C		729474	4237717	129.040	1.04E-06	0	10	75	353	1.395
70074	Road Segment C		729473	4237694	128.660	1.04E-06	0	10	25	0	1.395
70075	Road Segment C		729471	4237683	128.470	1.04E-06	0	25	10	0	1.395
70076	Road Segment C		729517	4237595	125.250	1.04E-06	0	10	100	347	1.395
70077	Road Segment C		729524	4237568	124.870	1.04E-06	0	10	25	347	1.395
70078	Road Segment C		729531	4237556	124.860	1.04E-06	0	25	10	0	1.395
70079	Road Segment C		729556	4237457	118.830	1.04E-06	0	10	100	0	1.395
70080	Road Segment D		729466	4237790	130.740	1.51E-06	0	10	100	15	1.395
70081	Road Segment D		729477	4237719	128.980	1.51E-06	0	10	75	352	1.395
70082	Road Segment D		729471	4237667	128.240	1.51E-06	0	10	50	0	1.395
70083	Road Segment D		729446	4237667	128.290	1.51E-06	0	25	10	0	1.395
70084	Road Segment D		729436	4237577	126.960	1.51E-06	0	10	100	0	1.395
70085	Road Segment D		729451	4237575	125.210	1.51E-06	0	100	10	11	1.395

[a] Locations confirmed by ICF International using aerial photography from USGS.

Exhibit B-4. Particle Size Distribution Inputs for Point Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
30001	Main Stack - GEP stack height (167.67 is actual stack ht)	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.35
40001A	Drossing	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.72
40004	Dross Kettle Heat Stack	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.72
40005	Dross Kettle Heat Stack	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.72
50001A	Refinery	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50001B	Refinery	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50011	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50012	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50013	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50014	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50015	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50016	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50017	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
50018	Kettle Setting Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60001	Strip Mill Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60002	Strip Mill Heat Stack	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60003	Strip Mill Baghouse	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60004	Low Alpha Baghouse	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60005	Strip Mill Vent	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86

Exhibit B-4. Particle Size Distribution Inputs for Point Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
60006	Strip Mill Vent	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60007	Strip Mill Vent	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86
60008	Strip Mill Vent	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.3	15.9	25.7	35.6	45.5	55.4	65.3	5.86

Exhibit B-5. Particle Size Distribution Inputs for Volume Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (μm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
10001A	Railcar Rotary Dump Fugitives	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
10001B	Railcar Rotary Dump Fugitives	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
10001C	Railcar Rotary Dump Fugitives	0.260	0.525	0.118	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.47	55.398	65.329	5.35
10001D	Railcar Rotary Dump Fugitives	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20001T	Transfer to Trestle Building	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20001S	Transfer to Trestle Building	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20002	Sinter Unloading (NE corner of Sinter Building)	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20003	Sinter Loading/ Unloading (Truck/Rail) (At Sinter Building)	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20004	Fume Loading	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005A	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005B	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005C	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005D	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005E	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20005F	Sinter Mix Room	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20006	Sinter Building Fugitives	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
20007	#3 Baghouse Roof Vents	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
30002	Blast Furnace	0.241	0.526	0.124	0.109	0.000	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	4.99
30011	#5 Baghouse Roof Vent	0.241	0.526	0.124	0.109	0.000	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	4.99
30012	#5 Baghouse Roof Vent	0.241	0.526	0.124	0.109	0.000	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	4.99

Exhibit B-5. Particle Size Distribution Inputs for Volume Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
30013	#5 Baghouse Roof Vent	0.241	0.526	0.124	0.109	0.000	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	4.99
40001	Drossing	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.72
50001	Drossing	0.149	0.641	0.211	0.000	0.000	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.86
70001	Fugitive Dross Handling	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.72
70003	Fugitive Concentrate Handling	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
70007	Fugitive Slag Handling	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35
70009	Fugitive Secondaries Handling	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.288	15.88	25.678	35.562	45.474	55.398	65.329	5.35

Exhibit B-6. Particle Size Distribution Inputs for Area Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
70002	Fugitive Dross Wind Erosion	0.285	0.447	0.041	0.000	0.228	0.000	0.000	6.29	15.88	25.68	35.56	45.47	55.40	65.33	5.72
70004	Fugitive Concentrate Wind Erosion	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.29	15.88	25.68	35.56	45.47	55.40	65.33	5.35
70006	Fugitive Sinter Wind Erosion	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.29	15.88	25.68	35.56	45.47	55.40	65.33	5.35
70008	Fugitive Slag Wind Erosion	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.29	15.88	25.68	35.56	45.47	55.40	65.33	5.35
70010	Fugitive Secondaries Wind Erosion	0.260	0.525	0.112	0.000	0.104	0.000	0.000	6.29	15.88	25.68	35.56	45.47	55.40	65.33	5.35
70020	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70021	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70022	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70023	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70024	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70025	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70026	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70027	Road Segment A	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70040	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70041	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70042	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70043	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35

Exhibit B-6. Particle Size Distribution Inputs for Area Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
70044	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70045	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70046	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70047	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70048	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70049	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70050	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70051	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70052	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70053	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70054	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70055	Road Segment B1	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70060	Road Segment B2	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70061	Road Segment B2	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70062	Raod Segment B2	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70063	Road Segment B2	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70064	Road Segment B2	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70070	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35

Exhibit B-6. Particle Size Distribution Inputs for Area Sources

Emission Point ID	Emission Point Description	MASS FRACTION							PARTICLE DIAMETER (µm)							PARTICLE DENSITY (g/cm^3)
		Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	Bin1	Bin2	Bin3	Bin4	Bin5	Bin6	Bin7	
70071	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70072	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70073	Raod Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70074	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70075	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70076	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70077	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70078	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70079	Road Segment C	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70080	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70081	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70082	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70083	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70084	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35
70085	Road Segment D	0.159	0.553	0.216	0.061	0.009	0.002	0.004	44.00	48.63	64.07	90.38	128.25	181.21	210.00	5.35

References

Missouri Department of Natural Resources (MDNR). (2000) *2000 Revision of the State Implementation Plan for Lead for the Doe Run Resources Corporation Primary Lead Smelter Herculaneum, Missouri, Public Hearing – October 26, 2000.* Jefferson City, MO: Air Pollution Control Program, Division of Environmental Quality. October.

Appendix C

Emissions and Modeling Parameters for the Secondary Pb Smelter

Appendix C includes a discussion and summary of the secondary Pb smelter facility's emission and source input parameters. Exhibit C-1 presents a summary of the emission release parameters and average annual emission rate for the four point sources and one area source at the secondary Pb smelter. Emission release parameters for point sources include stack height, stack gas exit temperature, stack gas exit velocity, and stack diameter; area source emission release parameters include release height, source area, angle, and initial vertical dimension of the area source plume. Exhibit C-2 presents a summary of particle size distribution inputs for the point and area emissions sources, including particle mass fractions, diameters, and density. A discussion of modeling results is provided in Chapter 4 of the report.

The estimates for process emissions for the secondary Pb smelter were calculated from Pb emissions measured during stack tests performed in December 1997, November 1999, and February 2000 (ECR 2006). Thus, the emissions represent actual emissions during that time period. Fugitive emissions were estimated by comparing the modeled stack emissions concentrations, background Pb concentrations, and monitored Pb concentrations. The fraction of the measured Pb concentration in air that could not be attributed to known sources was assumed to be from fugitive emissions, and a statistical analysis was conducted to generate fugitive Pb emission factors (ECR 2006). A total of 4.56 tons/year of Pb emissions from processes and fugitive emissions at the facility were modeled.

Stack parameters, fugitive release parameters, the location of each emission source, particle size information, and building downwash parameters were also obtained from ECR (2006). The particle size information used for deposition modeling was derived from AP-42 particle distributions for melting, smelting, refining metals, and fugitive dust emissions (USEPA 1995). Flat terrain was used for the model runs because there is minimal elevation change in the area. Particle sizes for emissions from point sources at the secondary Pb smelter ranged from 0.5 to 10 µm, and particle sizes for emissions from area sources at the secondary Pb smelter ranged from 1.25 to 22.5 µm. Emissions and release parameters, particle size inputs, and other modeling input information is provided in this appendix.

It was confirmed that the location coordinates, provided in the Universal Transverse Mercator zone 16 projection in the North American Datum 1983, were accurate by mapping the coordinates with GIS software and examining a local aerial photo. The emission release points appeared to be correct based on the aerial photo. Five years of meteorological data were compiled for use in the air dispersion modeling. Surface data from Montgomery, Alabama (NOAA 1997a) and upper air data from Centerville, Alabama (NOAA 1997b) from 1990 to 1994 were used. The meteorological data are limited because they are not site-specific and may not fully represent conditions at the facility.

Exhibit C-1. Secondary Pb Smelter Emission Release Parameters and Annual Average Emission Rates

	LOCATION[a]				POINT SOURCES					AREA SOURCES					
EMISSION POINT ID	UTMx (m)	UTMy (m)	Elevation (m)	SOURCE TYPE (Point, Area, or Volume)	Actual Annual Average Emission Rate (g/s)[b] Pb	Stack Height (m)	Stack Gas Exit Temperature (K)	Stack Gas Exit Velocity (m/s)	Stack Diameter (m)	Actual Annual Average Emission Rate ($g/s\text{-}m^2$) Pb	Release Height (m)	Length of x Side of Area (m)	Length of y Side of Area (m)	Angle (° from N)	Initial Vertical Dimension of the Area Source Plume (m)
Stack1	596705	3517220	NA	point	3.01E-02	54.9	366.3	36.6	1.2						
Stack4	596810	3517275	NA	point	3.17E-03	27.4	338.6	32.3	0.9						
Stack5	596715	3517220	NA	point	5.14E-02	54.9	366.3	25.3	1.2						
Stack10	596766	3517210	NA	point	8.47E-03	9.1	294.1	23.8	1.1						
Area	596814	3517435	NA	area						3.18E-07	0	400	300	125	0

[a] Locations confirmed by ICF International using aerial photography from USGS.

[b] Emissions confirmed by stack test in December 1997, November 1999 and February 2000.

Exhibit C-2. Secondary Pb Smelter Particle Size Distribution Inputs

Particle Size Distributions	Fraction of Particles	Mean Diameter (μm)	Particle Density (g/cm^3)
Source Type			
Point	0.72	0.5	1
	0.08	1.5	1
	0.04	2.5	1
	0.04	4	1
	0.12	10	1
Area	0.05	1.25	1.5
	0.15	6.25	1.5
	0.04	22.5	1.5
	0.77	22.5	1.5

References

EC/R Incorporated. (2006) *Secondary Lead Smelter Industry – Source Characterization for Residual Risk Assessment.* Prepared for USEPA Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, NC. November.

National Oceanic and Atmospheric Administration (NOAA). (1997a) *Hourly United States Weather Observations 1990-1995.* Asheville, NC: National Climatic Data Center (NCDC).

National Oceanic and Atmospheric Administration (NOAA). (1997b) *Rediosonde Data of North America.* Asheville, NC: National Climatic Data Center.

U.S. Environmental Protection Agency (USEPA). (1995) Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources. AP-42 Fifth Edition. Research Triangle Park: Office of Air Quality Planning and Standards. January. Available at http://www.epa.gov/ttn/chief/ap42/.

Appendix D

Supplemental Information for the Near Roadway Urban Case Study

Appendix D presents an additional description of the characteristics and data associated with the near roadway urban case study. These data include demographic data summaries of the area immediately surrounding the road segments of interest (Exhibit D-1); air monitoring data obtained from different networks of air monitors or studies of air quality (Exhibits D-2, D-3, D-4, and D-5); soil measurements, or "surrogate" soil measurements for the area of interest (Exhibit D-6; no relevant and proximate data on Houston soil Pb concentrations were identified); and modeled indoor dust concentrations for each census block located inside (or partially overlapping with) the study area (Exhibit D-7). Additional descriptive information regarding the near roadway urban case study is included in Chapter 3 of the report; a discussion of media concentrations associated with this case study is provided in Chapter 4.

D.1 Demographic Data

Demographic data for this location were obtained from the U.S. Census for each census block overlapping part of the study area. In order to estimate populations and derive demographic characteristics separately for each of the three zones within the study area and account for differences in size and shape between the zones and overlapping census blocks, an area-weighted average was calculated. Block polygons keyed to 15-digit FIPS codes with known areas (m^2), population, household, and housing unit counts[1] were superimposed on the study area, and the area of each block polygon overlapping with part of a study zone was calculated. These demographic data and overlap areas were used to calculate area-weighted estimates of population, household, and housing unit counts for each zone. The number of children age 7 years and under residing in each zone was estimated as the product of the ratio of children to total population for each overlapping block and the population for these blocks estimated to fall within each zone. These calculations assume an even distribution of population and housing locations across a census block. Demographic information for each zone is summarized in Exhibit D-1.

Exhibit D-1. Demographic Information for Roadside Scenario

Zone Within Study Area	Area (m^2)	Total Estimated Population	Estimated Population Ages 0-7	Number of Households	Number of Housing Units
0 to 12 m	38,621	49	7	17	17
12 to 75 m	320,468	537	84	176	190
75 to 200 m	680,582	1369	228	429	459

D.2 Air Monitoring Data

Ambient air monitoring data for Pb are available for two particle size fractions, $PM_{2.5}$ and PM_{10}, over the course of three days in February 2001 from a study focused on roadway contributions to air quality (ICF 2006). The sampler was located at 401½ Lang Avenue. This location is situated in a small park adjacent to residential neighborhoods and commercial areas. Lang Avenue is a relatively small neighborhood road used by local traffic, with a single lane in each direction and no median. Three major roads are in the near vicinity of the sampler location: one located about 100 meters to the west; one located about 115 meters to the south (selected as the roadway of interest for this case study); and one located about 275 meters to the northeast.

Daily average concentrations were reported for three consecutive dates. Overall, average Pb concentrations for the Houston site were 0.0035 $\mu g/m^3$ for $PM_{2.5}$ and 0.0050 $\mu g/m^3$ for PM_{10}. Daily average concentrations of ambient Pb associated with each particle size fraction assessed for the three sampling dates are presented in Exhibit D-2.

[1] The U.S. Census defines a *housing unit* as a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live and eat separately from any other persons in the building and which have direct access from the outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements. The Census defines a *household* as including "all the persons who occupy a housing unit."

Exhibit D-2. Air Monitoring Data for Pb, DRI Site in Houston, Texas

Sampling Date	Daily Average Pb Concentration, µg/m^3	
	$PM_{2.5}$ Fraction	PM_{10} Fraction
2/1/01	0.0018	0.0053
2/2/01	0.0033	0.0045
2/3/01	0.0035	0.0056
Average	**0.0030**	**0.0050**

Six sets of ambient Pb concentrations are also available in EPA's Air Quality System (AQS) for three locations in Houston, including two from 1999 and four from 2005 (USEPA 2006). Mean concentrations for each set of measurements from AQS are summarized in Exhibit D-3. Because these measurements were taken in developed urban or suburban locations (and they are identified by street address), it seems likely that the monitoring stations for each were located close to a roadway; however, no information was available from AQS regarding how close to the roadway these monitoring stations are located.

Exhibit D-3. AQS Ambient Pb Measurements for Houston

Particle Size Fraction	Year	No. of Observations	Location	Reported Land Use/Location Type	Mean of Data Set (µg/m^3)
TSP	1999	48	1262 ½ Mae Dr.	Commercial/urban and center city	0.005
	2005	35	1262 ½ Mae Dr.	Commercial/urban and center city	0.016
PM_{10}	1999	81	9525 Clinton Dr.	Industrial/suburban	0.007
	2005	59	9525 Clinton Dr.	Industrial/suburban	0.006
$PM_{2.5}$	2005	72	6400 Bissonnet St.	Residential/urban and center city	0.0031
	2005	35	1262 ½ Mae Dr.	Commercial/urban and center city	0.0029

Additionally, it is useful to compare Pb concentrations in Houston to those reported for the other five near roadway sampling locations where DRI conducted PM measurements in 2000 and 2001 (ICF 2006). Average Pb concentrations for the PM_{10} size fraction from the other five DRI monitoring sites are presented in Exhibit D-4.

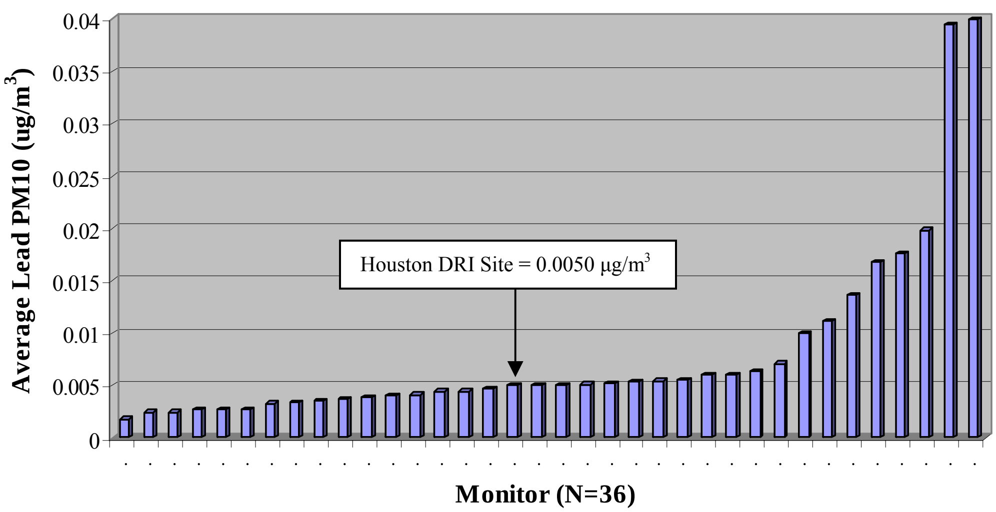
Exhibit D-4. Average Measured PM_{10} Pb Concentrations for DRI Monitoring Locations (Other than Houston)[a]

Location	Measurement Dates	Average Pb Concentration (µg/m^3)
Birmingham, AL	Dec. 17 and 19, 2000	0.0024
Las Vegas, NV	Feb. 20 and 22-23, 2001	0.00296
El Paso, TX	March 3 and 9-11, 2001	0.00708
Albany, NY	Dec. 8-9, 2000	0.0123
Long Beach, CA	Feb. 16-17, 2001	0.0164

[a] ICF 2006

For additional comparison, the average annual PM_{10} Pb concentrations from AirData monitor results across the United States for the year 2005 (USEPA 2006) were compared to the average PM_{10} Pb concentration for the DRI site in Houston of 0.0030 μg/m^3. Exhibit D-5 shows the distribution of PM_{10} Pb for 36 monitors across the United States (with average monitored Pb concentrations sorted in ascending order). The average PM_{10} Pb concentrations detected at the 36 monitors ranged from 0.0018 to 0.04 μg/m^3. The average PM_{10} Pb concentration for the DRI site in Houston is indicated on the figure.

Exhibit D-5. Average Annual PM_{10} Across the United States for 2005 Compared to PM_{10} at the Houston DRI Site



D.3 Soil Measurements

No soil measurements were identified in close proximity to this study area. Consequently, surrogate data for Houston or a similar location were sought through a literature search. Several studies were identified that reported Pb concentrations in surface soil adjacent to United States and Canadian roadways, as well as related information on Pb levels on road surfaces and in urban areas. Relevant information from this literature search is summarized in Exhibit D-6. As described in Sections 3.3.4 and 4.3.3, Pb measurements reported by Turer and Maynard (2003) for surface soil near an interstate entrance ramp in Corpus Christi, Texas were used to derive the soil concentrations used in the near roadway urban case study.

Exhibit D-6 is intended to convey the most relevant soil measurements that were identified with regard to the near roadway urban case study (i.e., surface soil measurements from a near roadway location). As a result, only studies that conducted measurements in soil in the recent past (approximately within the last decade) are included here. In many instances, additional measurements were collected or other analyses using the results were conducted by the investigators; these details are not included here. Information in this exhibit is ordered alphabetically by primary author.

Exhibit D-6. Selected Data – Pb in Surface Soil Near Roadways and Related Urban Measurements

Study Citation	Location and Sampling Scheme	Reported Pb Concentration(s) (total Pb unless otherwise specified)	Other Relevant Information
Chinreje et al. 2004	• Gainesville, FL (relatively undeveloped, low population/traffic density) and Miami, FL (developed, high population/traffic density) • Sampled locations according to land use characterization residential, commercial, public parks, public buildings	• Miami: median 98 ppm; 55% of samples were 51-200 ppm • Gainesville: median 15 ppm; 87% of samples <50 ppm	• Concluded lower Pb in Gainesville was due to lower inputs (low industrial activity, less traffic) but also increased Pb mobility/low retention (lower pH, OC, and clay content vs. Miami soils). • Pb patterns with land use slightly different between 2 cities. Residential and commercial areas generally higher in Pb.
Filippelli et al. 2005	• Indianapolis, IN • Sampled on transects along urban and suburban roadways; 10-40 m from road • Surface sample depth: 0-5 cm	• Urban roadways: 400 to >900 ppm • Suburban roadways: 100 to <200 ppm	• Concentrations diminished with increasing distance from roadside. • Also sampled at various urban locations to investigate Pb from diffuse (non-specific) sources. • Conducted predictive blood-Pb modeling using soil measurements.
Gillies et al. 1999	• Urban Nevada • Sampled dust at surface of soil or paved road • Sampling locations included playas (dry lake bed/salt flat), paved roads, and construction sites	• Reported relative abundance of Pb in $PM_{2.5}$ by weight percent • Playa and construction site 0.001-0.01% • Paved road 0.01-0.1% • Approx. enrichment factors of Pb in $PM_{2.5}$: playa ~1-10; paved road ~30; construction site ~5-10 • Pb enrichment factors slightly lower for PM 10-2.5 µm for playa and paved road; approx. same for construction site	• Results were used in source apportionment analysis for resuspended PM.
Hafen and Brinkmann 1996	• Tampa, FL • Sampled 32 transects at roadways, 7 samples per transect; 3 cm to 2.2 m from road; surface sample depth: 0-3 cm • 224 samples total, 7 samples/transect	• Range: 40 to 3,360 ppm • Mean Pb concentrations by distance from road were relatively tightly clustered; means ranged from 200 ppm (>0.8 m) to 440 ppm (0.24 m)	• Looked for trends in concentration with distance and other factors on a near-term scale (within 2.2 m of road); weak negative correlation with distance from roadway observed.
Lejano and Ericson 2005	• Pacoima, CA (near Los Angeles) • 210 samples at transects along freeways spaced about 1 km apart; surface sample depth: 0-2.54 cm; samples collected from within 150 m of the roadway	Total range not presented; mean concentrations of 5 roadways range from 43 to 112 ppm (mean for one road up to 232 ppm if one outlier included)	• Mean concentrations for 3 "nonvehicular" sample sites: 52, 67, 111 ppm. • Concluded that historical vehicular emissions appear to be primary and most bioavailable source of Pb in soil.

Exhibit D-6. Selected Data – Pb in Surface Soil Near Roadways and Related Urban Measurements

Study Citation	Location and Sampling Scheme	Reported Pb Concentration(s) (total Pb unless otherwise specified)	Other Relevant Information
Li 2006	• Burnaby, Canada • Three transects across highway; samples at 0.1 m intervals from road • 139 samples from 17 borehole locations; surface sample depth: 0-10 cm	Results for three transects: • (lower traffic/speed): 7-1020 ppm • 25-925 ppm • 303-1650 ppm	• Sequential extractions were also performed to check sorption/bioavailability.
Li and Preciado 2004	• British Columbia, Canada, Hwy. 17 • 2 transects along highway; 0 to 10 m from road; 1 m intervals • Surface sample depth: 0-5 cm • Also sampled on-road dust and measured Pb deposition rates adjacent to roadway	• Roadside soil results: ~100 ppm for samples 0 m from roadside; <50 ppm for all samples 1-10 m from roadside • On-road dust: Pb content ranged from 51-181 mg/kg	• PM deposition adjacent to road decreases by ~half within 10 m of roadway • Pb deposition rates on soils within 12 m of roadway range from 1.5 to 5 μg/m^2-day; no clear pattern vs. distance.
Sheets et al. 2001	• Springfield, MO • Multiple sampling locations, including 3 near heavy-traffic streets and 2 more than 30 m from residential street • Surface sampling depth: 0-1 cm	• Averages for surface samples at 5 roadside locations ranged from 18-179 ppm	• Correlates soil measurements taken in 1999 with airborne Pb monitoring from 1979-1984 (when gasoline was leaded)
Shinn et al. 2000	• Chicago, IL; sampled bare soil in 4-block urban residential area and measured Pb; developed surface plots of Pb levels via kriging • Analyzed patterns by reviewing historical data for potential sources	• Mean soil Pb – 2180 ppm; median – 1775 ppm; range was 175-7935 ppm	• Pb distribution in soil indicates non-random Pb sources • Pb surface soil patterns linked to existing and previous potential sources within study area as well as nearby street with high traffic volume.
Speiran 1998	• Interstate 95 north of Richmond, VA (Exit 86 to a moderately traveled, two-lane road) • 59 soil samples from 19 sites • Varying distances from interstate and exit ramp • Surface sampling depth: 0-7.6 cm	• Range: 46 to 1200 ppm	• Spatial variations in concentrations indicate that highway lanes were a source of metals, including Pb. • Concentrations decrease with increasing distance from roadside.

Exhibit D-6. Selected Data – Pb in Surface Soil Near Roadways and Related Urban Measurements

Study Citation	Location and Sampling Scheme	Reported Pb Concentration(s) (total Pb unless otherwise specified)	Other Relevant Information
Sutherland and Tolosa 2001	• Manoa basin, Oahu, Hawaii • Sampled 2 transects at low speed roadways (near park and school) out to 50 m from road • First sample (0 m) from “road deposited sediment (RDS)” – curbside area at edge of road • Surface sampling depth: 0 to 2.5 cm	• Park transect: max of 375 ppm (5 m from road); RDS 285 ppm • School transect: max of 200 ppm in RDS; all soil samples 25-50 ppm, out to 50 m • Measurements for both transects drop to <50 ppm within 5-10 m • Local background soil concentrations reported as 12-13 ppm	• Concluded that “urban architecture” (sidewalks, grass, topography) impacts Pb concentrations. • Pb conc. vs. distance plotted using data from 10 studies from 1970s-1980s; relationship generally linear when log of concentration and distance are used. • 5 supplemental soil samples collected from grass-covered recreational field >100m from roadway. 10 “control” locations sampled from relatively undisturbed areas.
Sutherland et al. 2000	• Manoa watershed, Oahu, Hawaii • Sampled of road deposited sediment (in curb at roadside) and roadside soils within 2 m of road surface; 78 samples • Daily traffic volumes <3200 to 45,200 vehicles/day • Surface sampling depth: 0 to 2.5 cm	• Range of total Pb in roadside soil 10-4870 ppm • Median Pb conc. 56 ppm (includes road deposited sediment, but highest levels seen in roadside soil)	• Enrichment ratios were calculated based on the degree of anthropogenic influence on Pb levels; Pb was the most significantly enhanced metal vs. Al, Cu, and Zn. • Enrichment ratio for roadside Pb was 4 to 5 times higher than in background soils.
Teichman et al. 1993	• California, Alameda Co., adjacent to Interstate 880 • ~200 samples were taken in residential yards and parks/playgrounds in communities adjacent to I-880 and within 1 mile radius of I-880 • Surface sampling depth: ranged from surface to 1.27 to 1.91 cm deep	• Residential soil measurements: avg. 567.7 ppm; range 195-2026 ppm • Parks and playgrounds measurements: avg. 136.5 ppm; range 6-565 ppm	• “Gasoline emissions” cited as a likely urban source.
Turer and Maynard 2003	• Corpus Christi, TX; 2 sampling sites; 1 transect per site • Site 1: city center (heavy traffic); 12 samples; 2 to 12 m from road; 12 m from road; surface sampling depth: 0-32.5 cm • Site 2: near oil refinery; 10 samples; 0.5 to 4 m from road; surface depth: 0.0 and 0-2.5 cm.	• Site 1: 210-770 ppm • Site 2: 140-390 ppm • Highest concentrations at both sites were observed closest to roadway (within 3.5 m)	• Results were compared to Cincinnati metal contamination in near-highway soils, and organic matter was determined to be the key to Pb mobility.

Exhibit D-6. Selected Data – Pb in Surface Soil Near Roadways and Related Urban Measurements

Study Citation	Location and Sampling Scheme	Reported Pb Concentration(s) (total Pb unless otherwise specified)	Other Relevant Information
Turer et al. 2001	• Cincinnati, OH; Interstate 75 through city; 58 samples • Sampling conducted adjacent to highways on median between lanes (within ~50m of road) • Surface sampling depth: 0-1 cm; also sampled 1-5 cm	• Range for 0-1 cm samples: 166-942 ppm • Range for 1-5 cm samples: 59-1073 ppm • Some samples taken at depth of 10-15 cm contained total Pb between 1000-2000 ppm	• Performed mass balance analysis to determine fate of Pb (total emitted historically in exhaust vs. Pb currently in soil). Results suggest 60% of Pb has been lost from study area (roadsides). • Removal via wind-blown dust was proposed as most likely remobilization mechanism; surface runoff may be lesser removal mechanism.
Young et al. 2001	• California highways; 3 locations (not identified) • Samples taken 1.5 m from roadway • Sampling depth not specified	• Pb conc. reported 38, 46, 322 ppm	• Pb content, potential PM_{10} yield, and Pb emission potential via resuspension measured for all samples.

D.4 Modeled Indoor Dust Concentrations

A summary of indoor dust concentrations for the near roadway urban case study estimated using the AGG model is presented in Section 4.3.4, which also summarizes the number of census blocks and children corresponding to each of the three modeled indoor dust concentrations. Exhibit D-7 presents the expanded data for each census block located inside (or partially overlapping with) the study area.

Exhibit D-7. Near Roadway Urban Case Study - Modeled Indoor Dust Concentrations

Census block ID	Estimated Number of Children[a]	Predicted House Dust Concentrations (µg/g)		
		AGG Non-Air	AGG Air-Rel.	Total
5001007	10	31.3	40	71
5001008	2	31.3	40	71
5001011	1	31.3	40	71
5002000	57	31.3	40	71
5002001	46	31.3	40	71
5002002	1	31.3	40	71
5003000	1	31.3	40	71
5003001	1	31.3	40	71
5003007	35	31.3	40	71
5003008	0	31.3	40	71
5003009	1	31.3	40	71
5003011	1	31.3	40	71
5003012	3	31.3	40	71
5003014	1	31.3	40	71

Exhibit D-7. Near Roadway Urban Case Study - Modeled Indoor Dust Concentrations

Census block ID	Estimated Number of Children[a]	Predicted House Dust Concentrations (µg/g)		
		AGG Non-Air	AGG Air-Rel.	Total
5003015	1	31.3	40	71
5003021	3	31.3	40	71
5003022	2	31.3	40	71
5003023	3	31.3	40	71
5003024	0	31.3	40	71
5003025	1	31.3	40	71
4002002	54	31.3	40	71
4001005	0	31.3	40	71
4001006	1	31.3	40	71
4001007	2	31.3	40	71
5003003	1	31.3	40	71
5001008Z	1	31.3	62	94
5001009Z	8	31.3	62	94
5002000Z	23	31.3	62	94
5002001Z	23	31.3	62	94
5002002Z	1	31.3	62	94
5003001Z	0	31.3	62	94
5003007Z	14	31.3	62	94
5003008Z	0	31.3	62	94
5003009Z	1	31.3	62	94
5003010Z	0	31.3	62	94
5003011Z	0	31.3	62	94
5003012Z	3	31.3	62	94
5003013Z	2	31.3	62	94
5003014Z	2	31.3	62	94
5003015Z	2	31.3	62	94
5003021Z	0	31.3	62	94
4001007Z	1	31.3	62	94
5003003Z	0	31.3	62	94
5001009Y	2	31.3	146	178
5002000Y	4	31.3	146	178
5002002Y	0	31.3	146	178
5003008Y	0	31.3	146	178
5003009Y	0	31.3	146	178
5003012Y	1	31.3	146	178
5003013Y	0	31.3	146	178

[a] Value represents the estimated number of children ages 0-7 residing within that census block that also reside within the study area.

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Appendix E

Summary Data for the Ecologically Vulnerable Case Study

Appendix E presents a detailed data summary and discussion of environmental data sources for the Hubbard Brook Experimental Forest (HBEF). A literature search was performed to obtain published studies pertaining to Pb movement throughout the environment at HBEF, with a particular focus on trends in Pb concentrations in and across three media: air (or deposition from air), soil, and surface water. The findings for each medium are presented here.

E.1 Air Deposition Inputs

Pb concentration data in ambient air were not located in the literature search; however, two studies of atmospheric Pb input (in precipitation and bulk deposition) to HBEF were reviewed. Johnson et al. (1995) used available Pb concentration data from Watershed 6 (W6) and areas proximate to W6 at HBEF together with historical data for Pb consumed in gasoline to construct a regression model used to estimate Pb inputs for the period 1926 to 1989. They analyzed precipitation inputs using measured water fluxes and annual volume-weighted mean Pb concentrations. The authors reported a significant decline in Pb deposition from 1975 (during a period of high Pb deposition) to 1989 (during a period of low Pb deposition). Specifically, the annual volume-weighted mean Pb concentration in bulk precipitation declined from 23 μg/L in 1975 to 0.85 μg/L in 1989, while the estimated input of Pb in bulk deposition fell from 396 $g \cdot ha^{-1} \cdot yr^{-1}$ in 1976 to 12.7 $g \cdot ha^{-1} \cdot yr^{-1}$ in 1989.

Wang et al. (1995) used clean techniques to analyze monthly precipitation samples collected by HBEF staff in 1993. Pb levels in bulk precipitation were approximately 0.45 to 0.80 ppb across the sampling period. The authors indicated that they estimated total atmospheric input of Pb from their bulk precipitation data; however, these estimations were not reported. Reported values for Pb fluxes in bulk precipitation were approximately 7 $g \cdot ha^{-1} \cdot yr^{-1}$ for the sampling period. Furthermore, based on their findings, the authors suggest that atmospheric Pb inputs do not directly affect Pb levels in streams at HBEF because deposited Pb is almost entirely retained in the soil profile.

E.2 Soil

Before presenting the Pb concentration data for soils at HBEF, it is useful to discuss the soil profile terms and abbreviations. A soil profile consists of various soil layers, or horizons, that have different characteristics (e.g., color, structure, texture, rupture-resistance class, levels of carbonates), and a general distinction is made between organic soils and mineral soils based on the proportion of organic carbon present (Soil Survey Staff 1999). Capital letters, sometimes with subscripts or lower case letters, are used to denote the various soil horizons, which are identified below.

- An O horizon is predominately organic material and may be the soil surface, though O horizons may also be buried beneath other horizons. Subscripts or lowercase letters indicate particular features of the horizon. O_a, O_e, O_i horizons are differentiated by the rubbed fiber content by percent of volume ("a" is lowest, "i" is highest).

- An A horizon is a layer of mineral soil present at the surface or below an O horizon.

- An E horizon is similar to the A horizon, but has a concentration of sand and silt particles.

- B horizons occur below an A, E, or O horizon and are characterized by obliteration of most of the original rock structure. The B_h horizon is characterized by the alluvial accumulation of organic matter, while the B_s horizon features the alluvial accumulation of sesquioxides and organic matter (Soil Survey Staff 1993).

Several studies provide insight regarding trends in Pb concentrations in soils at HBEF. Yanai et al. (2004) collected forest floor[1] samples seven times from Watershed 6 (W6) between 1976 and 1997 and three times from Watershed 1 (W1) between 1996 and 2000 (see Exhibit E-1). While W1 was subject to experiments in November 1999, the authors assumed that the treatment–experimental addition of calcium silicate would not influence Pb transport dynamics in the forest floor (Yanai et al. 2004). Both watersheds are similar in tree species composition and stand age, as well as watershed area (W6=13.2 ha; W1=11.8 ha) and aspect (W6= S32^{o}E; W1= S22^{o}E). HBEF soils are acidic, so both watersheds are acidified (Hubbard Brook Information Oversight Committee 2001). Collected plots were 15x15-cm blocks and were selected randomly within three elevation ranges. Samples were dried and ground using a Wiley mill. Organic mass was estimated using loss on ignition. Inductively coupled plasma spectroscopy (ICP) was used to analyze samples (dissolved in nitric acid [HNO_3]). The authors reported a 32 percent decline in forest floor Pb concentrations at HBEF from 1976 to 2000. As shown in Exhibit E-1, Pb concentrations for the data set ranged from about 38 mg/kg (collected from W1 in 2000) to 115 mg/kg (collected from W6 in 1978). Changes in Pb content and concentrations within soil horizons and with elevation were also analyzed. Results of the horizon analysis show that Pb has become more concentrated at lower depths over time. Pb content in the forest floor did not necessarily increase with elevation (Pb concentrations did increase with elevation because the forest floor mass declines with elevation).

[1] Yanai et al. (2004) define the "forest floor" as the O-A soil horizons.

Exhibit E-1. Pb Concentration in Forest Floor Samples Analyzed for Hubbard Brook Experimental Forest [a]

Stand Age (yr)	Sample Year	Horizon [b]	Mean Pb Concentration		
			n	mg/kg	Standard Error
Stand W6 (Elevation 550-790 m)					
66	1976	FF	59	77.77	4.84
67	1977	FF	58	98.42	6.06
68	1978	FF	58	86.41	4.26
72	1982	FF	68	82.10	3.53
77	1987	FF	70	69.84	3.11
82	1992	FF	80	68.09	3.15
87	1997	FF	87	59.89	2.73
68	1978	O_a	58	76.16	4.10
77	1987	O_a	70	66.73	3.41
82	1992	O_a	80	68.12	3.54
87	1997	O_a	87	74.24	3.84
68	1978	O_{ie}	58	115.01	4.01
77	1987	O_{ie}	70	75.66	3.47
82	1992	O_{ie}	80	63.79	3.15
87	1997	O_{ie}	87	40.57	2.51
Stand W1 (Elevation 490-740 m)					
86	1996	FF	84	62.04	3.03
88	1998	FF	97	60.59	2.48
90	2000	FF	100	55.00	2.04
86	1996	O_a	84	67.44	3.43
88	1998	O_a	97	73.98	3.43
90	2000	O_a	100	66.70	2.82
86	1996	O_{ie}	84	53.21	3.36
88	1998	O_{ie}	97	43.80	2.58
90	2000	O_{ie}	100	38.42	1.86

[a] Modified from Yanai et al. (2004).
[b] FF= forest floor (the authors define this as the O-A horizons); O_a = organic horizon with lower rubbed fiber content (study samples include the A horizon [a mineral layer] with the O_a horizon); O_{ie} = organic horizons with higher rubbed fiber content.

Johnson et al. (1995) also noted a downward movement of Pb in soil layers. The authors used available data from Watershed 6 (W6) and areas proximate to W6 to estimate Pb fluxes for HBEF. Forest floor[2] samples were analyzed using digestion in 6 mol/L HNO_3 and mineral soils were assessed using digestion in concentrated HNO_3 and hydrofluoric acid (HF). Pb was measured using flame atomic absorption spectrophotometry. Using the flux estimates and regression analysis, they estimated the net loss of Pb from the forest floor to be 44 $g \cdot ha^{-1} \cdot yr^{-1}$ from 1982 to 1987, while the accumulation rate of Pb in the mineral soil was approximately

[2] Johnson et al. (1995) define the "forest floor" as the O soil horizon.

75 g·ha^{-1}·yr^{-1} over the same period. Additionally, they predicted further accumulation of Pb in the mineral soil, which might lead to higher Pb concentrations in stream water; however, the authors noted uncertainty regarding the timeframe for when Pb concentrations in stream water might become elevated.

Wang and Benoit (1996) analyzed soil solutions (pH 4.0 to 4.7) to study Pb speciation and Pb mobility between the forest soil surface and the lower mineral soil layer at a watershed immediately west of W6. Soil solutions were collected monthly from September to December 1993 and June to July 1994. Based on their findings, the authors suggested that the movement of Pb from the O_a horizon to the B_h and B_s horizons occurs via organic colloids or as free-dissolved Pb^{2+} ions and that it is immobilized in the mineral layer as the Pb forms are adsorbed. The authors further suggested that either increases *or* decreases in pH levels may foster higher Pb mobility. Moreover, they explained that lower pH might increase Pb mobility by increasing free-dissolved Pb^{2+} levels, while higher pH may increase mobility as more Pb is complexed with dissolved organic carbon (DOC) and inorganic ligands.

E.3 Surface Water

Wang et al. (1995) collected stream water samples from Bear Brook (west of HBEF reference watershed W6). Samples were collected in 1993 on a monthly basis over a 1-year period. The investigators reported using rigorous cleaning techniques to prevent contamination of water samples (e.g., sample collection equipment was acid-cleaned; sample handling was conducted in a pressure positive clean room). Stream samples were collected, filtered, and acidified using ultrapure HNO_3. Pb was measured using graphite furnace atomic absorption spectrophotometry (GFAAS). The reported stream dissolved Pb concentrations ranged from about 5 to 15 parts per trillion (ppt) for the sampling period. The authors noted that the measured Pb levels in their study were 10 to 100 times lower than those reported in Driscoll et al. (1988), concluding that this discrepancy is mostly likely due to measurement error resulting from prior use of nonclean techniques rather than to a real change in Pb levels. Nevertheless, both studies found that the soil profile serves as a Pb sink, drastically reducing dissolved Pb levels as it moves through the soil layers to streams. Wang et al. (1995) reported a reduction in dissolved Pb of about 5 ppb to about 5 ppt as it moves from the O_a horizon to streams, concluding that the contribution of dissolved Pb from soils to streams is insignificant (less than 0.2 g·ha^{-1}·yr^{-1}).

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Appendix F

Primary Pb Smelter Case Study Media Concentrations

As discussed in Chapter 4, the media concentrations for the primary Pb smelter case study were estimated using a combination of modeling approaches and monitoring data. Additional details for estimating media concentrations for the primary Pb smelter case study location are provided in this appendix. Section F.1 is a presentation of Pb air concentrations, dry deposition rates, and soil Pb concentrations obtained from modeling the area around the primary Pb smelter. Section F.2 presents the measured soil, surface water, and sediment data analyzed for the ecological risk assessment. Section F.3 presents the analysis performed for identifying the modeling approach that was ultimately selected for estimating indoor dust concentrations for residences around the primary Pb smelting facility.

F.1 Primary Pb Smelter Modeled Pb Concentrations for Use in the Human Exposure and Health Risk Assessments

The first part of Appendix F, comprised of Exhibits F-1 through F-5, provides a summary of the Pb air concentrations, dry deposition rates, and soil Pb concentrations (based on dry deposition rates) obtained at the block group and block level from modeling the area around the primary Pb smelter. Exhibit F-1 shows the ratios of exposure concentrations to ambient air concentrations from the National Air Toxics Assessment (NATA) for the Census tracts surrounding the primary Pb smelter. Exhibit F-2 contains block-group and block-level summaries of modeled annual average air concentrations and dry deposition rates for Pb; counts of population and children under 7 years of age; modeled annual average exposure concentrations for the general population and children under 4 years of age; and the modeled soil Pb concentration (based on dry deposition rates). The modeled Pb air and exposure concentrations, dry deposition rates, and soil concentrations presented in Exhibit F-2 are based on "current conditions." In Exhibit F-2, some of the modeled air concentrations for the primary Pb smelter exceeded the current NAAQS for Pb. Exhibit F-3 presents modeled air and exposure concentrations, dry deposition rates, and soil concentrations of Pb for the attainment scenario (i.e., current NAAQS standards are not exceeded). Exhibit F-4 is a detailed comparison between modeled air concentrations and monitored concentrations at available air monitors, and Exhibit F-5 is a similar comparison for deposition results. Further discussion of air and soil concentrations used for the human exposure and health risk assessments is provided in Chapter 4, Sections 4.1.2 and 4.1.3, respectively.

Exhibit F-1. Primary Pb Smelter: Ratios of Exposure Concentrations to Ambient Air Concentrations from NATA for Study Area

Tract FIPS	HAPEM/ASPEN Ratios for Children Ages 0 to 4 Years
17133600200	0.40
17133600300	0.39
29099700104	0.40
29099700601	0.42
29099700603	0.40
29099700605	0.38
29099700700	0.41
29099700800	0.40
29099700900	0.37
29099701000	0.39

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006014042	729362.90	4238252.91	9	1	2.72601	1.02295	1.14103	4.65080	128.83	Re-contamination samples nearby
Block	290997006014039	729250.25	4237789.26	65	5	2.68203	1.00645	1.12262	5.19613	294.00	Re-contamination sample in block
Block	290997006014052	729155.30	4237234.24	41	1	2.32738	0.87337	0.97417	1.25085	215.67	Re-contamination sample in block
Block	290997006014032	729366.83	4238338.85	24	1	2.06834	0.77616	0.86574	3.82524	162.39	Re-contamination samples nearby
Block	290997006014048	729235.27	4237980.69	1	0	1.87497	0.70360	0.78481	4.05533	191.33	Re-contamination samples nearby
Block	290997006014033	729422.44	4238455.54	34	1	1.82939	0.68649	0.76573	3.22791	162.39	Re-contamination samples nearby
Block	290997006014051	729133.50	4237807.16	44	6	1.29944	0.48762	0.54391	2.82993	183.71	Re-contamination sample in block

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006014046	729247.56	4238193.09	50	5	1.27820	0.47965	0.53502	2.92586	128.83	Re-contamination sample in block
Block	290997006014027	729515.21	4238636.90	102	14	0.86550	0.32479	0.36227	1.87320	223.08	Re-contamination sample in block
Block	290997006014043	729196.78	4238271.42	29	2	0.83214	0.31227	0.34831	1.98609	149.92	Re-contamination samples nearby
Block	290997006014049	729111.36	4238054.93	33	1	0.75855	0.28465	0.31751	1.86272	167.13	Re-contamination sample in block
Block	290997006014028	729428.81	4238679.89	21	2	0.67228	0.25228	0.28140	1.49391	179.17	Re-contamination samples nearby
Block	290997006014029	729392.81	4238714.21	6	1	0.56946	0.21369	0.23836	1.27541	135.25	Re-contamination sample in block
Block	290997006014050	729071.48	4238169.93	4	1	0.52522	0.19709	0.21984	1.27528	171.00	Re-contamination sample in block

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006014045	729077.95	4238222.62	6	0	0.49061	0.18410	0.20535	1.20626	171.00	Re-contamination samples nearby
Block	290997006014044	729050.34	4238325.84	64	6	0.37145	0.13939	0.15548	0.89760	159.29	Re-contamination samples nearby
Block	290997006014031	729264.54	4238886.27	14	0	0.31235	0.11721	0.13074	0.63665	133.81	Re-contamination sample in block
Block	290997006015016	729023.43	4238545.21	65	8	0.27218	0.10214	0.11393	0.60448	104.98	Re-contamination sample in block
Block	290997006014025	729379.76	4239033.93	168	13	0.26914	0.10100	0.11265	0.53910	115.56	Re-contamination samples nearby
Block	290997006015017	728986.31	4238647.15	68	6	0.22852	0.08575	0.09565	0.47404	152.73	Re-contamination sample in block
Block	290997006015015	729148.25	4238972.84	21	2	0.22613	0.08486	0.09465	0.43252	97.63	Re-contamination samples nearby

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997007002006	729059.80	4236838.74	36	1	0.20643	0.07802	0.08414	0.52405	703.05	Regression equation from EPA soil measurements vs. distance
Block	290997006014021	729457.48	4239296.65	79	2	0.16434	0.06167	0.06879	0.34521	94.80	Re-contamination sample in block
Block	290997006015012	728858.19	4238842.45	173	5	0.14254	0.05349	0.05966	0.27291	63.38	Re-contamination sample in block
Block	290997006015018	728797.34	4238601.41	29	2	0.14210	0.05332	0.05948	0.26696	160.43	Re-contamination samples nearby
Block	290997007002007	728553.89	4237806.92	9	0	0.13955	0.05274	0.05688	0.30351	975.64	Regression equation from EPA soil measurements vs. distance
Block	290997006015001	728967.45	4239229.25	104	11	0.13606	0.05106	0.05695	0.24255	41.67	Re-contamination sample in block
Block	290997006015013	728814.37	4239124.95	7	1	0.12861	0.04826	0.05383	0.22434	52.52	Re-contamination samples nearby

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006015011	728758.89	4238694.23	15	1	0.11967	0.04491	0.05009	0.22659	122.94	Re-contamination samples nearby
Block	290997007002009	728590.84	4238331.02	5	1	0.10478	0.03960	0.04271	0.21515	958.04	Regression equation from EPA soil measurements vs. distance
Block	290997006015019	728660.34	4238434.97	53	5	0.09604	0.03604	0.04020	0.20131	175.83	Re-contamination sample in block
Block	290997007002011	728237.58	4237307.25	6	3	0.08899	0.03363	0.03627	0.19556	556.19	Regression equation from EPA soil measurements vs. distance
Block	290997007002008	728334.88	4238091.55	4	0	0.08653	0.03270	0.03527	0.18440	738.01	Regression equation from EPA soil measurements vs. distance
Block	290997007002012	728584.39	4236783.90	24	3	0.08548	0.03231	0.03484	0.18560	519.18	Regression equation from EPA soil measurements vs. distance
Block	290997006014018	729092.12	4239745.74	54	3	0.08244	0.03094	0.03451	0.19380	399.88	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006014020	728668.17	4239509.57	12	0	0.08166	0.03064	0.03418	0.20622	422.06	Regression equation from EPA soil measurements vs. distance
Block	290997006014019	728586.89	4239850.59	5	0	0.06262	0.02350	0.02621	0.19987	326.82	Regression equation from EPA soil measurements vs. distance
Block	290997006014015	728739.72	4240188.13	120	15	0.05931	0.02226	0.02483	0.22838	277.38	Regression equation from EPA soil measurements vs. distance
Block	290997008001049	728121.83	4237967.39	26	4	0.05749	0.02261	0.02315	0.10466	585.00	Regression equation from EPA soil measurements vs. distance
Block	290997008001048	728023.45	4237701.08	40	0	0.05472	0.02152	0.02203	0.10775	517.46	Regression equation from EPA soil measurements vs. distance
Block	290997008001047	727929.43	4237420.75	29	2	0.05199	0.02044	0.02093	0.11297	446.53	Regression equation from EPA soil measurements vs. distance
Block	290997007002016	728967.40	4236079.82	257	29	0.05192	0.01962	0.02116	0.17830	354.08	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006015010	728267.10	4238772.22	1	0	0.05069	0.01902	0.02122	0.10524	537.17	Regression equation from EPA soil measurements vs. distance
Block	290997007002017	729459.02	4235873.61	40	1	0.04686	0.01771	0.01910	0.17274	323.26	Regression equation from EPA soil measurements vs. distance
Block	290997006014006	728248.57	4241289.02	4	1	0.04638	0.01740	0.01941	0.28438	152.60	Regression equation from EPA soil measurements vs. distance
Block	290997006014007	728721.50	4240803.57	4	1	0.04470	0.01677	0.01871	0.24092	200.38	Regression equation from EPA soil measurements vs. distance
Block	290997008001046	727815.41	4237624.53	11	0	0.04431	0.01742	0.01784	0.10202	426.20	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006013	728097.71	4240224.82	1350	176	0.04427	0.01661	0.01853	0.20897	231.25	Regression equation from EPA soil measurements vs. distance
Block	290997007002020	729595.07	4235653.30	34	0	0.04131	0.01561	0.01684	0.18247	279.98	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012065	728085.71	4241532.82	9	2	0.04125	0.01548	0.01727	0.25331	136.43	Regression equation from EPA soil measurements vs. distance
Block	290997006015002	727830.79	4239565.70	469	95	0.04043	0.01517	0.01692	0.18086	281.93	Regression equation from EPA soil measurements vs. distance
Block	171336003001032	733177.72	4236966.44	11	0	0.04020	0.01725	0.01563	0.26413	138.18	Regression equation from EPA soil measurements vs. distance
Block	290997007002029	728299.71	4235527.81	253	46	0.03953	0.01494	0.01611	0.20949	221.57	Regression equation from EPA soil measurements vs. distance
Block	290997008001000	727894.73	4238256.85	20	3	0.03885	0.01528	0.01564	0.07871	461.04	Regression equation from EPA soil measurements vs. distance
Block	290997008001045	727651.84	4237637.10	30	4	0.03866	0.01520	0.01557	0.10264	375.94	Regression equation from EPA soil measurements vs. distance
Block	290997007002033	728508.56	4235633.67	89	23	0.03823	0.01445	0.01558	0.17519	244.94	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012064	727831.06	4241476.15	5	0	0.03807	0.01429	0.01593	0.23609	133.84	Regression equation from EPA soil measurements vs. distance
Block	290997008001044	727656.50	4237556.45	31	3	0.03770	0.01482	0.01518	0.09817	372.64	Regression equation from EPA soil measurements vs. distance
Block	290997007002030	728370.71	4235325.85	64	7	0.03702	0.01399	0.01509	0.20545	204.82	Regression equation from EPA soil measurements vs. distance
Block	290997007002032	728448.85	4235633.00	35	13	0.03689	0.01394	0.01504	0.16207	241.55	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008004	727854.54	4235378.22	2080	197	0.03673	0.01444	0.01479	0.18222	186.28	Regression equation from EPA soil measurements vs. distance
Block	290997007002014	728207.59	4236027.06	32	2	0.03663	0.01384	0.01493	0.12847	275.91	Regression equation from EPA soil measurements vs. distance
Block	290997007002031	728365.30	4235630.64	9	4	0.03653	0.01381	0.01489	0.16131	236.52	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997007002028	728275.96	4235183.83	42	6	0.03556	0.01344	0.01449	0.20387	188.79	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007003	729089.12	4235020.31	869	77	0.03468	0.01311	0.01413	0.16946	195.10	Regression equation from EPA soil measurements vs. distance
Block	290997008001019	727067.73	4236917.90	5	2	0.03379	0.01329	0.01361	0.15079	229.66	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006011	727442.52	4240285.11	647	45	0.03330	0.01250	0.01394	0.18903	184.96	Regression equation from EPA soil measurements vs. distance
Block	171336003001019	732630.91	4239062.17	9	1	0.03211	0.01378	0.01249	0.19496	169.46	Regression equation from EPA soil measurements vs. distance
Block	290997006012057	727278.47	4241402.03	18	3	0.03204	0.01202	0.01341	0.20020	124.15	Regression equation from EPA soil measurements vs. distance
Block	171336003001030	731517.59	4239632.06	3	0	0.03139	0.01347	0.01221	0.13580	239.29	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997007002021	729929.60	4235175.08	113	12	0.03096	0.01170	0.01262	0.15121	210.72	Regression equation from EPA soil measurements vs. distance
Block	171336002001059	737552.35	4243371.85	18	3	0.03072	0.01311	0.01216	0.06283	35.88	Regression equation from EPA soil measurements vs. distance
Block	290997008001026	727069.87	4235706.28	4	0	0.03039	0.01195	0.01224	0.17894	166.27	Regression equation from EPA soil measurements vs. distance
Block	290997006012052	728065.97	4242288.57	469	79	0.03036	0.01139	0.01271	0.18737	106.57	Regression equation from EPA soil measurements vs. distance
Block	171336002001034	731393.01	4240508.01	2	0	0.03032	0.01294	0.01200	0.16788	181.05	Regression equation from EPA soil measurements vs. distance
Block	290997006012053	727610.40	4242444.35	65	9	0.02957	0.01110	0.01238	0.16602	96.96	Regression equation from EPA soil measurements vs. distance
Block	171336002001058	737866.05	4243527.52	50	5	0.02946	0.01257	0.01166	0.05966	34.10	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012051	727496.28	4242739.01	40	5	0.02878	0.01080	0.01205	0.14616	88.54	Regression equation from EPA soil measurements vs. distance
Block	290997008001023	726770.39	4235878.63	14	2	0.02816	0.01107	0.01134	0.16873	158.16	Regression equation from EPA soil measurements vs. distance
Block	171336002001044	736092.50	4243307.84	310	34	0.02789	0.01190	0.01104	0.06465	43.52	Regression equation from EPA soil measurements vs. distance
Block	290997006012062	726979.17	4241716.73	9	2	0.02768	0.01039	0.01159	0.16055	107.56	Regression equation from EPA soil measurements vs. distance
Block	171336003001018	732645.21	4240142.05	12	0	0.02743	0.01177	0.01067	0.18413	137.91	Regression equation from EPA soil measurements vs. distance
Block	171336002001049	737526.20	4243990.12	25	0	0.02693	0.01149	0.01066	0.05363	34.15	Regression equation from EPA soil measurements vs. distance
Block	171336002001068	737267.02	4244091.56	7	0	0.02678	0.01143	0.01060	0.05378	34.87	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336003001005	736121.22	4241808.07	1	0	0.02669	0.01146	0.01038	0.07529	50.50	Regression equation from EPA soil measurements vs. distance
Block	290997006012059	726996.34	4242096.88	3	0	0.02667	0.01001	0.01116	0.14888	97.74	Regression equation from EPA soil measurements vs. distance
Block	290997006015008	727594.62	4238850.21	2	0	0.02666	0.01000	0.01116	0.07534	322.17	Regression equation from EPA soil measurements vs. distance
Block	290997008001030	726519.70	4235844.35	83	14	0.02661	0.01046	0.01071	0.15980	144.58	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006031	726323.72	4246358.98	6203	737	0.02659	0.01018	0.01054	0.07588	40.03	Regression equation from EPA soil measurements vs. distance
Block	290997006012033	727983.35	4244904.53	2	0	0.02658	0.00997	0.01113	0.09601	56.14	Regression equation from EPA soil measurements vs. distance
Block	290997006012025	729132.19	4243047.79	7	0	0.02619	0.00983	0.01096	0.15366	90.75	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012049	728045.19	4243137.18	17	3	0.02608	0.00979	0.01092	0.13977	83.98	Regression equation from EPA soil measurements vs. distance
Block	171336002001056	737535.07	4243715.70	19	3	0.02578	0.01100	0.01021	0.05408	34.93	Regression equation from EPA soil measurements vs. distance
Block	290997008001025	727049.76	4235855.16	11	0	0.02546	0.01001	0.01025	0.14515	172.51	Regression equation from EPA soil measurements vs. distance
Block	171336003001003	737807.96	4240201.39	84	11	0.02535	0.01088	0.00986	0.06548	42.65	Regression equation from EPA soil measurements vs. distance
Block	290997006012050	727262.39	4242454.74	9	0	0.02518	0.00945	0.01054	0.13719	92.63	Regression equation from EPA soil measurements vs. distance
Block	171336002001050	738021.90	4244044.10	57	9	0.02486	0.01061	0.00984	0.05027	32.13	Regression equation from EPA soil measurements vs. distance
Block	290997008001036	726677.76	4234806.73	35	10	0.02462	0.00968	0.00991	0.14659	117.18	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997008001035	726978.18	4234630.36	96	8	0.02450	0.00963	0.00986	0.14867	119.40	Regression equation from EPA soil measurements vs. distance
Block	290997008001031	726645.79	4235664.11	49	8	0.02444	0.00961	0.00984	0.14362	144.11	Regression equation from EPA soil measurements vs. distance
Block	290997006012027	728340.53	4244960.07	1	0	0.02425	0.00910	0.01015	0.09229	56.30	Regression equation from EPA soil measurements vs. distance
Block	290997008001034	726458.86	4234830.90	50	3	0.02411	0.00948	0.00971	0.14125	112.15	Regression equation from EPA soil measurements vs. distance
Block	290997008001032	726629.13	4235605.07	19	3	0.02380	0.00936	0.00958	0.13884	141.33	Regression equation from EPA soil measurements vs. distance
Block	171336002001066	736981.22	4242795.62	16	1	0.02362	0.01008	0.00935	0.06012	40.59	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008005	728415.30	4234222.77	907	104	0.02348	0.00923	0.00945	0.13723	132.27	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997007002025	729869.34	4234829.04	26	1	0.02279	0.00861	0.00929	0.11679	179.33	Regression equation from EPA soil measurements vs. distance
Block	290997008001029	726473.38	4235421.99	8	3	0.02273	0.00894	0.00915	0.13169	129.35	Regression equation from EPA soil measurements vs. distance
Block	290997008001037	726665.82	4234664.02	44	8	0.02253	0.00886	0.00907	0.13418	112.76	Regression equation from EPA soil measurements vs. distance
Block	290997006012040	727235.14	4243621.25	27	0	0.02239	0.00840	0.00937	0.10087	70.00	Regression equation from EPA soil measurements vs. distance
Block	171336003001002	738906.28	4242577.65	23	0	0.02218	0.00952	0.00863	0.04698	32.09	Regression equation from EPA soil measurements vs. distance
Block	171336002001057	737540.98	4243514.92	26	3	0.02217	0.00946	0.00878	0.05102	35.50	Regression equation from EPA soil measurements vs. distance
Block	290997006012048	727358.98	4243376.33	1	0	0.02214	0.00831	0.00927	0.10889	74.80	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997008001018	726148.91	4237144.61	27	0	0.02211	0.00869	0.00890	0.12769	157.35	Regression equation from EPA soil measurements vs. distance
Block	290997006012043	728139.39	4243773.97	2	0	0.02207	0.00828	0.00924	0.11126	72.21	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007004	729132.59	4234341.77	639	49	0.02196	0.00830	0.00895	0.12756	145.88	Regression equation from EPA soil measurements vs. distance
Block	290997008001017	725800.27	4236056.48	207	22	0.02157	0.00848	0.00868	0.12723	120.13	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008002	726547.58	4234282.49	1087	92	0.02076	0.00816	0.00836	0.12246	100.33	Regression equation from EPA soil measurements vs. distance
Block	171336002001051	737827.95	4244172.70	11	2	0.02074	0.00885	0.00821	0.04471	32.49	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008007	727676.79	4233773.46	1383	141	0.02050	0.00806	0.00825	0.12329	105.12	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012001	728421.23	4246464.88	88	7	0.02029	0.00761	0.00849	0.06602	42.84	Regression equation from EPA soil measurements vs. distance
Block	290997006012037	727572.91	4244649.60	13	0	0.02021	0.00758	0.00846	0.08063	57.84	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008006	728583.13	4233684.14	658	58	0.01989	0.00782	0.00801	0.11747	111.93	Regression equation from EPA soil measurements vs. distance
Block	290997006012021	727622.36	4245152.84	110	6	0.01973	0.00740	0.00826	0.07348	52.61	Regression equation from EPA soil measurements vs. distance
Block	290997006012026	728835.98	4245020.55	2	0	0.01967	0.00738	0.00823	0.08182	56.35	Regression equation from EPA soil measurements vs. distance
Block	290997006012044	727441.70	4243857.29	10	3	0.01920	0.00720	0.00804	0.09113	67.62	Regression equation from EPA soil measurements vs. distance
Block	290997008001033	726064.73	4235169.25	53	0	0.01914	0.00753	0.00771	0.10874	109.89	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012020	727399.40	4245499.97	7	0	0.01903	0.00714	0.00797	0.06701	48.83	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007001	729614.26	4233554.91	688	70	0.01877	0.00709	0.00765	0.11621	110.84	Regression equation from EPA soil measurements vs. distance
Block	290997006012030	728293.96	4244469.02	6	3	0.01865	0.00700	0.00781	0.08781	62.23	Regression equation from EPA soil measurements vs. distance
Block	290997006012041	727449.38	4244460.32	12	2	0.01812	0.00680	0.00758	0.07782	59.62	Regression equation from EPA soil measurements vs. distance
Block	290997006012002	727972.60	4246917.69	18	0	0.01788	0.00671	0.00748	0.05615	39.38	Regression equation from EPA soil measurements vs. distance
Block	290997006012031	727938.98	4244559.96	11	1	0.01786	0.00670	0.00748	0.08092	60.07	Regression equation from EPA soil measurements vs. distance
Block	171336002001041	738509.37	4245076.42	41	8	0.01766	0.00754	0.00699	0.03677	28.13	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
BlkGrp	290997009002	728311.66	4233068.92	783	86	0.01720	0.00713	0.00638	0.09843	91.47	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006051	723624.91	4242046.21	715	62	0.01682	0.00664	0.00637	0.05761	55.39	Regression equation from EPA soil measurements vs. distance
Block	290997006012019	727579.22	4245892.79	13	3	0.01674	0.00628	0.00701	0.05947	45.97	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997009001	727560.50	4233013.02	1338	120	0.01670	0.00693	0.00619	0.09472	84.59	Regression equation from EPA soil measurements vs. distance
Block	171336002001107	735680.14	4242223.36	3	0	0.01669	0.00712	0.00661	0.05544	51.97	Regression equation from EPA soil measurements vs. distance
Block	290997008001042	725103.83	4236817.60	18	3	0.01637	0.00644	0.00659	0.09378	106.01	Regression equation from EPA soil measurements vs. distance
Block	290997008001003	725140.09	4237088.20	13	1	0.01631	0.00641	0.00657	0.09750	109.34	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997008001014	725116.05	4236750.29	2	0	0.01630	0.00641	0.00656	0.09279	105.82	Regression equation from EPA soil measurements vs. distance
Block	290997006012013	727516.48	4246481.73	52	5	0.01613	0.00605	0.00675	0.05335	41.58	Regression equation from EPA soil measurements vs. distance
Block	171336002001033	731924.18	4243353.68	2	0	0.01607	0.00686	0.00636	0.09918	73.41	Regression equation from EPA soil measurements vs. distance
Block	171336002001060	737221.98	4243458.08	12	2	0.01605	0.00685	0.00635	0.04320	37.10	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006054	725924.10	4239158.81	653	63	0.01595	0.00629	0.00604	0.09315	139.00	Regression equation from EPA soil measurements vs. distance
Block	171336003001042	733093.44	4235053.49	5	0	0.01574	0.00676	0.00612	0.10167	104.16	Regression equation from EPA soil measurements vs. distance
Block	290997008001012	724888.21	4236496.57	3	0	0.01557	0.00612	0.00627	0.08680	96.80	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012011	727847.92	4246714.24	7	0	0.01554	0.00583	0.00650	0.05149	40.52	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008003	726064.69	4233841.60	1014	72	0.01547	0.00608	0.00623	0.08743	83.43	Regression equation from EPA soil measurements vs. distance
Block	171336003001017	733925.93	4240803.07	13	2	0.01545	0.00663	0.00601	0.09418	86.98	Regression equation from EPA soil measurements vs. distance
Block	290997006012018	727609.44	4246315.72	37	1	0.01516	0.00569	0.00635	0.05225	42.87	Regression equation from EPA soil measurements vs. distance
Block	290997006012022	728922.03	4245492.53	31	3	0.01510	0.00567	0.00632	0.06484	51.44	Regression equation from EPA soil measurements vs. distance
Block	290997008001005	724770.39	4237068.84	4	0	0.01508	0.00593	0.00607	0.08827	97.59	Regression equation from EPA soil measurements vs. distance
Block	290997006012014	727539.10	4246920.60	38	4	0.01494	0.00561	0.00625	0.04799	38.84	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	290997006012012	727772.31	4246744.42	2	0	0.01475	0.00554	0.00617	0.04898	40.23	Regression equation from EPA soil measurements vs. distance
Block	290997006012016	727715.57	4246528.74	36	8	0.01473	0.00553	0.00617	0.05003	41.56	Regression equation from EPA soil measurements vs. distance
Block	290997006012006	727655.81	4247068.29	20	2	0.01472	0.00552	0.00616	0.04711	38.12	Regression equation from EPA soil measurements vs. distance
Block	290997006012005	727758.77	4247026.77	14	2	0.01472	0.00552	0.00616	0.04757	38.48	Regression equation from EPA soil measurements vs. distance
Block	290997006012015	727633.80	4246861.68	21	0	0.01466	0.00550	0.00614	0.04779	39.32	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997001044	729902.81	4248977.71	1758	164	0.01431	0.00593	0.00579	0.04494	29.80	Regression equation from EPA soil measurements vs. distance
Block	290997006012004	727988.01	4247103.93	7	1	0.01417	0.00532	0.00593	0.04625	38.27	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (μg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336002001032	732434.00	4243775.28	6	0	0.01394	0.00595	0.00552	0.08094	63.83	Regression equation from EPA soil measurements vs. distance
Block	290997006012007	727629.68	4247514.88	1	0	0.01392	0.00522	0.00583	0.04349	35.64	Regression equation from EPA soil measurements vs. distance
Block	171336003001041	734065.76	4234674.59	2	0	0.01383	0.00594	0.00538	0.08788	78.49	Regression equation from EPA soil measurements vs. distance
Block	290997006012010	728232.00	4247333.98	5	0	0.01365	0.00512	0.00571	0.04443	37.16	Regression equation from EPA soil measurements vs. distance
Block	290997008001006	724360.62	4237030.20	10	5	0.01360	0.00535	0.00548	0.07711	86.79	Regression equation from EPA soil measurements vs. distance
Block	290997006012003	728123.39	4247209.74	130	12	0.01353	0.00508	0.00566	0.04440	37.78	Regression equation from EPA soil measurements vs. distance
Block	290997008001010	724327.70	4236523.43	2	0	0.01301	0.00512	0.00524	0.07053	83.40	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
BlkGrp	290997009003	725875.12	4231328.49	2380	254	0.01279	0.00530	0.00474	0.04729	50.99	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007005	728878.10	4232113.24	1086	74	0.01191	0.00450	0.00485	0.06374	73.21	Regression equation from EPA soil measurements vs. distance
Block	171336002001108	735966.95	4242212.54	4	0	0.01176	0.00502	0.00466	0.04172	49.74	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997010001	721139.29	4233404.33	1558	145	0.01156	0.00558	0.00449	0.03319	36.59	Regression equation from EPA soil measurements vs. distance
Block	171336002001009	732976.35	4252069.34	4	0	0.01156	0.00493	0.00458	0.03170	20.01	Regression equation from EPA soil measurements vs. distance
Block	171336002001026	739822.35	4249773.88	2	0	0.01111	0.00474	0.00440	0.02312	17.92	Regression equation from EPA soil measurements vs. distance
Block	171336002001030	732927.82	4245135.58	20	3	0.01100	0.00469	0.00435	0.05512	47.82	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336003001052	738918.72	4232880.44	11	0	0.01091	0.00468	0.00424	0.03608	31.06	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006053	724430.01	4237803.71	1585	139	0.01088	0.00429	0.00412	0.05302	90.57	Regression equation from EPA soil measurements vs. distance
Block	171336003001015	734134.66	4241977.47	3	1	0.01058	0.00454	0.00411	0.05303	69.65	Regression equation from EPA soil measurements vs. distance
Block	171336002001037	732299.98	4246468.60	9	0	0.01052	0.00449	0.00416	0.04504	40.25	Regression equation from EPA soil measurements vs. distance
Block	171336003001038	736866.71	4233738.13	12	0	0.01046	0.00449	0.00407	0.04446	43.36	Regression equation from EPA soil measurements vs. distance
Block	171336002001012	736254.93	4251368.09	3	0	0.01028	0.00439	0.00407	0.02823	19.09	Regression equation from EPA soil measurements vs. distance
Block	171336002001038	732505.82	4248322.47	7	0	0.00998	0.00426	0.00395	0.03564	30.76	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336002001011	735260.35	4251890.35	3	0	0.00994	0.00424	0.00393	0.02735	18.98	Regression equation from EPA soil measurements vs. distance
Block	171336002001004	737525.30	4252254.74	8	0	0.00990	0.00422	0.00392	0.02507	16.82	Regression equation from EPA soil measurements vs. distance
Block	171336003001043	733446.25	4233838.78	2	0	0.00988	0.00424	0.00384	0.06199	76.80	Regression equation from EPA soil measurements vs. distance
Block	171336003001000	740536.58	4241786.83	73	11	0.00975	0.00418	0.00379	0.02808	27.43	Regression equation from EPA soil measurements vs. distance
Block	171336002001003	738581.35	4251459.89	6	1	0.00957	0.00408	0.00379	0.02280	17.00	Regression equation from EPA soil measurements vs. distance
Block	171336002001007	736217.44	4253648.24	2	0	0.00953	0.00407	0.00377	0.02433	15.87	Regression equation from EPA soil measurements vs. distance
Block	171336002001029	734596.43	4245667.61	19	4	0.00943	0.00402	0.00373	0.03802	38.50	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336003001063	740323.26	4238788.24	8	1	0.00925	0.00397	0.00360	0.02775	30.48	Regression equation from EPA soil measurements vs. distance
Block	171336003001054	739740.77	4231971.62	7	0	0.00923	0.00396	0.00359	0.02878	26.76	Regression equation from EPA soil measurements vs. distance
Block	171336003001009	735197.90	4241730.65	9	1	0.00923	0.00396	0.00359	0.04160	59.57	Regression equation from EPA soil measurements vs. distance
Block	171336003001012	734729.52	4241772.57	8	0	0.00920	0.00395	0.00358	0.04312	64.44	Regression equation from EPA soil measurements vs. distance
Block	171336003001006	735393.76	4241891.86	3	0	0.00912	0.00391	0.00355	0.03883	56.52	Regression equation from EPA soil measurements vs. distance
Block	171336003001055	740588.40	4231227.23	4	2	0.00905	0.00388	0.00352	0.02657	23.53	Regression equation from EPA soil measurements vs. distance
Block	171336002001015	733988.46	4249102.54	11	4	0.00901	0.00385	0.00357	0.03057	26.34	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (µg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336003001066	740381.33	4239647.35	9	1	0.00900	0.00386	0.00350	0.02660	29.86	Regression equation from EPA soil measurements vs. distance
Block	171336003001026	736235.65	4239744.29	5	0	0.00895	0.00384	0.00348	0.03773	57.86	Regression equation from EPA soil measurements vs. distance
Block	171336003001010	735066.36	4241875.26	2	0	0.00887	0.00381	0.00345	0.03958	59.91	Regression equation from EPA soil measurements vs. distance
Block	171336002001014	735142.94	4249403.74	6	0	0.00887	0.00379	0.00351	0.02967	24.15	Regression equation from EPA soil measurements vs. distance
Block	171336003001008	735260.73	4241950.60	2	0	0.00875	0.00376	0.00340	0.03781	57.43	Regression equation from EPA soil measurements vs. distance
Block	171336002001018	736016.75	4248018.53	7	0	0.00874	0.00373	0.00346	0.02871	26.44	Regression equation from EPA soil measurements vs. distance
Block	171336002001091	734948.92	4241972.83	2	0	0.00871	0.00372	0.00345	0.03867	60.41	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336003001065	740900.87	4239016.49	10	4	0.00867	0.00372	0.00337	0.02552	28.22	Regression equation from EPA soil measurements vs. distance
Block	171336002001106	735067.40	4241976.28	2	0	0.00866	0.00370	0.00343	0.03804	59.17	Regression equation from EPA soil measurements vs. distance
Block	171336002001103	735405.02	4242188.07	2	0	0.00864	0.00369	0.00342	0.03540	54.54	Regression equation from EPA soil measurements vs. distance
Block	171336003001007	735322.76	4242061.47	7	0	0.00859	0.00369	0.00334	0.03630	56.10	Regression equation from EPA soil measurements vs. distance
Block	171336002001105	735186.97	4242024.19	6	0	0.00858	0.00366	0.00340	0.03702	57.64	Regression equation from EPA soil measurements vs. distance
Block	171336002001073	735024.05	4243274.65	2	0	0.00856	0.00365	0.00339	0.03613	50.44	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006052	722072.13	4239260.36	1569	187	0.00853	0.00337	0.00323	0.02920	51.26	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration (μg/m^3)	Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336002001104	735242.93	4242124.78	8	1	0.00847	0.00361	0.00335	0.03576	56.42	Regression equation from EPA soil measurements vs. distance
Block	171336002001101	735065.65	4242173.14	6	1	0.00845	0.00361	0.00334	0.03618	57.75	Regression equation from EPA soil measurements vs. distance
Block	171336002001093	735279.67	4242393.45	6	0	0.00829	0.00354	0.00328	0.03398	54.30	Regression equation from EPA soil measurements vs. distance
Block	171336002001019	736622.49	4249083.49	2	0	0.00814	0.00347	0.00322	0.02534	22.97	Regression equation from EPA soil measurements vs. distance
Block	171336003001051	738200.79	4232475.57	1	0	0.00813	0.00349	0.00316	0.02756	32.88	Regression equation from EPA soil measurements vs. distance
Block	171336003001044	734283.87	4233329.79	7	0	0.00803	0.00345	0.00312	0.04476	61.50	Regression equation from EPA soil measurements vs. distance
Block	171336002001076	734539.48	4243602.90	4	0	0.00800	0.00341	0.00317	0.03742	51.41	Regression equation from EPA soil measurements vs. distance

Exhibit F-2. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb air concentration ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid Coordinates in NAD83]		[From 2000 Census]		[From ISC-Prime Modeling]	[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes Background]	
Block	171336002001022	737420.01	4248814.08	25	1	0.00754	0.00322	0.00298	0.02241	22.41	Regression equation from EPA soil measurements vs. distance
Block	171336002001070	735389.94	4244507.20	7	0	0.00742	0.00317	0.00294	0.02931	41.27	Regression equation from EPA soil measurements vs. distance
Block	171336002001028	737198.82	4246114.30	19	0	0.00735	0.00314	0.00291	0.02379	29.10	Regression equation from EPA soil measurements vs. distance
Block	171336002001023	738625.88	4249231.42	54	4	0.00642	0.00274	0.00254	0.01839	20.07	Regression equation from EPA soil measurements vs. distance
Block	171336003001058	739334.27	4229409.76	6	0	0.00556	0.00239	0.00216	0.01625	23.36	Regression equation from EPA soil measurements vs. distance
Block	171336003001045	735284.84	4231890.54	2	0	0.00541	0.00232	0.00210	0.02255	44.10	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006014042	729362.90	4238252.91	9	1	1.500000	0.56289	0.62785	4.65080	128.83	Re-contamination samples nearby
Block	290997006014039	729250.25	4237789.26	65	5	1.500000	0.56289	0.62785	5.19613	294.00	Re-contamination sample in block
Block	290997006014052	729155.30	4237234.24	41	1	1.195566	0.44864	0.50043	1.25085	215.67	Re-contamination sample in block
Block	290997006014032	729366.83	4238338.85	24	1	1.500000	0.56289	0.62785	3.82524	162.39	Re-contamination samples nearby
Block	290997006014048	729235.27	4237980.69	1	0	1.483735	0.55678	0.62105	4.05533	191.33	Re-contamination samples nearby
Block	290997006014033	729422.44	4238455.54	34	1	1.493954	0.56062	0.62532	3.22791	162.39	Re-contamination samples nearby
Block	290997006014051	729133.50	4237807.16	44	6	1.209662	0.45393	0.50633	2.82993	183.71	Re-contamination sample in block
Block	290997006014046	729247.56	4238193.09	50	5	1.278124	0.47963	0.53498	2.92586	128.83	Re-contamination sample in block
BlkGrp	290997006013	728097.71	4240224.82	1350	176	0.04427	0.01661	0.01853	0.20897	231.25	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
BlkGrp	290997008004	727854.54	4235378.22	2080	197	0.03673	0.01444	0.01479	0.18222	186.28	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007003	729089.12	4235020.31	869	77	0.03468	0.01311	0.01413	0.16946	195.10	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006011	727442.52	4240285.11	647	45	0.03330	0.01250	0.01394	0.18903	184.96	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006031	726323.72	4246358.98	6203	737	0.02659	0.01018	0.01054	0.07588	40.03	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008005	728415.30	4234222.77	907	104	0.02348	0.00923	0.00945	0.13723	132.27	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007004	729132.59	4234341.77	639	49	0.02196	0.00830	0.00895	0.12756	145.88	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
BlkGrp	290997008002	726547.58	4234282.49	1087	92	0.02076	0.00816	0.00836	0.12246	100.33	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008007	727676.79	4233773.46	1383	141	0.02050	0.00806	0.00825	0.12329	105.12	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008006	728583.13	4233684.14	658	58	0.01989	0.00782	0.00801	0.11747	111.93	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007001	729614.26	4233554.91	688	70	0.01877	0.00709	0.00765	0.11621	110.84	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997009002	728311.66	4233068.92	783	86	0.01720	0.00713	0.00638	0.09843	91.47	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006051	723624.91	4242046.21	715	62	0.01682	0.00664	0.00637	0.05761	55.39	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
BlkGrp	290997009001	727560.50	4233013.02	1338	120	0.01670	0.00693	0.00619	0.09472	84.59	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006054	725924.10	4239158.81	653	63	0.01595	0.00629	0.00604	0.09315	139.00	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997008003	726064.69	4233841.60	1014	72	0.01547	0.00608	0.00623	0.08743	83.43	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997001044	729902.81	4248977.71	1758	164	0.01431	0.00593	0.00579	0.04494	29.80	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997009003	725875.12	4231328.49	2380	254	0.01279	0.00530	0.00474	0.04729	50.99	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997007005	728878.10	4232113.24	1086	74	0.01191	0.00450	0.00485	0.06374	73.21	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
BlkGrp	290997010001	721139.29	4233404.33	1558	145	0.01156	0.00558	0.00449	0.03319	36.59	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006053	724430.01	4237803.71	1585	139	0.01088	0.00429	0.00412	0.05302	90.57	Regression equation from EPA soil measurements vs. distance
BlkGrp	290997006052	722072.13	4239260.36	1569	187	0.00853	0.00337	0.00323	0.02920	51.26	Regression equation from EPA soil measurements vs. distance
Block	290997006014027	729515.21	4238636.90	102	14	0.86550	0.32479	0.36227	1.87320	223.08	Re-contamination sample in block
Block	290997006014043	729196.78	4238271.42	29	2	0.83214	0.31227	0.34831	1.98609	149.92	Re-contamination samples nearby
Block	290997006014049	729111.36	4238054.93	33	1	0.75855	0.28465	0.31751	1.86272	167.13	Re-contamination sample in block
Block	290997006014028	729428.81	4238679.89	21	2	0.67228	0.25228	0.28140	1.49391	179.17	Re-contamination samples nearby
Block	290997006014029	729392.81	4238714.21	6	1	0.56946	0.21369	0.23836	1.27541	135.25	Re-contamination sample in block
Block	290997006014050	729071.48	4238169.93	4	1	0.52522	0.19709	0.21984	1.27528	171.00	Re-contamination sample in block

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (μg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006014045	729077.95	4238222.62	6	0	0.49061	0.18410	0.20535	1.20626	171.00	Re-contamination samples nearby
Block	290997006014044	729050.34	4238325.84	64	6	0.37145	0.13939	0.15548	0.89760	159.29	Re-contamination samples nearby
Block	290997006014031	729264.54	4238886.27	14	0	0.31235	0.11721	0.13074	0.63665	133.81	Re-contamination sample in block
Block	290997006015016	729023.43	4238545.21	65	8	0.27218	0.10214	0.11393	0.60448	104.98	Re-contamination sample in block
Block	290997006014025	729379.76	4239033.93	168	13	0.26914	0.10100	0.11265	0.53910	115.56	Re-contamination samples nearby
Block	290997006015017	728986.31	4238647.15	68	6	0.22852	0.08575	0.09565	0.47404	152.73	Re-contamination sample in block
Block	290997006015015	729148.25	4238972.84	21	2	0.22613	0.08486	0.09465	0.43252	97.63	Re-contamination samples nearby
Block	290997007002006	729059.80	4236838.74	36	1	0.20643	0.07802	0.08414	0.52405	703.05	Regression equation from EPA soil measurements vs. distance
Block	290997006014021	729457.48	4239296.65	79	2	0.16434	0.06167	0.06879	0.34521	94.80	Re-contamination sample in block

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006015012	728858.19	4238842.45	173	5	0.14254	0.05349	0.05966	0.27291	63.38	Re-contamination sample in block
Block	290997006015018	728797.34	4238601.41	29	2	0.14210	0.05332	0.05948	0.26696	160.43	Re-contamination samples nearby
Block	290997007002007	728553.89	4237806.92	9	0	0.13955	0.05274	0.05688	0.30351	975.64	Regression equation from EPA soil measurements vs. distance
Block	290997006015001	728967.45	4239229.25	104	11	0.13606	0.05106	0.05695	0.24255	41.67	Re-contamination sample in block
Block	290997006015013	728814.37	4239124.95	7	1	0.12861	0.04826	0.05383	0.22434	52.52	Re-contamination samples nearby
Block	290997006015011	728758.89	4238694.23	15	1	0.11967	0.04491	0.05009	0.22659	122.94	Re-contamination samples nearby
Block	290997007002009	728590.84	4238331.02	5	1	0.10478	0.03960	0.04271	0.21515	958.04	Regression equation from EPA soil measurements vs. distance
Block	290997006015019	728660.34	4238434.97	53	5	0.09604	0.03604	0.04020	0.20131	175.83	Re-contamination sample in block

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997007002011	728237.58	4237307.25	6	3	0.08899	0.03363	0.03627	0.19556	556.19	Regression equation from EPA soil measurements vs. distance
Block	290997007002008	728334.88	4238091.55	4	0	0.08653	0.03270	0.03527	0.18440	738.01	Regression equation from EPA soil measurements vs. distance
Block	290997007002012	728584.39	4236783.90	24	3	0.08548	0.03231	0.03484	0.18560	519.18	Regression equation from EPA soil measurements vs. distance
Block	290997006014018	729092.12	4239745.74	54	3	0.08244	0.03094	0.03451	0.19380	399.88	Regression equation from EPA soil measurements vs. distance
Block	290997006014020	728668.17	4239509.57	12	0	0.08166	0.03064	0.03418	0.20622	422.06	Regression equation from EPA soil measurements vs. distance
Block	290997006014019	728586.89	4239850.59	5	0	0.06262	0.02350	0.02621	0.19987	326.82	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (μg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006014015	728739.72	4240188.13	120	15	0.05931	0.02226	0.02483	0.22838	277.38	Regression equation from EPA soil measurements vs. distance
Block	290997008001049	728121.83	4237967.39	26	4	0.05749	0.02261	0.02315	0.10466	585.00	Regression equation from EPA soil measurements vs. distance
Block	290997008001048	728023.45	4237701.08	40	0	0.05472	0.02152	0.02203	0.10775	517.46	Regression equation from EPA soil measurements vs. distance
Block	290997008001047	727929.43	4237420.75	29	2	0.05199	0.02044	0.02093	0.11297	446.53	Regression equation from EPA soil measurements vs. distance
Block	290997007002016	728967.40	4236079.82	257	29	0.05192	0.01962	0.02116	0.17830	354.08	Regression equation from EPA soil measurements vs. distance
Block	290997006015010	728267.10	4238772.22	1	0	0.05069	0.01902	0.02122	0.10524	537.17	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m³)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m³)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m³)	Modeled Dry Deposition (g/m²/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997007002017	729459.02	4235873.61	40	1	0.04686	0.01771	0.01910	0.17274	323.26	Regression equation from EPA soil measurements vs. distance
Block	290997006014006	728248.57	4241289.02	4	1	0.04638	0.01740	0.01941	0.28438	152.60	Regression equation from EPA soil measurements vs. distance
Block	290997006014007	728721.50	4240803.57	4	1	0.04470	0.01677	0.01871	0.24092	200.38	Regression equation from EPA soil measurements vs. distance
Block	290997008001046	727815.41	4237624.53	11	0	0.04431	0.01742	0.01784	0.10202	426.20	Regression equation from EPA soil measurements vs. distance
Block	290997007002020	729595.07	4235653.30	34	0	0.04131	0.01561	0.01684	0.18247	279.98	Regression equation from EPA soil measurements vs. distance
Block	290997006012065	728085.71	4241532.82	9	2	0.04125	0.01548	0.01727	0.25331	136.43	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006015002	727830.79	4239565.70	469	95	0.04043	0.01517	0.01692	0.18086	281.93	Regression equation from EPA soil measurements vs. distance
Block	171336003001032	733177.72	4236966.44	11	0	0.04020	0.01725	0.01563	0.26413	138.18	Regression equation from EPA soil measurements vs. distance
Block	290997007002029	728299.71	4235527.81	253	46	0.03953	0.01494	0.01611	0.20949	221.57	Regression equation from EPA soil measurements vs. distance
Block	290997008001000	727894.73	4238256.85	20	3	0.03885	0.01528	0.01564	0.07871	461.04	Regression equation from EPA soil measurements vs. distance
Block	290997008001045	727651.84	4237637.10	30	4	0.03866	0.01520	0.01557	0.10264	375.94	Regression equation from EPA soil measurements vs. distance
Block	290997007002033	728508.56	4235633.67	89	23	0.03823	0.01445	0.01558	0.17519	244.94	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m³)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m³)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m³)	Modeled Dry Deposition (g/m²/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012064	727831.06	4241476.15	5	0	0.03807	0.01429	0.01593	0.23609	133.84	Regression equation from EPA soil measurements vs. distance
Block	290997008001044	727656.50	4237556.45	31	3	0.03770	0.01482	0.01518	0.09817	372.64	Regression equation from EPA soil measurements vs. distance
Block	290997007002030	728370.71	4235325.85	64	7	0.03702	0.01399	0.01509	0.20545	204.82	Regression equation from EPA soil measurements vs. distance
Block	290997007002032	728448.85	4235633.00	35	13	0.03689	0.01394	0.01504	0.16207	241.55	Regression equation from EPA soil measurements vs. distance
Block	290997007002014	728207.59	4236027.06	32	2	0.03663	0.01384	0.01493	0.12847	275.91	Regression equation from EPA soil measurements vs. distance
Block	290997007002031	728365.30	4235630.64	9	4	0.03653	0.01381	0.01489	0.16131	236.52	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m³)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m³)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m³)	Modeled Dry Deposition (g/m²/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997007002028	728275.96	4235183.83	42	6	0.03556	0.01344	0.01449	0.20387	188.79	Regression equation from EPA soil measurements vs. distance
Block	290997008001019	727067.73	4236917.90	5	2	0.03379	0.01329	0.01361	0.15079	229.66	Regression equation from EPA soil measurements vs. distance
Block	171336003001019	732630.91	4239062.17	9	1	0.03211	0.01378	0.01249	0.19496	169.46	Regression equation from EPA soil measurements vs. distance
Block	290997006012057	727278.47	4241402.03	18	3	0.03204	0.01202	0.01341	0.20020	124.15	Regression equation from EPA soil measurements vs. distance
Block	171336003001030	731517.59	4239632.06	3	0	0.03139	0.01347	0.01221	0.13580	239.29	Regression equation from EPA soil measurements vs. distance
Block	290997007002021	729929.60	4235175.08	113	12	0.03096	0.01170	0.01262	0.15121	210.72	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (μg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001059	737552.35	4243371.85	18	3	0.03072	0.01311	0.01216	0.06283	35.88	Regression equation from EPA soil measurements vs. distance
Block	290997008001026	727069.87	4235706.28	4	0	0.03039	0.01195	0.01224	0.17894	166.27	Regression equation from EPA soil measurements vs. distance
Block	290997006012052	728065.97	4242288.57	469	79	0.03036	0.01139	0.01271	0.18737	106.57	Regression equation from EPA soil measurements vs. distance
Block	171336002001034	731393.01	4240508.01	2	0	0.03032	0.01294	0.01200	0.16788	181.05	Regression equation from EPA soil measurements vs. distance
Block	290997006012053	727610.40	4242444.35	65	9	0.02957	0.01110	0.01238	0.16602	96.96	Regression equation from EPA soil measurements vs. distance
Block	171336002001058	737866.05	4243527.52	50	5	0.02946	0.01257	0.01166	0.05966	34.10	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration ($\mu g/m^3$)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012051	727496.28	4242739.01	40	5	0.02878	0.01080	0.01205	0.14616	88.54	Regression equation from EPA soil measurements vs. distance
Block	290997008001023	726770.39	4235878.63	14	2	0.02816	0.01107	0.01134	0.16873	158.16	Regression equation from EPA soil measurements vs. distance
Block	171336002001044	736092.50	4243307.84	310	34	0.02789	0.01190	0.01104	0.06465	43.52	Regression equation from EPA soil measurements vs. distance
Block	290997006012062	726979.17	4241716.73	9	2	0.02768	0.01039	0.01159	0.16055	107.56	Regression equation from EPA soil measurements vs. distance
Block	171336003001018	732645.21	4240142.05	12	0	0.02743	0.01177	0.01067	0.18413	137.91	Regression equation from EPA soil measurements vs. distance
Block	171336002001049	737526.20	4243990.12	25	0	0.02693	0.01149	0.01066	0.05363	34.15	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (μg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (μg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (μg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001068	737267.02	4244091.56	7	0	0.02678	0.01143	0.01060	0.05378	34.87	Regression equation from EPA soil measurements vs. distance
Block	171336003001005	736121.22	4241808.07	1	0	0.02669	0.01146	0.01038	0.07529	50.50	Regression equation from EPA soil measurements vs. distance
Block	290997006012059	726996.34	4242096.88	3	0	0.02667	0.01001	0.01116	0.14888	97.74	Regression equation from EPA soil measurements vs. distance
Block	290997006015008	727594.62	4238850.21	2	0	0.02666	0.01000	0.01116	0.07534	322.17	Regression equation from EPA soil measurements vs. distance
Block	290997008001030	726519.70	4235844.35	83	14	0.02661	0.01046	0.01071	0.15980	144.58	Regression equation from EPA soil measurements vs. distance
Block	290997006012033	727983.35	4244904.53	2	0	0.02658	0.00997	0.01113	0.09601	56.14	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration ($\mu g/m^3$)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012025	729132.19	4243047.79	7	0	0.02619	0.00983	0.01096	0.15366	90.75	Regression equation from EPA soil measurements vs. distance
Block	290997006012049	728045.19	4243137.18	17	3	0.02608	0.00979	0.01092	0.13977	83.98	Regression equation from EPA soil measurements vs. distance
Block	171336002001056	737535.07	4243715.70	19	3	0.02578	0.01100	0.01021	0.05408	34.93	Regression equation from EPA soil measurements vs. distance
Block	290997008001025	727049.76	4235855.16	11	0	0.02546	0.01001	0.01025	0.14515	172.51	Regression equation from EPA soil measurements vs. distance
Block	171336003001003	737807.96	4240201.39	84	11	0.02535	0.01088	0.00986	0.06548	42.65	Regression equation from EPA soil measurements vs. distance
Block	290997006012050	727262.39	4242454.74	9	0	0.02518	0.00945	0.01054	0.13719	92.63	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001050	738021.90	4244044.10	57	9	0.02486	0.01061	0.00984	0.05027	32.13	Regression equation from EPA soil measurements vs. distance
Block	290997008001036	726677.76	4234806.73	35	10	0.02462	0.00968	0.00991	0.14659	117.18	Regression equation from EPA soil measurements vs. distance
Block	290997008001035	726978.18	4234630.36	96	8	0.02450	0.00963	0.00986	0.14867	119.40	Regression equation from EPA soil measurements vs. distance
Block	290997008001031	726645.79	4235664.11	49	8	0.02444	0.00961	0.00984	0.14362	144.11	Regression equation from EPA soil measurements vs. distance
Block	290997006012027	728340.53	4244960.07	1	0	0.02425	0.00910	0.01015	0.09229	56.30	Regression equation from EPA soil measurements vs. distance
Block	290997008001034	726458.86	4234830.90	50	3	0.02411	0.00948	0.00971	0.14125	112.15	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997008001032	726629.13	4235605.07	19	3	0.02380	0.00936	0.00958	0.13884	141.33	Regression equation from EPA soil measurements vs. distance
Block	171336002001066	736981.22	4242795.62	16	1	0.02362	0.01008	0.00935	0.06012	40.59	Regression equation from EPA soil measurements vs. distance
Block	290997007002025	729869.34	4234829.04	26	1	0.02279	0.00861	0.00929	0.11679	179.33	Regression equation from EPA soil measurements vs. distance
Block	290997008001029	726473.38	4235421.99	8	3	0.02273	0.00894	0.00915	0.13169	129.35	Regression equation from EPA soil measurements vs. distance
Block	290997008001037	726665.82	4234664.02	44	8	0.02253	0.00886	0.00907	0.13418	112.76	Regression equation from EPA soil measurements vs. distance
Block	290997006012040	727235.14	4243621.25	27	0	0.02239	0.00840	0.00937	0.10087	70.00	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001002	738906.28	4242577.65	23	0	0.02218	0.00952	0.00863	0.04698	32.09	Regression equation from EPA soil measurements vs. distance
Block	171336002001057	737540.98	4243514.92	26	3	0.02217	0.00946	0.00878	0.05102	35.50	Regression equation from EPA soil measurements vs. distance
Block	290997006012048	727358.98	4243376.33	1	0	0.02214	0.00831	0.00927	0.10889	74.80	Regression equation from EPA soil measurements vs. distance
Block	290997008001018	726148.91	4237144.61	27	0	0.02211	0.00869	0.00890	0.12769	157.35	Regression equation from EPA soil measurements vs. distance
Block	290997006012043	728139.39	4243773.97	2	0	0.02207	0.00828	0.00924	0.11126	72.21	Regression equation from EPA soil measurements vs. distance
Block	290997008001017	725800.27	4236056.48	207	22	0.02157	0.00848	0.00868	0.12723	120.13	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001051	737827.95	4244172.70	11	2	0.02074	0.00885	0.00821	0.04471	32.49	Regression equation from EPA soil measurements vs. distance
Block	290997006012001	728421.23	4246464.88	88	7	0.02029	0.00761	0.00849	0.06602	42.84	Regression equation from EPA soil measurements vs. distance
Block	290997006012037	727572.91	4244649.60	13	0	0.02021	0.00758	0.00846	0.08063	57.84	Regression equation from EPA soil measurements vs. distance
Block	290997006012021	727622.36	4245152.84	110	6	0.01973	0.00740	0.00826	0.07348	52.61	Regression equation from EPA soil measurements vs. distance
Block	290997006012026	728835.98	4245020.55	2	0	0.01967	0.00738	0.00823	0.08182	56.35	Regression equation from EPA soil measurements vs. distance
Block	290997006012044	727441.70	4243857.29	10	3	0.01920	0.00720	0.00804	0.09113	67.62	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997008001033	726064.73	4235169.25	53	0	0.01914	0.00753	0.00771	0.10874	109.89	Regression equation from EPA soil measurements vs. distance
Block	290997006012020	727399.40	4245499.97	7	0	0.01903	0.00714	0.00797	0.06701	48.83	Regression equation from EPA soil measurements vs. distance
Block	290997006012030	728293.96	4244469.02	6	3	0.01865	0.00700	0.00781	0.08781	62.23	Regression equation from EPA soil measurements vs. distance
Block	290997006012041	727449.38	4244460.32	12	2	0.01812	0.00680	0.00758	0.07782	59.62	Regression equation from EPA soil measurements vs. distance
Block	290997006012002	727972.60	4246917.69	18	0	0.01788	0.00671	0.00748	0.05615	39.38	Regression equation from EPA soil measurements vs. distance
Block	290997006012031	727938.98	4244559.96	11	1	0.01786	0.00670	0.00748	0.08092	60.07	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001041	738509.37	4245076.42	41	8	0.01766	0.00754	0.00699	0.03677	28.13	Regression equation from EPA soil measurements vs. distance
Block	290997006012019	727579.22	4245892.79	13	3	0.01674	0.00628	0.00701	0.05947	45.97	Regression equation from EPA soil measurements vs. distance
Block	171336002001107	735680.14	4242223.36	3	0	0.01669	0.00712	0.00661	0.05544	51.97	Regression equation from EPA soil measurements vs. distance
Block	290997008001042	725103.83	4236817.60	18	3	0.01637	0.00644	0.00659	0.09378	106.01	Regression equation from EPA soil measurements vs. distance
Block	290997008001003	725140.09	4237088.20	13	1	0.01631	0.00641	0.00657	0.09750	109.34	Regression equation from EPA soil measurements vs. distance
Block	290997008001014	725116.05	4236750.29	2	0	0.01630	0.00641	0.00656	0.09279	105.82	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration ($\mu g/m^3$)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population ($\mu g/m^3$)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration ($\mu g/m^3$)	Modeled Dry Deposition ($g/m^2/yr$)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012013	727516.48	4246481.73	52	5	0.01613	0.00605	0.00675	0.05335	41.58	Regression equation from EPA soil measurements vs. distance
Block	171336002001033	731924.18	4243353.68	2	0	0.01607	0.00686	0.00636	0.09918	73.41	Regression equation from EPA soil measurements vs. distance
Block	171336002001060	737221.98	4243458.08	12	2	0.01605	0.00685	0.00635	0.04320	37.10	Regression equation from EPA soil measurements vs. distance
Block	171336003001042	733093.44	4235053.49	5	0	0.01574	0.00676	0.00612	0.10167	104.16	Regression equation from EPA soil measurements vs. distance
Block	290997008001012	724888.21	4236496.57	3	0	0.01557	0.00612	0.00627	0.08680	96.80	Regression equation from EPA soil measurements vs. distance
Block	290997006012011	727847.92	4246714.24	7	0	0.01554	0.00583	0.00650	0.05149	40.52	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001017	733925.93	4240803.07	13	2	0.01545	0.00663	0.00601	0.09418	86.98	Regression equation from EPA soil measurements vs. distance
Block	290997006012018	727609.44	4246315.72	37	1	0.01516	0.00569	0.00635	0.05225	42.87	Regression equation from EPA soil measurements vs. distance
Block	290997006012022	728922.03	4245492.53	31	3	0.01510	0.00567	0.00632	0.06484	51.44	Regression equation from EPA soil measurements vs. distance
Block	290997008001005	724770.39	4237068.84	4	0	0.01508	0.00593	0.00607	0.08827	97.59	Regression equation from EPA soil measurements vs. distance
Block	290997006012014	727539.10	4246920.60	38	4	0.01494	0.00561	0.00625	0.04799	38.84	Regression equation from EPA soil measurements vs. distance
Block	290997006012012	727772.31	4246744.42	2	0	0.01475	0.00554	0.00617	0.04898	40.23	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012016	727715.57	4246528.74	36	8	0.01473	0.00553	0.00617	0.05003	41.56	Regression equation from EPA soil measurements vs. distance
Block	290997006012006	727655.81	4247068.29	20	2	0.01472	0.00552	0.00616	0.04711	38.12	Regression equation from EPA soil measurements vs. distance
Block	290997006012005	727758.77	4247026.77	14	2	0.01472	0.00552	0.00616	0.04757	38.48	Regression equation from EPA soil measurements vs. distance
Block	290997006012015	727633.80	4246861.68	21	0	0.01466	0.00550	0.00614	0.04779	39.32	Regression equation from EPA soil measurements vs. distance
Block	290997006012004	727988.01	4247103.93	7	1	0.01417	0.00532	0.00593	0.04625	38.27	Regression equation from EPA soil measurements vs. distance
Block	171336002001032	732434.00	4243775.28	6	0	0.01394	0.00595	0.00552	0.08094	63.83	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	290997006012007	727629.68	4247514.88	1	0	0.01392	0.00522	0.00583	0.04349	35.64	Regression equation from EPA soil measurements vs. distance
Block	171336003001041	734065.76	4234674.59	2	0	0.01383	0.00594	0.00538	0.08788	78.49	Regression equation from EPA soil measurements vs. distance
Block	290997006012010	728232.00	4247333.98	5	0	0.01365	0.00512	0.00571	0.04443	37.16	Regression equation from EPA soil measurements vs. distance
Block	290997008001006	724360.62	4237030.20	10	5	0.01360	0.00535	0.00548	0.07711	86.79	Regression equation from EPA soil measurements vs. distance
Block	290997006012003	728123.39	4247209.74	130	12	0.01353	0.00508	0.00566	0.04440	37.78	Regression equation from EPA soil measurements vs. distance
Block	290997008001010	724327.70	4236523.43	2	0	0.01301	0.00512	0.00524	0.07053	83.40	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m³)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m³)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m³)	Modeled Dry Deposition (g/m²/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001108	735966.95	4242212.54	4	0	0.01176	0.00502	0.00466	0.04172	49.74	Regression equation from EPA soil measurements vs. distance
Block	171336002001009	732976.35	4252069.34	4	0	0.01156	0.00493	0.00458	0.03170	20.01	Regression equation from EPA soil measurements vs. distance
Block	171336002001026	739822.35	4249773.88	2	0	0.01111	0.00474	0.00440	0.02312	17.92	Regression equation from EPA soil measurements vs. distance
Block	171336002001030	732927.82	4245135.58	20	3	0.01100	0.00469	0.00435	0.05512	47.82	Regression equation from EPA soil measurements vs. distance
Block	171336003001052	738918.72	4232880.44	11	0	0.01091	0.00468	0.00424	0.03608	31.06	Regression equation from EPA soil measurements vs. distance
Block	171336003001015	734134.66	4241977.47	3	1	0.01058	0.00454	0.00411	0.05303	69.65	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m³)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m³)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m³)	Modeled Dry Deposition (g/m²/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001037	732299.98	4246468.60	9	0	0.01052	0.00449	0.00416	0.04504	40.25	Regression equation from EPA soil measurements vs. distance
Block	171336003001038	736866.71	4233738.13	12	0	0.01046	0.00449	0.00407	0.04446	43.36	Regression equation from EPA soil measurements vs. distance
Block	171336002001012	736254.93	4251368.09	3	0	0.01028	0.00439	0.00407	0.02823	19.09	Regression equation from EPA soil measurements vs. distance
Block	171336002001038	732505.82	4248322.47	7	0	0.00998	0.00426	0.00395	0.03564	30.76	Regression equation from EPA soil measurements vs. distance
Block	171336002001011	735260.35	4251890.35	3	0	0.00994	0.00424	0.00393	0.02735	18.98	Regression equation from EPA soil measurements vs. distance
Block	171336002001004	737525.30	4252254.74	8	0	0.00990	0.00422	0.00392	0.02507	16.82	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001043	733446.25	4233838.78	2	0	0.00988	0.00424	0.00384	0.06199	76.80	Regression equation from EPA soil measurements vs. distance
Block	171336003001000	740536.58	4241786.83	73	11	0.00975	0.00418	0.00379	0.02808	27.43	Regression equation from EPA soil measurements vs. distance
Block	171336002001003	738581.35	4251459.89	6	1	0.00957	0.00408	0.00379	0.02280	17.00	Regression equation from EPA soil measurements vs. distance
Block	171336002001007	736217.44	4253648.24	2	0	0.00953	0.00407	0.00377	0.02433	15.87	Regression equation from EPA soil measurements vs. distance
Block	171336002001029	734596.43	4245667.61	19	4	0.00943	0.00402	0.00373	0.03802	38.50	Regression equation from EPA soil measurements vs. distance
Block	171336003001063	740323.26	4238788.24	8	1	0.00925	0.00397	0.00360	0.02775	30.48	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001054	739740.77	4231971.62	7	0	0.00923	0.00396	0.00359	0.02878	26.76	Regression equation from EPA soil measurements vs. distance
Block	171336003001009	735197.90	4241730.65	9	1	0.00923	0.00396	0.00359	0.04160	59.57	Regression equation from EPA soil measurements vs. distance
Block	171336003001012	734729.52	4241772.57	8	0	0.00920	0.00395	0.00358	0.04312	64.44	Regression equation from EPA soil measurements vs. distance
Block	171336003001006	735393.76	4241891.86	3	0	0.00912	0.00391	0.00355	0.03883	56.52	Regression equation from EPA soil measurements vs. distance
Block	171336003001055	740588.40	4231227.23	4	2	0.00905	0.00388	0.00352	0.02657	23.53	Regression equation from EPA soil measurements vs. distance
Block	171336002001015	733988.46	4249102.54	11	4	0.00901	0.00385	0.00357	0.03057	26.34	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001066	740381.33	4239647.35	9	1	0.00900	0.00386	0.00350	0.02660	29.86	Regression equation from EPA soil measurements vs. distance
Block	171336003001026	736235.65	4239744.29	5	0	0.00895	0.00384	0.00348	0.03773	57.86	Regression equation from EPA soil measurements vs. distance
Block	171336003001010	735066.36	4241875.26	2	0	0.00887	0.00381	0.00345	0.03958	59.91	Regression equation from EPA soil measurements vs. distance
Block	171336002001014	735142.94	4249403.74	6	0	0.00887	0.00379	0.00351	0.02967	24.15	Regression equation from EPA soil measurements vs. distance
Block	171336003001008	735260.73	4241950.60	2	0	0.00875	0.00376	0.00340	0.03781	57.43	Regression equation from EPA soil measurements vs. distance
Block	171336002001018	736016.75	4248018.53	7	0	0.00874	0.00373	0.00346	0.02871	26.44	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001091	734948.92	4241972.83	2	0	0.00871	0.00372	0.00345	0.03867	60.41	Regression equation from EPA soil measurements vs. distance
Block	171336003001065	740900.87	4239016.49	10	4	0.00867	0.00372	0.00337	0.02552	28.22	Regression equation from EPA soil measurements vs. distance
Block	171336002001106	735067.40	4241976.28	2	0	0.00866	0.00370	0.00343	0.03804	59.17	Regression equation from EPA soil measurements vs. distance
Block	171336002001103	735405.02	4242188.07	2	0	0.00864	0.00369	0.00342	0.03540	54.54	Regression equation from EPA soil measurements vs. distance
Block	171336003001007	735322.76	4242061.47	7	0	0.00859	0.00369	0.00334	0.03630	56.10	Regression equation from EPA soil measurements vs. distance
Block	171336002001105	735186.97	4242024.19	6	0	0.00858	0.00366	0.00340	0.03702	57.64	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336002001073	735024.05	4243274.65	2	0	0.00856	0.00365	0.00339	0.03613	50.44	Regression equation from EPA soil measurements vs. distance
Block	171336002001104	735242.93	4242124.78	8	1	0.00847	0.00361	0.00335	0.03576	56.42	Regression equation from EPA soil measurements vs. distance
Block	171336002001101	735065.65	4242173.14	6	1	0.00845	0.00361	0.00334	0.03618	57.75	Regression equation from EPA soil measurements vs. distance
Block	171336002001093	735279.67	4242393.45	6	0	0.00829	0.00354	0.00328	0.03398	54.30	Regression equation from EPA soil measurements vs. distance
Block	171336002001019	736622.49	4249083.49	2	0	0.00814	0.00347	0.00322	0.02534	22.97	Regression equation from EPA soil measurements vs. distance
Block	171336003001051	738200.79	4232475.57	1	0	0.00813	0.00349	0.00316	0.02756	32.88	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001044	734283.87	4233329.79	7	0	0.00803	0.00345	0.00312	0.04476	61.50	Regression equation from EPA soil measurements vs. distance
Block	171336002001076	734539.48	4243602.90	4	0	0.00800	0.00341	0.00317	0.03742	51.41	Regression equation from EPA soil measurements vs. distance
Block	171336002001022	737420.01	4248814.08	25	1	0.00754	0.00322	0.00298	0.02241	22.41	Regression equation from EPA soil measurements vs. distance
Block	171336002001070	735389.94	4244507.20	7	0	0.00742	0.00317	0.00294	0.02931	41.27	Regression equation from EPA soil measurements vs. distance
Block	171336002001028	737198.82	4246114.30	19	0	0.00735	0.00314	0.00291	0.02379	29.10	Regression equation from EPA soil measurements vs. distance
Block	171336002001023	738625.88	4249231.42	54	4	0.00642	0.00274	0.00254	0.01839	20.07	Regression equation from EPA soil measurements vs. distance

Exhibit F-3. Primary Pb Smelter: Attainment Scenario Media Concentrations

Spatial Level	Block Group or Block FIPS	UTMx	UTMy	Pop 2000	Children Ages 0 to 7 Years in 2000	Current NAAQS: Modeled Average Annual Pb Air Concentration (µg/m^3)	Current NAAQS: Modeled Average Annual Pb Air Exposure Concentration for Population (µg/m^3)	Current NAAQS: Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Concentration (µg/m^3)	Modeled Dry Deposition (g/m^2/yr)	Estimated Soil Pb Concentration (mg/kg)	Method of Estimating Soil Concentrations
		[Centroid coordinates in NAD83]		[From 2000 census]			[From NATA Ratios]	[From NATA Ratios]	[From ISC-Prime Modeling]	[Includes background]	
Block	171336003001058	739334.27	4229409.76	6	0	0.00556	0.00239	0.00216	0.01625	23.36	Regression equation from EPA soil measurements vs. distance
Block	171336003001045	735284.84	4231890.54	2	0	0.00541	0.00232	0.00210	0.02255	44.10	Regression equation from EPA soil measurements vs. distance

Exhibit F-4. Primary Pb Smelter Air Concentration Modeled Results Compared to Monitor Values

Pilot Analysis ID or Monitor ID	Distance from Main Stack[a] (km)	Two Year Average Modeled Air Conc ($\mu g/m^3$)	Average Monitored Pb concentrations									
			2001		2002		2003		2004		2005	
			Mean Conc ($\mu g/m^3$)	Ratio Monitor to Model	Mean Conc ($\mu g/m^3$)	Ratio Monitor to Model	Mean Conc ($\mu g/m^3$)	Ratio Monitor to Model	Mean Conc ($\mu g/m^3$)	Ratio Monitor to Model	Mean Conc ($\mu g/m^3$)	Ratio Monitor to Model
USEPA Region 7 Database HiVols Values[b]												
100	0.39	1.06	1.3	1.2	1.0	0.9	0.79	0.7				
101	0.45	4.04	0.52	0.1	1.1	0.3						
102	0.53	2.17	6.2	2.8	2.4	1.1	1.0	0.4				
103	0.73	0.186	1.0	5.4	0.80	4.3	0.39	2.1				
AirData Monitored Values[c]												
290990015	0.29	1.71	3.18	1.9	1.29	0.8	1.31	0.8	1.37	0.8	1.56	0.9
290990004	0.34	2.46							1.27	0.5	0.939	0.4
290990005	0.78	0.463	2.11	4.6	0.395	0.9	0.308	0.7	0.436	0.9	0.278	0.6
290990011	0.89	0.323	1.52	4.7	0.508	1.6	0.414	1.3	0.558	1.7	0.282	0.9
290990016	0.92	0.151							0.300	2.0	0.196	1.3
290990013	1.5	0.135	0.904	6.7	0.241	1.8	0.194	1.4	0.437	3.2	0.202	1.5
290990008	1.5	0.044	0.273	6.2	0.068	1.5	0.102	2.3	0.097	2.2	0.137	3.1
290990010	2.2	0.043	0.077	1.8	0.069	1.6	0.034	0.8	0.046	1.1	0.057	1.3
290990009	2.7	0.048	0.332	7.0	0.048	1.0	0.086	1.8	0.105	2.2	0.069	1.5

[a] The facility spans roughly 0.2 by 1 km. Therefore, some monitors will be closer to other emission release points than they are to the main stack.
[b] The Pb air concentration detections (which appear to be TSP Pb) reported in the HiVols dataset of the EPA Region 7 database were averaged for each year. All non-detects were assigned half of the detection limit for averaging. Averages for 2001 are from measurements taken between October and December; averages for 2002 are from measurements taken all year; and averages for 2003 are from measurements taken between January and July.
[c] AirData values are for TSP Pb and are averages obtained from the AirData website monitor reports. In some cases, there is more than one monitor at a site.

Exhibit F-5. Primary Pb Smelter Deposition Modeled Results Compared to Measured Values

Pilot Analysis ID	Distance to Main Stack (km)[a]	Modeled Average Pb Deposition ($g/m^2/yr$)	2003 Measured Deposition				2004 Measured Deposition			
			Height = 1 Foot		Height = 10 Feet		Height = 1 Foot		Height = 10 Feet	
			Average Pb Deposition ($g/m^2/yr$)	Ratio Measured to Modeled	Average Pb Deposition ($g/m^2/yr$)	Ratio Measured to Modeled	Average Pb Deposition ($g/m^2/yr$)	Ratio Measured to Modeled	Average Pb Deposition ($g/m^2/yr$)	Ratio Measured to Modeled
1071	0.38	2.62	1.38	0.53	1.43	0.55	1.71	0.65	1.43	0.55
181	0.49	1.23	0.92	0.75	0.97	0.79	0.97	0.79	0.88	0.71
286	0.56	2.55	0.77	0.30	0.84	0.33	1.35	0.53	2.03	0.80
1073	0.70	0.45	0.68	1.51	0.65	1.44	0.77	1.71	0.72	1.60
444	0.71	1.42	0.35	0.25	0.34	0.24	0.49	0.35	0.77	0.54
240	0.76	0.37	0.30	0.82	0.34	0.91	0.44	1.17	0.48	1.30
207	0.85	0.65	0.26	0.40	0.30	0.45	0.42	0.65	0.54	0.83
576	1.0	0.53	0.16	0.31	0.17	0.32	0.34	0.64	0.37	0.69
531	1.3	0.35	0.13	0.39	0.11	0.31	0.30	0.87	0.23	0.67
1072	1.9	0.21	0.05	0.26	0.22	1.04	0.13	0.63	0.10	0.46
Average				0.55		0.64		0.80		0.82

[a] The facility spans roughly 0.2 by 1 km. Therefore, some monitors will be closer to other emission release points than they are to the main stack.

F.2 Primary Pb Smelter Measured Pb Concentrations for Use in the Ecological Risk Assessment

This section provides a summary of Pb concentrations in soil, surface water, and sediment used to estimate ecological receptor exposure and risk for the primary Pb smelter case study location. Exhibit F-6 presents measured soil concentrations near the facility that were used in the ecological risk assessment. Exhibits F-7, F-8, and F-9 present measured Pb concentrations in surface water bodies near the facility used for the ecological risk assessment. Exhibits F-10, F-11, and F-12 present measured Pb concentrations in sediment near the facility used for the ecological risk assessment. Further discussion of media concentrations used for the ecological risk assessment is provided in Chapter 4, Section 4.1.5.

Exhibit F-6. Soil Sample Clusters Used to Estimate Ecological Receptor Exposure via Soil and Corresponding Pb Analysis Results (ELM 2005)

Sample ID[a]	Measured Pb conc. (mg Pb/kg Soil)	Detection Limit (mg/kg)
Sample Cluster 1: Soil Samples from West of Joachim Creek		
JWSL1 (040)	448	0.30
JWSL2 (080)	472	0.31
JWSL3 (120)	449	0.30
JWSL4 (160)	484	0.31
JWSL5 (200)	476	0.31
JWSL6 (240)	393	0.39
JWSL7 (280)	376	0.38
JWSL8 (320)	363	0.38
JWSL9 (360)	412	0.42
JWSL10 (400)	381	0.40
Mean	425	0.35
Standard deviation	45.7	
Sample Cluster 2: Soil Samples from Crystal City Locations (South of Facility)		
CCSL1 (01)	74.5	0.52
CCSL2 (02)	58.6	0.40
CCSL3 (03)	52.3	0.39
CCSL4 (04)	72.1	0.39
CCSL5 (05)	56.5	0.40
CCSL6 (06)	74.3	0.39
Mean	64.7	0.41
Standard deviation	10.0	
Sample Cluster 3: Soil Samples from 'Near Festers Airport' Locations (South of Facility)		
RTSL1 (001)	68.1	0.48
RTSL2 (002)	56	0.37
RTSL3 (007)	77.1	0.38
RTSL4 (008)	39.8	0.43
RTSL5 (009)	36.6	0.41
RTSL6 (010)	37.6	0.42
RTSL7 (011)	49.5	0.29
RTSL8 (012)	45.7	0.37
RTSL9 (05)	40.5	0.36
RTSL10 (06)	34.3	0.35
Mean	48.5	0.39
Standard deviation	14.4	

[a] Sampling location numerical designations used in ELM (2005) Figure 6 are provided in parentheses.

Exhibit F-7. Joachim Creek Measured Surface Water Dissolved Pb Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Joachim Creek Sample ID No.	Dissolved Pb Concentration for Surface Water (μg/L)[a]	Hardness (mg/L of $CaCO_3$)
Cluster 1		
JC01-01	Not detected	290
JC01-02	Not detected	280
JC01-03	Not detected	280
Cluster 2		
JC02-01	Not detected	270
JC02-02	Not detected	280
JC02-03	Not detected	280
Cluster 3		
JC03-01	Not detected	310
JC03-02	Not detected	270
JC03-03	Not detected	270
JC04-01	Not detected	280
JC04-02	Not detected	280
JC04-03	Not detected	280
Cluster 4		
JC05-01	Not detected	270
JC05-02	Not detected	270
JC05-03	Not detected	280
JC06-01	Not detected	270
JC06-02	Not detected	270
JC06-03	Not detected	270
JC07-01	Not detected	280
JC07-02	Not detected	270
JC07-03	Not detected	270
Cluster 5		
JC08-01	Not detected	270
JC08-02	Not detected	270
JC08-03	Not detected	280

[a] Detection limit for dissolved Pb in this analysis was 3 μg/L.

Exhibit F-8. Mississippi River Measured Dissolved Pb Surface Water Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Location with Respect to Facility and Sample ID No.	Dissolved Pb Concentration for Surface Water (μg/L)[a]	Hardness (mg/L of $CaCO_3$)
Upstream		
PONAR04-01	Not detected	210
Near Facility		
PONAR01-01	Not detected	220
PONAR02-01	Not detected	230
PONAR03-01	Not detected	230
PONAR05-01	Not detected	230
Downstream		
PONAR06-01	Not detected	240
PONAR07-01	Not detected	230

[a] Detection limit for dissolved Pb in this analysis was 3 μg/L.

Exhibit F-9. Other Surface Water, Drainage Areas and U-Shaped Pond, Measured Surface Water Dissolved Pb Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Surface Waters and Sample ID No.[a]	Dissolved Pb Concentration for Surface Water (μg/L)[b]	Hardness (mg/L of $CaCO_3$)
Drainage Area Samples		
CHRDDP-01 (drainage)	Not detected	700
CHRDDP-02 (JC)	Not detected	230
RRDP-02 (MR)	Not detected	240
DAMUP-SW01 (drainage)	Not detected	480
DAMUP-02 (JC)	Not detected	480
U-Shaped Pond		
UPOND-01	Not detected	170
UPOND-02	Not detected	170
UPOND-03	Not detected	160

[a] Abbreviations: JC = Joachim Creek; MR = Mississippi River.
[b] Detection limit for dissolved Pb in this analysis was 3 μg/L.

Exhibit F-10. Joachim Creek Measured Sediment Pb Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Sample Cluster and Sample ID No.	Pb Concentration in Dry Sediment (mg/kg)
Cluster 1	
JC01-01	24.1
JC01-02	53
JC01-03	32.3
Mean	36.5
Standard deviation	14.9
Cluster 2	
JC02-01A	79.9
JC02-01B	55.4
JC02-02	31
JC02-03	57.6
Mean	56.0
Standard deviation	20.0
Cluster 3	
JC03-01	44.3
JC03-02	52.2
JC03-03	54.8
JC04-01	131
JC04-02	164
JC04-03	25.8
Mean	78.7
Standard deviation	55.3
Cluster 4	
JC05-01	25.5
JC05-02	23.8
JC05-03	18.1
JC06-01A	41.1
JC06-01B	29.8
JC06-02	23.3
JC06-03	40.4
JC07-01A	23.7
JC07-01B	25.3
JC07-02	36.7
JC07-03	42
Mean	30.0
Standard deviation	8.5
Cluster 5	
JC08-01	29
JC08-02	35.2
JC08-03	39.3
Mean	34.5
Standard deviation	5.2

Exhibit F-11. Mississippi River Measured Sediment Pb Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Location with Respect to Facility	Sample ID No.	Pb Concentration in Dry Sediment (mg/kg)
Upstream	PONAR04-SD01	10.5
	PONAR04-SD02	10.2
	PONAR04-SD03	15.8
	PONAR04-SD04	8.7
	PONAR04-SD05	28.3
	Mean	14.7
	Standard deviation	8.1
Near Facility	PONAR01-SD01	13.5
	PONAR01-SD02	11.5
	PONAR01-SD03	14.3
	PONAR01-SD04	17.6
	PONAR01-SD05	8.3
	PONAR02-SD01	37.3
	PONAR02-SD02	96.5
	PONAR02-SD03	37.8
	PONAR02-SD04	56.8
	PONAR02-SD05	84
	PONAR03-SD01	39.5
	PONAR03-SD02	17.8
	PONAR03-SD03	32.4
	PONAR03-SD04	48.9
	PONAR03-SD05	37.8
	PONAR05-SD01	16.1
	PONAR05-SD02	6.7
	PONAR05-SD03	9.1
	PONAR05-SD04	6.2
	PONAR05-SD05	10.3
	Mean	30.1
	Standard deviation	25.6
Downstream	PONAR06-SD01	8.4
	PONAR06-SD02	8.6
	PONAR06-SD03	12.9
	PONAR06-SD04	13
	PONAR06-SD05	9.3
	PONAR07-SD01	14.9
	PONAR07-SD02	11.5
	PONAR07-SD03	12.5
	PONAR07-SD04	18.2
	PONAR07-SD05	8.5
	RRDP-SD02	14.8
	Mean	12.1
	Standard deviation	3.2

Exhibit F-12. Other Surface Water, Drainage Areas and U-Shaped Pond, Measured Sediment Pb Concentration Data for Primary Pb Smelter Case Study (ELM 2005)

Sampled Surface Water Body and Sample ID No.	Pb Concentration in Dry Sediment (mg/kg)
Drainage Area	
CHRDDP	110
Drainage Area	
RRDP-02	14.8
U-Shaped Pond	
UPOND-01	190
UPOND-02	278
UPOND-03	153
REFPOND-01	59.3
Mean	170.1
Standard deviation	90.6

F.3 Statistical Modeling for Estimating Pb Concentrations in House Dust for the Primary Pb Smelter

F.3.1 Purpose

The objective of the house dust analysis was to derive a statistical model that could be used to estimate Pb concentrations in house dust from Pb concentrations in other media at locations where the media concentrations had not been directly measured. The models derived were used to estimate house dust Pb concentrations for the census blocks closest to the primary Pb smelter.

F.3.2 Overview of Methods

The primary approach taken in this analysis was to derive regression-type models that describe the relationships among the environmental media concentrations at the primary Pb smelter case study location. This approach was informed by previous analysis completed by EPA and other researchers with similar data. It is possible that more complex approaches (e.g., structural equation modeling) might also be used to explore and/or confirm the relationships among the variables examined. Based on preliminary analyses of the data, the regression analyses were best justified by the quality and quantity of data that were available.

F.3.3 Data Sources

All of the data used in the analyses were obtained electronically from EPA Region 7 (2006). Pb concentrations in residential soil and house and road dust were obtained from samples taken by EPA contractors as part of Superfund investigations conducted in the area around the primary Pb smelter from March 2003 to May 2006 (see Exhibit F-13). The data set also contained Pb loading information related to indoor floor dust, dust obtained from wipe samples, and total dust.

UTM coordinates were provided for all of the samples and were used in the analysis of the spatial patterns of soil and dust contamination. From March 2002 to May 2006, concentrations of Pb in both house dust and residential soil were measured at only 17 locations (homes) near the primary Pb smelter. Pb concentrations in residential soil only were measured at 12 other residential locations, for which there were no accompanying Pb house dust measurements (see Exhibit F-13). Note that the soil measurements were taken post-remediation; thus, the effect of the facility operations on soil Pb concentrations (from stack emissions or road dust) are expected to be greatly attenuated compared to the soil Pb concentrations that existed prior to remediation.

Exhibit F-13. Primary Pb Smelter: Summary of Pb Concentrations in Residential Soil and House and Road Dust

Data Field	Sampling Locations[a]	Sampling Dates	Samples per Location Mean (Range)	Total Samples	Distances to Main Stack Mean (Range) (m)	Pb Concentration Mean (Range) mg/kg
House Dust	17	March 2002 to May 2006	9 (3 to 20)	159	898 (395 to 1,594)	1,544 (348 to 3,812)
Residential Soil	17	March 2002 to May 2006	13 (4 to 23)	215	898 (395 to 1,594)	81 (31 to 139)
Road Dust	21[b]	May 2002 to April 2006	42 (14 to 139)	891	609 (161 to 1,693)	28,300 (1,570 to 111,000)

[a] Number of locations include both house dust and residential soil Pb data.
[b] Sampling locations with the same UTM coordinates were combined.

Anecdotal evidence suggested that road dust may be a major source of Pb in the air and in house dust at residences around the primary Pb smelter; therefore, an analysis was performed to identify the relationships between road dust Pb concentrations and house dust Pb concentrations. EPA contractors analyzed almost 900 road dust samples from May 2002 to April 2006. The road dust samples were taken from 21 locations ranging from 161 to about 1,700 meters (m) from the main stack.[1] Pb sampling locations for road dust differed from the residential soil and house dust sample locations; the distance between road dust sampling locations and the 17 residential soil and house dust sampling locations ranged from 52 to 1328 m (average 280 m).

In the absence of spatially detailed air concentration monitoring data, the house dust levels were fit to modeled air concentrations. Long-term average air concentrations predicted in the ISC-Prime "current conditions" runs for census block and block group centroids located near the residential house dust sampling locations were used (see Exhibit F-14). Again, the centroids were not precisely co-located with any of the house dust sampling locations.

[1] Samples were taken from both lanes of the road at most sites, but the results have been combined, using averages or geometric means, for samples from "inbound" and "outbound" lanes.

Exhibit F-14. Primary Pb Smelter: Modeled Indoor Dust Concentrations

Block Group or Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)			Attainment Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-Air Sources	From Air-Related Sources	Total	From Non-Air Sources	From Air-Related Sources	Total
290997006014042	1	52	5211	5263	52	3283	3335
290997006014039	5	52	5146	5198	52	3283	3335
290997006014052	1	52	4613	4664	52	2752	2804
290997006014032	1	52	4211	4262	52	3283	3335
290997006014033	1	52	3829	3881	52	3273	3325
290997006014051	6	52	2937	2989	52	2777	2829
290997006014046	5	52	2899	2951	52	2899	2951
290997006014027	14	52	2139	2191	52	2139	2191
290997006014043	2	52	2074	2126	52	2074	2126
290997006014049	1	52	1929	1981	52	1929	1981
290997006014028	2	52	1755	1806	52	1755	1806
290997006014029	1	52	1540	1591	52	1540	1591
290997006014050	1	52	1444	1496	52	1444	1496
290997006014044	6	52	1096	1148	52	1096	1148
290997006015016	8	52	854	905	52	854	905
290997006014025	13	52	846	898	52	846	898
290997006015017	6	52	741	792	52	741	792
290997006015015	2	52	734	786	52	734	786
290997006014021	2	52	564	616	52	564	616
290997006015012	5	52	501	552	52	501	552
290997006015018	2	52	499	551	52	499	551
290997006015001	11	52	481	533	52	481	533
290997006015013	1	52	459	511	52	459	511
290997006015011	1	52	432	483	52	432	483
290997006015019	5	52	357	409	52	357	409
290997007002006	1	31	132	163	31	132	163
290997007002009	1	31	67	98	31	67	98
290997007002011	3	31	57	88	31	57	88
290997007002012	3	31	55	86	31	55	86
290997006014018	3	31	53	84	31	53	84
290997006014015	15	31	38	69	31	38	69
290997008001049	4	31	37	68	31	37	68
290997008001047	2	31	33	64	31	33	64

Exhibit F-14. Primary Pb Smelter: Modeled Indoor Dust Concentrations

Block Group or Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)			Attainment Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-Air Sources	From Air-Related Sources	Total	From Non-Air Sources	From Air-Related Sources	Total
290997007002016	29	31	33	64	31	33	64
290997007002017	1	31	30	61	31	30	61
290997006014006	1	31	30	61	31	30	61
290997006014007	1	31	29	60	31	29	60
290997006013	176	31	28	60	31	28	60
290997006012065	2	31	26	58	31	26	58
290997006015002	95	31	26	57	31	26	57
290997007002029	46	31	25	57	31	25	57
290997008001000	3	31	25	56	31	25	56
290997008001045	4	31	25	56	31	25	56
290997007002033	23	31	24	56	31	24	56
290997008001044	3	31	24	55	31	24	55
290997007002030	7	31	24	55	31	24	55
290997007002032	13	31	24	55	31	24	55
290997008004	197	31	23	55	31	23	55
290997007002014	2	31	23	55	31	23	55
290997007002031	4	31	23	55	31	23	55
290997007002028	6	31	23	54	31	23	54
290997007003	77	31	22	53	31	22	53
290997008001019	2	31	22	53	31	22	53
290997006011	45	31	21	53	31	21	53
171336003001019	1	31	20	52	31	20	52
290997006012057	3	31	20	52	31	20	52
290997007002021	12	31	20	51	31	20	51
171336002001059	3	31	20	51	31	20	51
290997006012052	79	31	19	51	31	19	51
290997006012053	9	31	19	50	31	19	50
171336002001058	5	31	19	50	31	19	50
290997006012051	5	31	18	50	31	18	50
290997008001023	2	31	18	49	31	18	49
171336002001044	34	31	18	49	31	18	49
290997006012062	2	31	18	49	31	18	49
290997008001030	14	31	17	48	31	17	48

Exhibit F-14. Primary Pb Smelter: Modeled Indoor Dust Concentrations

Block Group or Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)			Attainment Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-Air Sources	From Air-Related Sources	Total	From Non-Air Sources	From Air-Related Sources	Total
290997006031	737	31	17	48	31	17	48
290997006012049	3	31	17	48	31	17	48
171336002001056	3	31	16	48	31	16	48
171336003001003	11	31	16	47	31	16	47
171336002001050	9	31	16	47	31	16	47
290997008001036	10	31	16	47	31	16	47
290997008001035	8	31	16	47	31	16	47
290997008001031	8	31	16	47	31	16	47
290997008001034	3	31	15	47	31	15	47
290997008001032	3	31	15	46	31	15	46
171336002001066	1	31	15	46	31	15	46
290997008005	104	31	15	46	31	15	46
290997007002025	1	31	15	46	31	15	46
290997008001029	3	31	15	46	31	15	46
290997008001037	8	31	14	46	31	14	46
171336002001057	3	31	14	45	31	14	45
290997007004	49	31	14	45	31	14	45
290997008001017	22	31	14	45	31	14	45
290997008002	92	31	13	45	31	13	45
171336002001051	2	31	13	45	31	13	45
290997008007	141	31	13	44	31	13	44
290997006012001	7	31	13	44	31	13	44
290997008006	58	31	13	44	31	13	44
290997006012021	6	31	13	44	31	13	44
290997006012044	3	31	12	44	31	12	44
290997007001	70	31	12	43	31	12	43
290997006012030	3	31	12	43	31	12	43
290997006012041	2	31	12	43	31	12	43
290997006012031	1	31	11	43	31	11	43
171336002001041	8	31	11	43	31	11	43
290997009002	86	31	11	42	31	11	42
290997006051	62	31	11	42	31	11	42
290997006012019	3	31	11	42	31	11	42

Exhibit F-14. Primary Pb Smelter: Modeled Indoor Dust Concentrations

Block Group or Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)			Attainment Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-Air Sources	From Air-Related Sources	Total	From Non-Air Sources	From Air-Related Sources	Total
290997009001	120	31	11	42	31	11	42
290997008001042	3	31	10	42	31	10	42
290997008001003	1	31	10	42	31	10	42
290997006012013	5	31	10	42	31	10	42
171336002001060	2	31	10	42	31	10	42
290997006054	63	31	10	41	31	10	41
290997008003	72	31	10	41	31	10	41
171336003001017	2	31	10	41	31	10	41
290997006012018	1	31	10	41	31	10	41
290997006012022	3	31	10	41	31	10	41
290997006012014	4	31	10	41	31	10	41
290997006012016	8	31	9	41	31	9	41
290997006012005	2	31	9	41	31	9	41
290997006012006	2	31	9	41	31	9	41
290997001044	164	31	9	40	31	9	40
290997006012004	1	31	9	40	31	9	40
290997008001006	5	31	9	40	31	9	40
290997006012003	12	31	9	40	31	9	40
290997009003	254	31	8	39	31	8	39
290997007005	74	31	8	39	31	8	39
290997010001	145	31	7	39	31	7	39
171336002001030	3	31	7	38	31	7	38
290997006053	139	31	7	38	31	7	38
171336003001015	1	31	7	38	31	7	38
171336003001000	11	31	6	38	31	6	38
171336002001003	1	31	6	37	31	6	37
171336002001029	4	31	6	37	31	6	37
171336003001063	1	31	6	37	31	6	37
171336003001009	1	31	6	37	31	6	37
171336003001055	2	31	6	37	31	6	37
171336002001015	4	31	6	37	31	6	37
171336003001066	1	31	6	37	31	6	37
171336003001065	4	31	6	37	31	6	37

Exhibit F-14. Primary Pb Smelter: Modeled Indoor Dust Concentrations

Block Group or Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)			Attainment Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-Air Sources	From Air-Related Sources	Total	From Non-Air Sources	From Air-Related Sources	Total
290997006052	187	31	5	37	31	5	37
171336002001104	1	31	5	37	31	5	37
171336002001101	1	31	5	37	31	5	37
171336002001022	1	31	5	36	31	5	36
171336002001023	4	31	4	35	31	4	35

F.3.4 Data Manipulation

Developing house dust prediction models for the primary Pb smelter presented a number of challenges. Primary among these challenges was that the house dust, residential soil, and road dust measurements were not taken at the same time. In addition, as noted above, the road dust and air modeling input data were spatially removed from the residential house dust sampling locations. For these reasons, two approaches were taken to develop data sets for the regression analyses.

F.3.4.1 Data Set Based on Spatial-Temporal "Windows"

The first approach involved identifying observations from each of the various environmental media that were "close" together in time and space, and using these data to create composite data points. Each data point represented the mean or geometric mean value of all of the observations in each medium within defined spatial and temporal "windows" of the nearest residential house dust observation. The house dust observations were used as the centers of the "windows" because there were fewer house dust observations than for any other medium (and because house dust was the "dependent" variable whose values were being predicted). The dimensions of the windows were defined for two purposes:

1. Maintain, to the extent possible, the temporal and spatial relationships between the house dust measurements and the measured/estimated concentrations in the other media; and
2. Include as many input data as possible per window.

After looking at a number of possible approaches to stratify the data, window "dimensions" were chosen with the following spatial and temporal boundaries:

- House dust measurements from the same location occurring within ± 30 days of each other.

- Residential soil measurements within ± 30 days of the nearest house dust sampling date for the same residence (soil and house dust measurements were taken from the same locations, so no spatial window was necessary).

- Road dust Pb measurements from all of the sampling locations within 300 m, or the closest road dust sampling location, taken within ± 60 days of the house dust sample. If there was no road dust sampling location within 300 m, then the measurements from the nearest road dust sampling locations were used. For five homes, there were no road dust samples taken within 60 ± days of any house dust sampling events. In these cases, all of the road dust results from within 300 m, or from the closest road dust sampling location, were averaged as above, and associated with the house dust sampling dates in the database.

- Average long-term air Pb concentrations estimated for census block centroids within 200 m of each house dust Pb measurement. Most house dust sampling locations had several centroids less than 200 m away, but it was found that averaging the air Pb levels within 200 m produced the highest correlations with the house dust samples. Because no specific date is associated with the estimated air Pb concentrations, the same air concentration values were used for all "windows" for each house dust location.

The resulting data set contained 125 records comprised of air, residential soil, and house and road dust data, along with a number of other auxiliary variables relating to location, distance from the main stack, and sampling dates.

F.3.4.2 Data Set Based on House Dust Sampling Locations

The number of samples (and therefore the amount of information) combined into the observations for the individual "windows" varied greatly. The "house" data set, which combines all of the data for each house dust sampling location was developed in order to avoid giving undue weight to points with little observational data. The "house" data set includes 17 values for each variable. Each value corresponds to the mean (or geometric mean) of all of the values for that variable for all the "windows" associated with a given house dust sampling location. As described below, the modeling results obtained using the "windows" and the "house" data sets are quite similar.

F.3.5 Results of the Statistical Analysis

F.3.5.1 Exploratory Analysis

A number of exploratory analyses were conducted to confirm the general relationships within the data set, and to rule out the potential for omitted variables to affect the results of the regression analysis. The exploratory analyses included graphical summaries and calculation of simple correlation coefficients among the variables and their log-transformed values.

For House 3, there were two house dust Pb measurements (5,230 and 23,640 mg/kg) that were very different from all other measurements taken at that house (mean = 1,190 mg/kg, 15 samples). The two different measurements were the last two samples taken at House 3 (in April and October 2005). It was decided to omit the two measurements from the analysis on the grounds that there may have been some factor affecting house dust Pb concentrations during this period that had not been operating previously. After removal of these two data points, the house dust Pb concentrations in the "windows" data set were well-represented by a lognormal distribution, and thus both the untransformed and log-transformed house dust Pb values were included in the regression analyses, as discussed below.

As expected, average house dust Pb concentrations were found to be highly (inversely) correlated with distance to the main stack, when the "windows" data set was used (see Exhibit F-15). If it is believed that Pb in air is a major contributor to house dust Pb levels, these results are to be expected. A weak, but significant inverse correlation between house dust Pb concentrations and residential soil Pb was found. The reason for this correlation was not clear, and the correlation loses significance in some, but not all, regression models when measures of air Pb are also included. Average and log-transformed road dust Pb concentrations were found to be weakly correlated with similarly expressed house dust Pb statistics, but the correlations lost significance when included in models with residential soil and air Pb (see Exhibit F-16).

Exhibit F-15. Primary Pb Smelter: Relationship Between House Dust Pb Concentrations and Distance from Main Stack

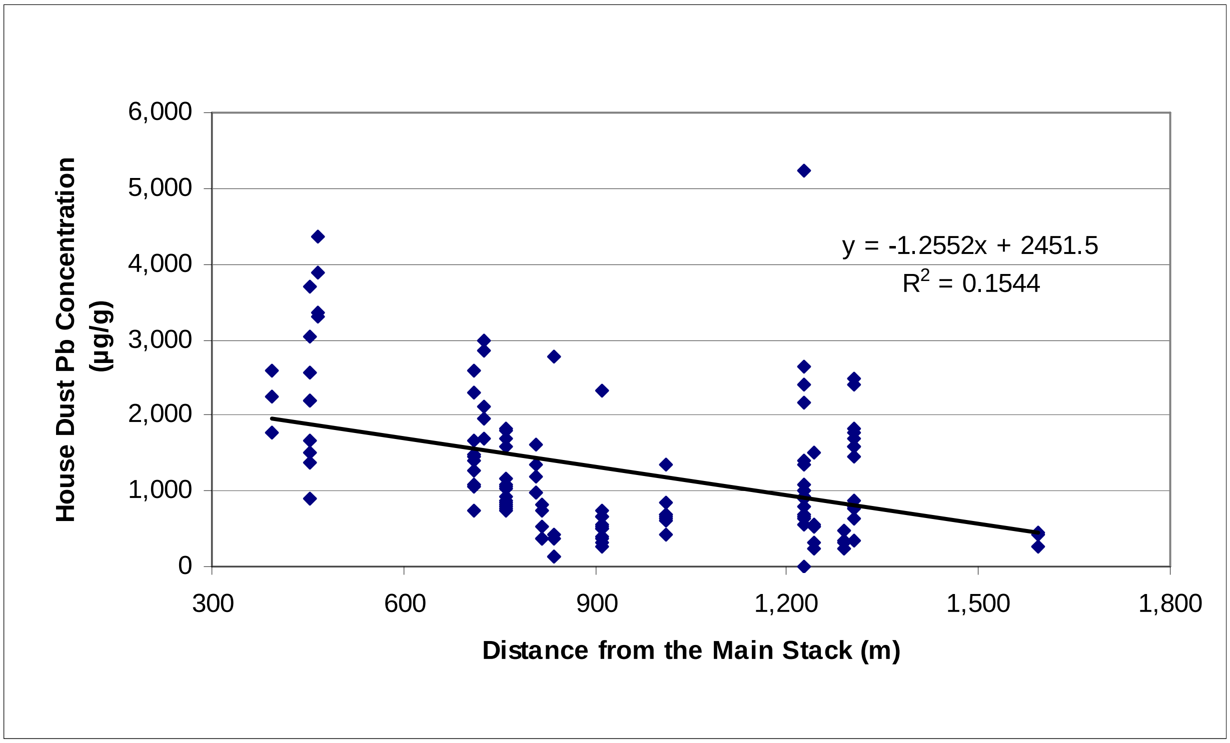
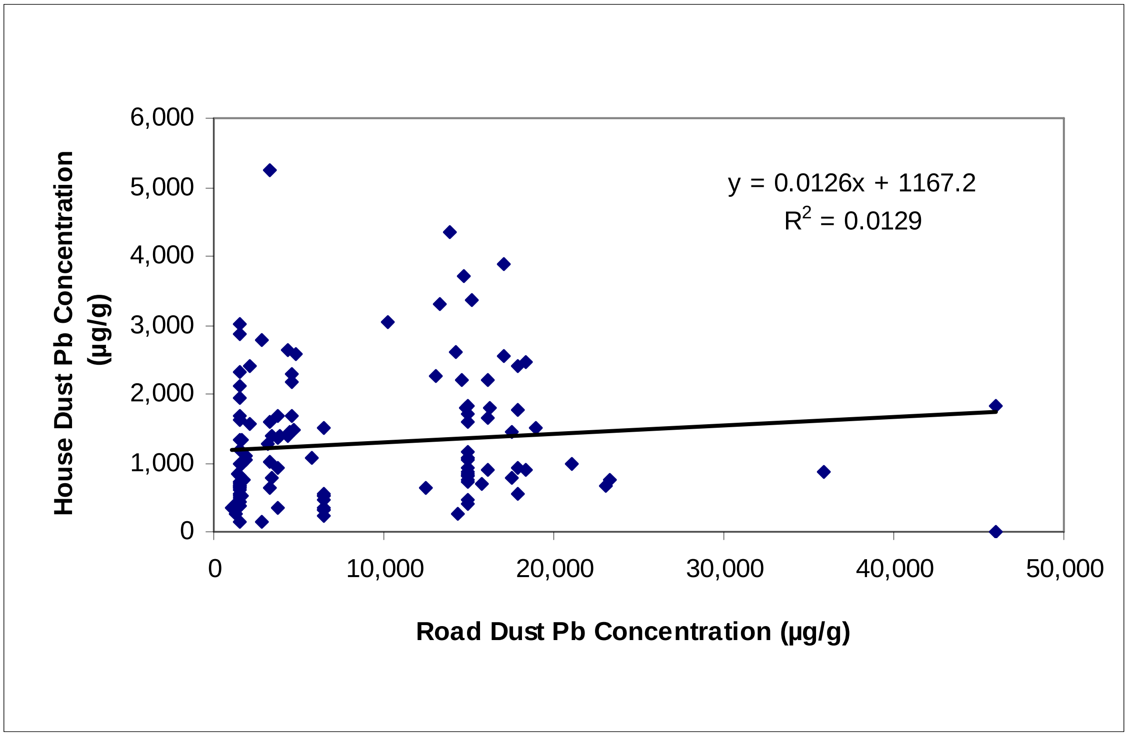


Exhibit F-16. Primary Pb Smelter: Relationship Between Road Dust Pb Concentrations and Nearby House Dust Pb Concentrations



F.3.5.2 Regression Modeling

A systematic search for multiple regression models was conducted to maximize the proportion of explained variance (R^2) in house dust (DustPb) and the log-transformed house dust (lnDustPb) values. Forwards and backwards stepwise regression methods were used, with contribution to the F-statistic as the inclusion/removal criterion for untransformed and log-transformed variables. Residential soil and road dust Pb were "forced" back into well-fitted models to determine their effect on R^2 and on the coefficients for other variables. Probability plots of residuals and other diagnostics were used to evaluate the quality of the fit and to look for failures in assumptions required to produce unbiased estimates. Results of the best regressions derived from the "windows" data set are summarized in Exhibit F-17.

Exhibit F-17 Indoor Dust Regression Models Tested and Summary of Regression Analysis Results for the "Windows" Data Set [a,b]

Model	Independent Variable	Dependent Variable(s)	Estimated Values (m)	Coefficient p-Value(s)	Adjusted R^2
W1	DustPb	Intercept	685.7	0.000	0.322
		AIR_200	1625.2	0.000	
W2	DustPb	Intercept	1012.5	0.000	0.367
		SoilAvg	-4.699	0.002	
		AIR_200	1687.2	0.000	
W3	DustPb	Intercept	2285.6	0.000	0.343
		lnAIR200	791.0	0.000	
W4	DustPb	Intercept	2863.2	0.000	0.426
		SoilAvg	-6.317	0.000	
		lnAIR200	874.7	0.000	
W5	LnDustPb	Intercept	6.4540	0.000	0.268
		AIR_200	1.2361	0.000	
W6	LnDustPb	Intercept	6.6725	0.000	0.294
		SoilAvg	-0.0031	0.020	
		AIR_200	1.2777	0.000	
W7	LnDustPb	Intercept	7.7366	0.000	0.336
		lnAIR200	0.6520	0.000	
W8	LnDustPb	Intercept	8.1506	0.000	0.395
		SoilAvg	-0.0045	0.000	
		lnAIR200	0.7120	0.000	

[a] Abbreviations: DustPb = Pb concentration in house dust; LnDustPb = log-transformed value; AIR_200 = ambient air concentration within 200 meters (m) of house dust sampling locations; lnAIR200 = log-transformed concentration; and SoilAvg = average residential soil Pb concentration.

[b] Models labeled "W" were developed considering media concentrations within a particular spatial distance and temporal period of the nearest house dust observation.

In all of the regressions, it was found that variables representing ambient air Pb concentrations at monitors within 200 m of house dust sampling locations (AIR200, lnAIR200) accounted for the bulk of explained variance in house dust Pb levels (see Exhibit F-17). The only other variable related to environmental concentrations that retained significance and/or resulted in increases in explained variance was the average residential soil Pb (SoilAvg). Surprisingly, the sign of the coefficient for residential soil Pb was consistently negative in those regressions where it was statistically significant. When the natural log of house dust Pb concentration (LnDustPb) was used as the "independent" variable, the R^2 values for regressions including air and residential soil Pb levels were reduced slightly compared to the results obtained for the analogous regressions using the untransformed DustPb values. However, the pattern of regression residuals was considerably improved (more nearly normal) when the log-transformed house dust was fit instead of the untransformed values. No variables representing road dust Pb concentration were ever found to retain statistical significance when air-related variables were included in the regression models.

Similar results were found when regressions were fit using the "house" data set, as shown in Exhibit F-18. Similar coefficient values are seen for analogous regressions based on the two data sets. One difference from the results obtained using the "windows" data was that, when Air200 was included in the regression, SoilAvg became statistically insignificant. Residential soil was significant in the other variants of the model shown in Exhibit F-18. As with the "windows" data set, the road dust Pb was never a significant predictor of house dust Pb levels. Also, patterns of residuals were again superior when the models were fit to LnDustPb, rather than DustPb. The results (coefficients and significance) were not significantly altered when regressions were conducted weighted by the numbers of observations at each house, instead of uniformly weighted.

Exhibit F-18. Summary of Regression Analysis Results for the "House" Data Set [a,b]

Model	Independent Variable	Dependent Variable(s)	Estimated Values (m)	Coefficient p-Value(s)	Adjusted R^2
H1	DustPb	Intercept	701.2	0.008	0.489
		Air200	1573.1	0.001	
H2	DustPb	Intercept	2447.1	0.000	0.609
		LnAir200	883.4	0.000	
H3	DustPb	Intercept	3313.2	0.000	0.722
		SoilAvg	-11.349	0.019	
		LnAir200	946.9	0.000	
H4	LnDustPb	Intercept	6.3928	0.000	0.447
		Air200	1.2185	0.002	
H5	LnDustPb	Intercept	7.7892	0.000	0.625
		LnAir200	0.7200	0.000	
H6	LnDustPb	Intercept	8.3884	0.000	0.701
		SoilAvg	-0.0079	0.045	
		LnAir200	0.7639	0.000	

[a] Abbreviations: DustPb = Pb concentration in house dust; LnDustPb = log-transformed value; AIR_200 = ambient air concentration within 200 meters (m) of house dust sampling locations; LnAIR200 = log-transformed concentration; and SoilAvg = average residential soil Pb concentration.

[b] Models labeled "H" were created considering all of the data for each house dust sampling location.

F.3.5.3 Comparison of Predicted to Observed Dust Pb Concentrations at Primary Pb Smelter

In order to evaluate potential approaches for estimating house dust Pb levels at the primary Pb smelter, the estimated house dust Pb concentrations derived using several of the better-fitting models (as judged by adjusted R^2 values) were compared based on the "windows" data (see Exhibit F-19).

Exhibit F-19. Comparison of Three Best "Windows" Models with EPA AGG (Air+Soil) Model and "Windows" Data

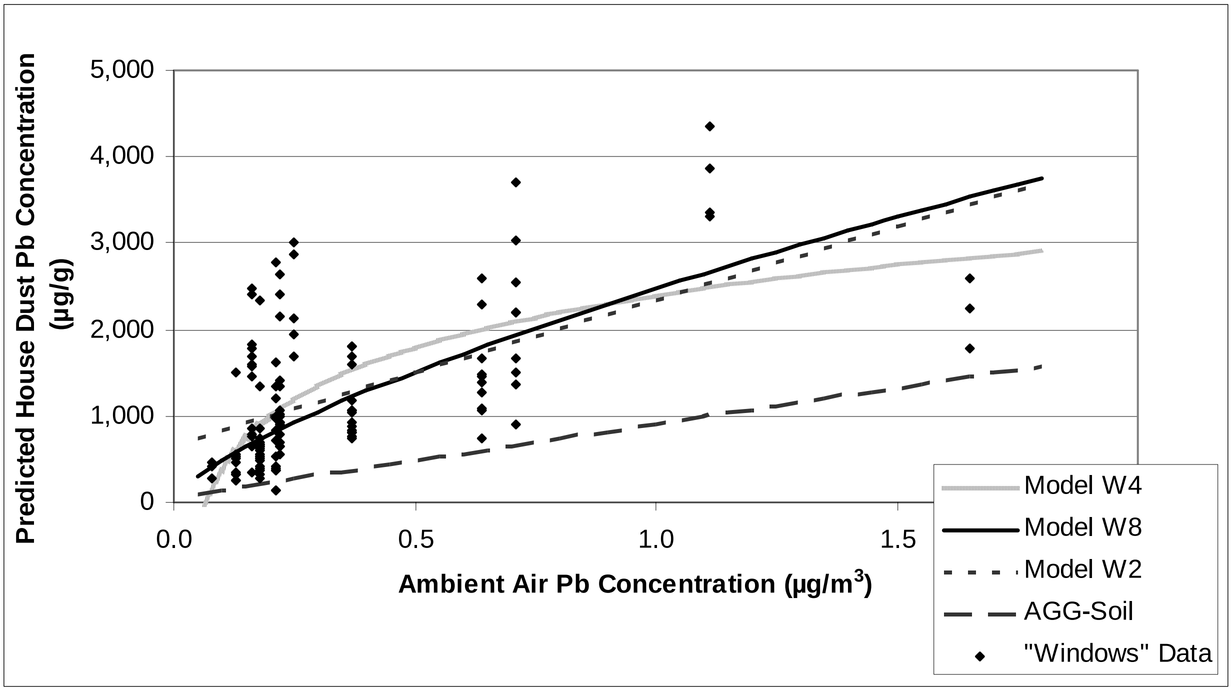
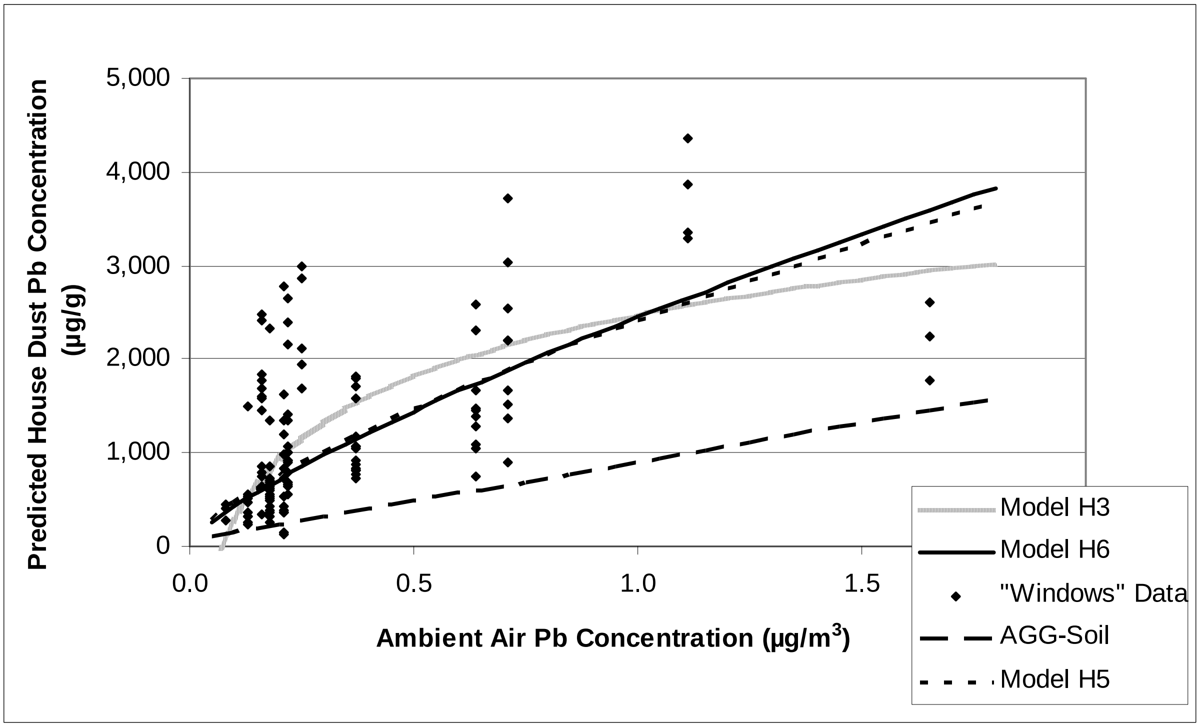


Exhibit F-20 shows the dust concentrations predicted by the three best-fitting models derived using the "house" data. For models that included coefficients for residential soil Pb (all except H5), the assumed residential soil Pb concentration was held constant at its mean value. In both cases, the predictions are compared to those derived using EPA's AGG Model (Soil+Dust) model (USEPA 1989, see also Section 4.1.4).

Exhibit F-20. Comparison of Best-Fitting "House" Models with the EPA AGG (Air+Soil) Model and the "Windows" House Dust Data



It can be seen that the models derived from the “windows” and “house” data sets have generally the same form. The relationships were highly curved and negative house dust values were predicted at low air concentrations, when the models were fit to untransformed house dust data (W4, H3). For the “windows” models, predicted house dust Pb concentration values were very similar when the model was fit using untransformed air concentrations (W2) or log-transformed values (W8.) Also, predicted house dust Pb levels were very similar for the two log-log “house” models when soil concentration was included (H6) or excluded (H6) from the model.

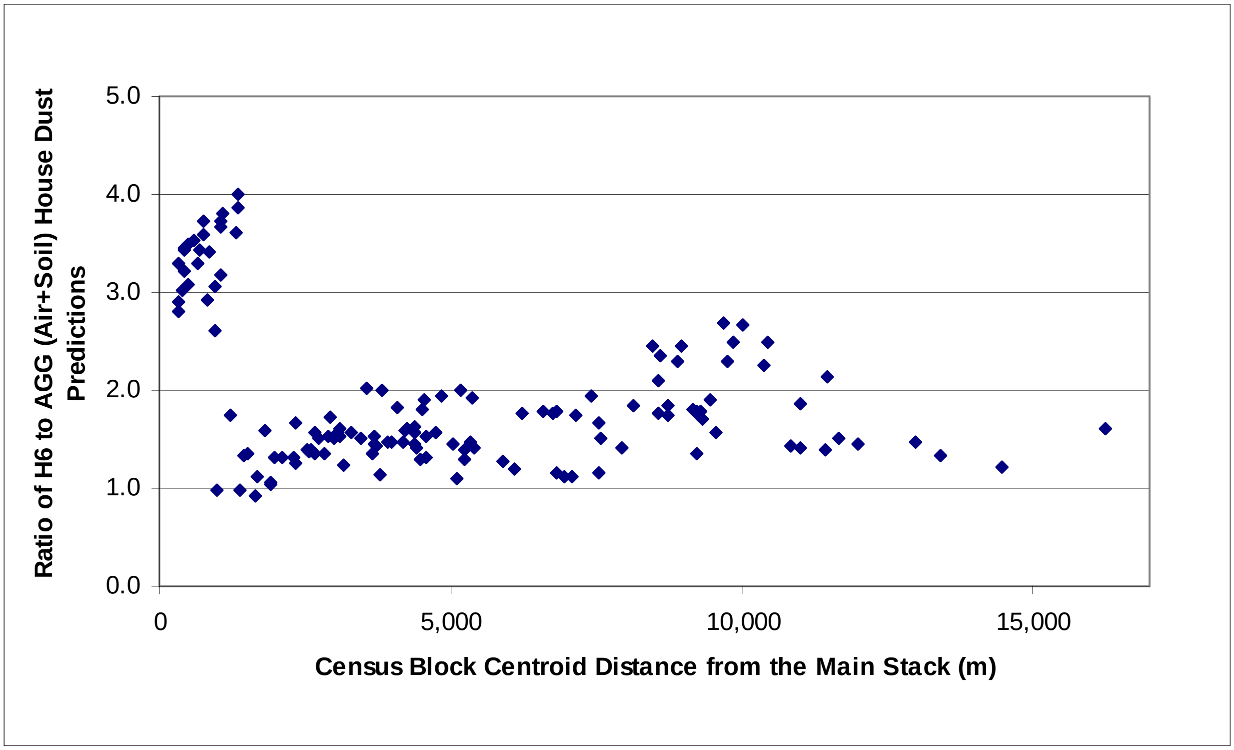
All of the models predicted substantially higher house dust Pb concentrations than the EPA AGG (Air + Soil) model. In addition, the AGG model predicts house dust levels that are far below the observed values.

F.3.6 Primary Pb Smelter: Selection of the House Dust Modeling Approach

The original intent in the pilot phase was to use the same house dust estimation approach across all of the case studies and exposure scenarios to maintain consistency and comparability. As discussed in Chapter 4, EPA’s generic AGG regression models (U.S. EPA 1989) were selected as the primary tools for estimating house dust Pb concentrations for the secondary Pb smelter and near roadway case studies. However, the availability of site-specific house dust and residential soil concentration data from the primary Pb smelter case study location raised the possibility of developing site-specific models as described above. The modeling approach that was ultimately selected for the primary Pb smelter represents a compromise that combines the site-specific and generic models based on their applicability to specific areas covered in the case study.

As shown in Exhibit F-15, soil and house dust samples from which the site-specific models were developed were available only out to a distance of about 1,600 m from the facility's main stack. Thus, using the site-specific model to predict house dust Pb concentrations at greater distances would be subject to great uncertainty. Thus, the decision was made to use the site-specific model H6 to predict house dust Pb concentrations at centroids out to a distance of 1.5 km from the site, and to use the AGG (Air + Dust) generic model to predict house dust Pb levels for the large majority of the centroids at greater distances. As shown in Exhibit F-21, the H6 model predicted much higher house dust concentrations at centroids closer to the facility than the AGG model, but at longer distances, the predictions (to the extent that the comparison is valid) became more similar. For centroids around 1,500 m (1.5 km) from the facility, the average H6 model predicted house dust Pb concentrations of 310 µg/g, while the average AGG (Air + Soil) prediction was approximately 270 µg/g. At 5,000 m (5 km), the average predictions from the two models were 120 µg/g and 80 µg/g, respectively.

Exhibit F-21. Ratio of House Dust Concentrations Predicted by the H6 and AGG (Air+Soil) Models versus Distance from the Main Stack for the Primary Pb Smelter Case Study Census Block Centroids



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Appendix G

Secondary Pb Smelter Case Study
Media Concentrations

Appendix G presents summaries of the Pb air concentrations and dry deposition rates obtained from modeling the area around the secondary Pb smelter. Exhibit G-1 shows the ratios of exposure concentrations to ambient air concentrations from the National Air Toxics Assessment (NATA) for the Census tracts surrounding the secondary Pb smelter facility. Exhibit G-2 contains block-level summaries of modeled annual average air concentrations and dry deposition rates for Pb; counts of population and children under seven years of age; modeled annual average exposure concentrations for the general population and children under four years of age; and the modeled soil Pb concentrations (based on total deposition). Exhibit G-3 presents the modeled indoor dust concentrations of Pb for the case study. Exhibit G-4 contains input parameters for the secondary Pb smelter facility soil calculations. Additional discussion regarding these modeling results is provided in Chapter 4 of the report.

Exhibit G-1. Secondary Pb Smelter: Ratios of Exposure Concentrations to Ambient Air Concentrations from NATA for Study Area

Tract FIPS	HAPEM/ASPEN Ratios for Children Ages 0 to 4 Years
01109988900	0.46
01109989000	0.44
01109989100	0.45
01109989200	0.45

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003045	596945.89	3516998.82	308	8	0	0.53547	0.21315	0.23796	0.435192	367.73	382.73	1148.18
011099890003046	597384.76	3517378.86	584	22	2	0.08634	0.03437	0.03837	0.040328	33.14	48.14	144.41
011099890002042	597048.30	3517914.85	683	29	1	0.06387	0.02543	0.02839	0.029802	31.70	46.70	140.09
011099890003042	595760.05	3517699.22	1132	64	6	0.04204	0.01673	0.01868	0.015370	12.63	27.63	82.89
011099890002050	597768.32	3517688.87	1044	44	5	0.03153	0.01255	0.01401	0.011616	10.57	25.57	76.72
011099890002051	597843.54	3517381.20	1039	9	0	0.03048	0.01213	0.01355	0.012110	9.95	24.95	74.85
011099890002049	597868.49	3517835.95	1198	15	0	0.02569	0.01022	0.01141	0.008990	8.18	23.18	69.55
011099890002041	597471.11	3518350.18	1262	8	1	0.02557	0.01018	0.01136	0.009540	10.15	25.15	75.44
011099890003137	597982.25	3516826.22	1255	41	1	0.02529	0.01007	0.01124	0.012738	11.59	26.59	79.78
011099890002048	597803.82	3518119.53	1304	2	0	0.02426	0.00966	0.01078	0.008204	7.61	22.61	67.82
011099891003019	598086.36	3517373.43	1280	3	0	0.02114	0.00855	0.00955	0.007946	7.23	22.23	66.70
011099891003011	598045.45	3517692.51	1304	8	1	0.02103	0.00850	0.00950	0.007204	6.56	21.56	64.67
011099891003012	598018.66	3517884.74	1354	29	2	0.02048	0.00828	0.00925	0.006894	6.27	21.27	63.82
011099891003018	598124.43	3517443.33	1325	10	0	0.02007	0.00811	0.00906	0.007288	6.63	21.63	64.90
011099890002047	597778.54	3518333.95	1435	18	3	0.01990	0.00792	0.00884	0.006830	6.22	21.22	63.65
011099890003139	598176.93	3516722.25	1474	18	0	0.01933	0.00770	0.00859	0.009412	8.57	23.57	70.70
011099890003138	598215.10	3517052.16	1423	30	4	0.01927	0.00767	0.00856	0.007830	7.13	22.13	66.38
011099890002039	597690.35	3518557.85	1556	45	3	0.01850	0.00736	0.00822	0.006386	5.81	20.81	62.44
011099890002026	596955.29	3518834.09	1566	57	5	0.01823	0.00726	0.00810	0.006612	7.03	22.03	66.10
011099890002023	596485.56	3518721.84	1483	257	32	0.01813	0.00722	0.00806	0.005934	6.31	21.31	63.93
011099891003021	598208.76	3517356.46	1401	7	0	0.01810	0.00732	0.00817	0.006652	6.05	21.05	63.16
011099890003141	598221.39	3516573.52	1576	21	0	0.01799	0.00716	0.00799	0.009078	7.46	22.46	67.38
011099891003013	597960	3518349.78	1574	121	5	0.01766	0.00714	0.00797	0.005638	5.13	20.13	60.39
011099890002025	596744.76	3518890.56	1617	16	2	0.01764	0.00702	0.00784	0.006264	6.66	21.66	64.99
011099890002038	597786.31	3518512.40	1576	46	5	0.01742	0.00693	0.00774	0.005924	5.39	20.39	61.17
011099891003010	598223.62	3517693.2	1474	44	1	0.01699	0.00687	0.00767	0.005592	5.09	20.09	60.27
011099891003009	598271.58	3517538.46	1485	25	2	0.01672	0.00676	0.00755	0.005692	5.18	20.18	60.54
011099890002024	596571.02	3518877.84	1621	54	14	0.01661	0.00661	0.00738	0.005452	5.80	20.80	62.40
011099890002033	597585.35	3518738.26	1656	7	0	0.01655	0.00659	0.00736	0.005632	5.13	20.13	60.38
011099890002032	597527.66	3518740.73	1632	15	0	0.01642	0.00654	0.00730	0.005704	5.19	20.19	60.57
011099890002036	597702.68	3518709.13	1689	24	3	0.01642	0.00653	0.00730	0.005518	5.02	20.02	60.07
011099890002031	597436.39	3518744.91	1598	17	0	0.01621	0.00645	0.00720	0.005820	5.30	20.30	60.89

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099891003022	598350.04	3517255.01	1540	13	1	0.01551	0.00627	0.00700	0.005678	5.17	20.17	60.50
011099890002037	597812.91	3518703.13	1745	21	1	0.01535	0.00611	0.00682	0.005070	4.61	19.61	58.84
011099891003023	598433.21	3517108.67	1632	13	4	0.01506	0.00609	0.00680	0.005588	5.09	20.09	60.26
011099891002021	597707.54	3518832.13	1797	8	0	0.01493	0.00604	0.00674	0.004892	4.45	19.45	58.36
011099890003140	598413.07	3516694.27	1705	56	5	0.01493	0.00594	0.00664	0.006740	6.13	21.13	63.40
011099890002027	596966.10	3519056.91	1789	104	9	0.01486	0.00592	0.00660	0.005164	4.70	19.70	59.10
011099891003014	598030.8	3518507.67	1735	18	0	0.01474	0.00596	0.00666	0.004618	4.20	19.20	57.61
011099890003094	597006.49	3515773.92	1514	21	1	0.01454	0.00579	0.00646	0.006922	5.69	20.69	62.06
011099890003102	595847.65	3516333.48	1346	2	0	0.01430	0.00569	0.00636	0.005202	5.59	20.59	61.77
011099891003015	597967.8	3518615.91	1772	22	0	0.01419	0.00573	0.00641	0.004542	4.13	19.13	57.40
011099891002018	597832.35	3518830.29	1861	37	5	0.01408	0.00569	0.00636	0.004558	4.15	19.15	57.44
011099891003025	598501.53	3517165.76	1695	44	9	0.01373	0.00555	0.00620	0.004932	4.05	19.05	57.16
011099890002029	597445.00	3518926.39	1769	7	1	0.01363	0.00543	0.00606	0.004772	4.34	19.34	58.03
011099890002028	597241.29	3518988.96	1767	23	4	0.01359	0.00541	0.00604	0.004760	5.06	20.06	60.19
011099891002019	597753.76	3518949.47	1922	27	2	0.01348	0.00545	0.00609	0.004304	3.92	18.92	56.75
011099891003008	598472.09	3517364.01	1664	117	7	0.01344	0.00543	0.00607	0.004666	3.83	18.83	56.50
011099890002018	596922.55	3519203.64	1932	64	4	0.01341	0.00534	0.00596	0.004562	4.15	19.15	57.46
011099890002019	596660.95	3519199.16	1930	14	2	0.01337	0.00532	0.00594	0.004330	3.94	18.94	56.82
011099891003016	597977	3518733.91	1868	62	5	0.01319	0.00533	0.00596	0.004204	3.83	18.83	56.48
011099890003087	597698.07	3515929.61	1612	31	3	0.01303	0.00519	0.00579	0.007136	6.49	21.49	64.48
011099890003093	597133.93	3515772.10	1537	41	4	0.01302	0.00518	0.00579	0.006388	5.25	20.25	60.75
011099890002020	596587.72	3519207.54	1945	8	0	0.01284	0.00511	0.00571	0.004030	3.67	18.67	56.00
011099890002015	596849.94	3519327.92	2053	30	1	0.01237	0.00492	0.00550	0.004138	4.40	19.40	58.20
011099891003017	598120.29	3518690.94	1929	81	0	0.01236	0.00500	0.00558	0.003756	3.42	18.42	55.26
011099891002020	597662.52	3519041.32	1961	14	2	0.01230	0.00497	0.00555	0.003984	3.63	18.63	55.88
011099890002022	596491.38	3519202.61	1954	20	4	0.01227	0.00488	0.00545	0.003712	3.38	18.38	55.13
011099890003092	597245.86	3515771.14	1566	25	0	0.01191	0.00474	0.00529	0.005954	4.89	19.89	59.68
011099891002010	597702.3	3519112.25	2042	3	0	0.01159	0.00469	0.00523	0.003686	3.35	18.35	55.06
011099890003083	598193.76	3515950.45	1916	18	5	0.01153	0.00459	0.00512	0.006048	5.50	20.50	61.51
011099891002013	597942.66	3519087.32	2137	63	1	0.01152	0.00466	0.00520	0.003530	3.21	18.21	54.64
011099890003090	597503.32	3515766.52	1660	18	0	0.01149	0.00457	0.00511	0.005880	5.35	20.35	61.05
011099890003088	597628.12	3515769.72	1713	13	2	0.01145	0.00456	0.00509	0.005960	5.42	20.42	61.27

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003091	597367.28	3515768.25	1606	11	0	0.01141	0.00454	0.00507	0.005750	4.72	19.72	59.17
011099890003086	597976.45	3515896.98	1805	29	1	0.01141	0.00454	0.00507	0.006062	4.98	19.98	59.94
011099891003005	598664.77	3517648.04	1892	38	2	0.01127	0.00455	0.00509	0.003472	3.16	18.16	54.48
011099891002017	598120.31	3518869.32	2064	15	1	0.01127	0.00455	0.00509	0.003420	3.11	18.11	54.34
011099890001035	596510.45	3519371.09	2117	16	3	0.01103	0.00439	0.00490	0.003276	2.98	17.98	53.94
011099890002030	597470.02	3519192.68	2028	6	0	0.01100	0.00438	0.00489	0.003708	3.44	18.44	55.31
011099891001017	598560.9	3518427.07	2096	164	1	0.01094	0.00442	0.00494	0.003038	2.82	17.82	53.45
011099891002011	597815.68	3519226.2	2195	32	1	0.01072	0.00433	0.00484	0.003276	2.98	17.98	53.94
011099891003000	598659.21	3517958.38	1971	141	10	0.01071	0.00433	0.00484	0.003098	2.55	17.55	52.64
011099891002012	597978.43	3519216.66	2266	42	4	0.01065	0.00430	0.00481	0.003176	2.89	17.89	53.67
011099890003089	597850.22	3515772.83	1827	52	6	0.01062	0.00423	0.00472	0.005574	4.58	19.58	58.74
011099891002007	597676.46	3519204.72	2115	23	1	0.01062	0.00429	0.00479	0.003380	3.13	18.13	54.40
011099891003004	598724.81	3517760.48	1975	31	3	0.01042	0.00421	0.00471	0.003090	2.81	17.81	53.44
011099890002011	597427.96	3519271.90	2090	5	0	0.01041	0.00414	0.00463	0.003498	3.24	18.24	54.73
011099891002014	598121.13	3519053.75	2210	64	8	0.01037	0.00419	0.00468	0.003120	2.89	17.89	53.68
011099891001012	598628.30	3518579.90	2238	19	0	0.01020	0.00412	0.00461	0.002770	2.57	17.57	52.70
011099890002017	596258.29	3519370.74	2167	32	4	0.00985	0.00392	0.00438	0.002760	2.51	17.51	52.54
011099890003082	598196.97	3515794.27	2029	31	3	0.00985	0.00392	0.00438	0.005036	4.58	19.58	58.75
011099891003006	598821.73	3517527.6	2028	76	6	0.00984	0.00398	0.00444	0.003106	2.83	17.83	53.48
011099890001026	596399.12	3519496.02	2259	71	7	0.00976	0.00388	0.00434	0.002732	2.49	17.49	52.46
011099890003085	598338.13	3515797.63	2126	24	4	0.00965	0.00384	0.00429	0.004876	5.19	20.19	60.56
011099891003028	598944.83	3517078.3	2144	34	3	0.00959	0.00388	0.00433	0.003196	2.91	17.91	53.73
011099890001025	596273.89	3519451.51	2242	24	2	0.00954	0.00380	0.00424	0.002618	2.38	17.38	52.15
011099891003027	599010.47	3516967.06	2222	5	0	0.00938	0.00379	0.00423	0.003198	2.91	17.91	53.73
011099891002002	597966.97	3519426.17	2443	52	3	0.00936	0.00378	0.00423	0.002722	2.90	17.90	53.69
011099891001011	598724.37	3518703.77	2389	294	0	0.00934	0.00378	0.00422	0.002474	2.29	17.29	51.88
011099891002015	598266.09	3519105.52	2339	250	8	0.00934	0.00378	0.00422	0.002712	2.47	17.47	52.40
011099891003003	598922.01	3517661.59	2147	54	1	0.00920	0.00372	0.00415	0.002736	2.49	17.49	52.47
011099890001027	596886.13	3519780.76	2507	34	4	0.00917	0.00365	0.00407	0.002848	2.59	17.59	52.78
011099891001001	598410.93	3518988.99	2345	292	0	0.00911	0.00368	0.00411	0.002532	2.69	17.69	53.08
011099890003040	595439.63	3518836.04	2077	155	36	0.00904	0.00360	0.00402	0.002638	2.22	17.22	51.67
011099891002003	597771.62	3519425.32	2356	80	5	0.00898	0.00363	0.00405	0.002736	2.49	17.49	52.47

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (μg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (μg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (μg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003142	598996.19	3516571.87	2296	50	2	0.00893	0.00355	0.00397	0.003564	3.24	18.24	54.73
011099890003146	599021.84	3516500.56	2343	17	0	0.00888	0.00353	0.00394	0.003562	3.24	18.24	54.73
011099891003007	598942.14	3517448.13	2139	77	2	0.00885	0.00358	0.00400	0.002786	2.54	17.54	52.61
011099891002016	598284.79	3519219.58	2441	42	4	0.00884	0.00357	0.00399	0.002544	2.32	17.32	51.95
011099890003143	599004.75	3516666.69	2277	45	1	0.00882	0.00351	0.00392	0.003444	3.13	18.13	54.40
011099891002005	597566.01	3519507.02	2357	2	0	0.00876	0.00354	0.00395	0.002804	2.60	17.60	52.80
011099890001033	597095.25	3519780.71	2522	6	0	0.00873	0.00347	0.00388	0.002630	2.44	17.44	52.31
011099891003029	599049.83	3517170.01	2242	6	0	0.00852	0.00344	0.00385	0.002730	2.48	17.48	52.45
011099891004068	599144.26	3516839.35	2375	51	9	0.00847	0.00342	0.00382	0.002952	2.69	17.69	53.06
011099890002000	597462.88	3519582.63	2398	3	0	0.00845	0.00336	0.00376	0.002676	2.48	17.48	52.44
011099890001028	596883.04	3519925.85	2652	31	0	0.00843	0.00336	0.00375	0.002566	2.34	17.34	52.01
011099890001029	596627.46	3519924.45	2656	44	10	0.00841	0.00335	0.00374	0.002434	2.22	17.22	51.65
011099891001008	598865.31	3518904.66	2623	31	0	0.00821	0.00332	0.00371	0.002104	1.95	16.95	50.85
011099889002041	597457.96	3519648.09	2460	4	0	0.00816	0.00325	0.00379	0.002540	2.35	17.35	52.06
011099890003145	599120.34	3516551.90	2421	10	0	0.00814	0.00324	0.00362	0.003180	2.89	17.89	53.68
011099891002001	598350.5	3519368.36	2599	191	32	0.00808	0.00327	0.00365	0.002276	2.42	17.42	52.26
011099890003144	599126.46	3516631.58	2404	46	3	0.00808	0.00322	0.00359	0.003098	2.82	17.82	53.46
011099890001023	596190.71	3519695.62	2499	228	16	0.00802	0.00319	0.00356	0.002114	2.25	17.25	51.75
011099890001032	597135.18	3519927.22	2672	34	3	0.00800	0.00318	0.00355	0.002334	2.12	17.12	51.37
011099889002040	597522.37	3519661.80	2491	9	0	0.00799	0.00318	0.00371	0.002514	2.33	17.33	51.99
011099889002025	598257.30	3519665.77	2795	33	0	0.00786	0.00313	0.00365	0.002134	1.94	16.94	50.83
011099891004060	599246.44	3517045.93	2447	20	3	0.00781	0.00316	0.00353	0.002472	2.03	17.03	51.09
011099890001030	597061.90	3520032.35	2769	9	0	0.00777	0.00309	0.00345	0.002264	2.06	17.06	51.18
011099889002029	597704.27	3519719.96	2603	11	2	0.00760	0.00303	0.00353	0.002306	2.10	17.10	51.30
011099891003002	599135.54	3518103.04	2469	11	0	0.00748	0.00302	0.00338	0.001962	1.79	16.79	50.36
011099889002026	598004.48	3519734.91	2735	74	15	0.00747	0.00298	0.00347	0.002104	1.91	16.91	50.74
011099891003001	599132.82	3518206.82	2503	26	3	0.00747	0.00302	0.00337	0.001942	1.77	16.77	50.30
011099889002024	598294.82	3519792.10	2922	12	0	0.00743	0.00296	0.00345	0.001974	1.80	16.80	50.39
011099890001031	597209.03	3520034.74	2788	14	1	0.00738	0.00294	0.00328	0.002090	1.94	16.94	50.81
011099890003107	593330.77	3516868.67	3503	61	5	0.00736	0.00293	0.00327	0.002068	1.64	16.64	49.92
011099890001024	596128.51	3519812.95	2628	8	3	0.00731	0.00291	0.00325	0.001896	1.73	16.73	50.18
011099889002032	597653.20	3519841.42	2701	23	0	0.00715	0.00285	0.00332	0.002176	1.98	16.98	50.94

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m³)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m³)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m³)	Total Deposition (g/m²/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099891001016	599135.79	3518344.92	2560	16	1	0.00710	0.00287	0.00320	0.001866	1.70	16.70	50.09
011099889002023	598381.30	3519837.27	3006	39	7	0.00704	0.00281	0.00327	0.001852	1.69	16.69	50.06
011099890001015	597064.02	3520263.15	2999	88	8	0.00695	0.00276	0.00309	0.001960	2.08	17.08	51.25
011099891004050	599353.15	3517762.49	2589	48	7	0.00692	0.00280	0.00312	0.001896	1.73	16.73	50.18
011099891004062	599480.43	3516794.22	2713	3	0	0.00689	0.00279	0.00311	0.002274	2.07	17.07	51.21
011099889002022	598252.84	3519951.94	3041	40	1	0.00687	0.00274	0.00319	0.001816	1.93	16.93	50.79
011099889002044	598500.90	3519660.04	2924	79	0	0.00685	0.00273	0.00318	0.001842	1.68	16.68	50.03
011099890003048	597275.95	3515045.82	2277	527	55	0.00680	0.00271	0.00302	0.002880	2.62	17.62	52.86
011099891004047	599350.24	3517885.41	2613	47	6	0.00675	0.00273	0.00305	0.001788	1.63	16.63	49.88
011099889002030	597752.93	3519943.15	2830	64	5	0.00672	0.00268	0.00312	0.001984	2.11	17.11	51.33
011099889002009	597367.58	3520104.77	2884	4	0	0.00660	0.00263	0.00307	0.001850	1.71	16.71	50.14
011099890001016	596613.16	3520439.30	3170	19	0	0.00655	0.00261	0.00291	0.001780	1.62	16.62	49.86
011099891001002	599225.35	3519054.26	3000	312	0	0.00653	0.00264	0.00295	0.001578	1.44	16.44	49.31
011099889002011	597548.07	3520037.95	2860	8	3	0.00653	0.00260	0.00303	0.001906	2.03	17.03	51.08
011099889002021	598047.13	3519955.02	2952	29	5	0.00649	0.00259	0.00302	0.001780	1.89	16.89	50.68
011099890001022	595977.48	3519858.91	2715	10	0	0.00649	0.00258	0.00289	0.001722	1.57	16.57	49.70
011099891004046	599354.28	3518002.36	2646	35	2	0.00648	0.00262	0.00293	0.001680	1.53	16.53	49.59
011099891004042	599367.76	3518211.1	2724	28	0	0.00647	0.00261	0.00292	0.001626	1.48	16.48	49.44
011099891004043	599349.93	3518096.04	2669	31	1	0.00646	0.00261	0.00292	0.001650	1.50	16.50	49.51
011099890003081	598224.73	3515230.17	2487	3	0	0.00642	0.00256	0.00285	0.002980	2.71	17.71	53.14
011099891004035	599366.18	3518374.35	2783	21	0	0.00635	0.00257	0.00287	0.001590	1.45	16.45	49.34
011099890001011	596613.05	3520542.09	3273	46	3	0.00628	0.00250	0.00279	0.001684	1.53	16.53	49.60
011099890001014	597122.15	3520486.42	3227	10	0	0.00624	0.00248	0.00277	0.001690	1.54	16.54	49.61
011099890003106	594383.20	3516250.42	2634	1	0	0.00621	0.00247	0.00276	0.001974	1.67	16.67	50.00
011099889001010	598557.37	3519963.93	3207	86	6	0.00620	0.00247	0.00288	0.001592	1.34	16.34	49.02
011099889002031	597709.75	3520139.26	3002	15	1	0.00612	0.00244	0.00284	0.001792	1.91	16.91	50.72
011099890001012	597089.72	3520549.61	3287	57	5	0.00611	0.00243	0.00271	0.001656	1.51	16.51	49.52
011099891004059	599564.47	3517184.04	2756	89	6	0.00604	0.00244	0.00273	0.001776	1.62	16.62	49.85
011099890001021	595848.74	3519913.14	2808	20	0	0.00604	0.00240	0.00268	0.001594	1.45	16.45	49.35
011099891004051	599517.48	3517414.37	2711	31	4	0.00603	0.00244	0.00272	0.001744	1.43	16.43	49.30
011099891004034	599377.94	3518493.38	2842	32	1	0.00601	0.00243	0.00271	0.001522	1.39	16.39	49.16
011099889002018	598262.01	3520163.67	3233	5	0	0.00600	0.00239	0.00279	0.001566	1.67	16.67	50.00

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. ($\mu g/m^3$)	Modeled Average Annual Pb Air Exposure Conc. for Population ($\mu g/m^3$)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. ($\mu g/m^3$)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890001006	596615.34	3520665.07	3396	33	5	0.00598	0.00238	0.00266	0.001584	1.44	16.44	49.32
011099891004049	599613.03	3517770.04	2846	32	6	0.00596	0.00241	0.00269	0.001592	1.45	16.45	49.35
011099890001007	596852.79	3520671.33	3397	22	0	0.00594	0.00236	0.00264	0.001632	1.49	16.49	49.46
011099891004048	599605.81	3517893.93	2863	27	2	0.00593	0.00240	0.00268	0.001536	1.40	16.40	49.19
011099891004041	599583.29	3517640.76	2797	126	9	0.00589	0.00238	0.00266	0.001640	1.35	16.35	49.04
011099891004052	599577.42	3517268.82	2767	29	2	0.00588	0.00238	0.00265	0.001706	1.55	16.55	49.66
011099890003035	592970.38	3518647.16	4077	6	0	0.00587	0.00234	0.00261	0.001386	1.45	16.45	49.34
011099890003077	598131.63	3514970.28	2657	10	1	0.00584	0.00232	0.00260	0.002578	2.35	17.35	52.04
011099890001018	595963.05	3520113.74	2962	17	1	0.00582	0.00232	0.00259	0.001478	1.35	16.35	49.04
011099890003080	599785.06	3516094.74	3201	480	18	0.00582	0.00232	0.00259	0.002084	1.65	16.65	49.96
011099890001008	597014.49	3520678.90	3410	16	2	0.00582	0.00232	0.00258	0.001578	1.44	16.44	49.31
011099889002008	597464.37	3520333.45	3128	1	0	0.00579	0.00231	0.00269	0.001572	1.46	16.46	49.37
011099889002012	597695.67	3520263.08	3117	33	2	0.00577	0.00230	0.00268	0.001658	1.76	16.76	50.29
011099889002014	597842.18	3520240.29	3140	35	1	0.00577	0.00230	0.00268	0.001640	1.74	16.74	50.23
011099889001011	598606.99	3520263.72	3487	122	20	0.00573	0.00229	0.00266	0.001412	1.50	16.50	49.51
011099891004045	599596.11	3518006.71	2881	23	2	0.00573	0.00232	0.00259	0.001446	1.32	16.32	48.95
011099890001020	595850.13	3520041.14	2928	17	1	0.00569	0.00227	0.00253	0.001482	1.35	16.35	49.05
011099889002019	598078.37	3520199.20	3187	18	1	0.00569	0.00227	0.00264	0.001516	1.61	16.61	49.84
011099889002015	597936.83	3520241.19	3173	48	8	0.00568	0.00226	0.00264	0.001572	1.67	16.67	50.02
011099890003036	594040.37	3519476.20	3538	37	2	0.00565	0.00225	0.00251	0.001226	1.12	16.12	48.35
011099890003109	594584.92	3516126.30	2504	4	1	0.00563	0.00224	0.00250	0.001798	1.93	16.93	50.80
011099890001009	597197.78	3520679.62	3427	31	8	0.00563	0.00224	0.00250	0.001476	1.34	16.34	49.03
011099889001009	598817.78	3519911.00	3314	39	2	0.00562	0.00224	0.00261	0.001410	1.04	16.04	48.13
011099890003078	598274.46	3514980.72	2722	19	2	0.00562	0.00224	0.00250	0.002498	2.27	17.27	51.82
011099891004044	599587.38	3518108.41	2900	5	0	0.00562	0.00227	0.00254	0.001390	1.27	16.27	48.80
011099889002017	598225.40	3520302.39	3342	8	2	0.00545	0.00217	0.00253	0.001410	1.50	16.50	49.50
011099889002013	597757.28	3520390.65	3256	3	0	0.00544	0.00217	0.00253	0.001538	1.64	16.64	49.91
011099889002020	598078.26	3520300.99	3281	32	1	0.00543	0.00216	0.00252	0.001436	1.53	16.53	49.58
011099890001010	597197.61	3520788.46	3535	30	1	0.00542	0.00216	0.00241	0.001400	1.27	16.27	48.82
011099891004033	599702.96	3518439.08	3118	34	2	0.00540	0.00218	0.00244	0.001274	1.16	16.16	48.48
011099890003058	598260.10	3514861.66	2815	16	1	0.00538	0.00214	0.00239	0.002330	2.12	17.12	51.36
011099891004036	599696.59	3518296.92	3062	45	8	0.00536	0.00216	0.00242	0.001282	1.17	16.17	48.50

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890001013	597385.70	3520645.12	3419	53	2	0.00533	0.00212	0.00237	0.001364	1.24	16.24	48.72
011099889001007	598693.90	3520443.94	3687	138	32	0.00532	0.00212	0.00247	0.001274	1.36	16.36	49.07
011099890003059	598247.49	3514829.29	2837	6	0	0.00532	0.00212	0.00236	0.002288	2.08	17.08	51.25
011099889002004	597749.70	3520464.15	3325	2	0	0.00528	0.00211	0.00245	0.001470	1.56	16.56	49.69
011099889002007	597586.65	3520506.94	3324	17	1	0.00525	0.00209	0.00244	0.001410	1.50	16.50	49.50
011099889002003	597843.53	3520460.00	3348	13	0	0.00525	0.00209	0.00244	0.001466	1.56	16.56	49.68
011099889002002	597936.43	3520463.91	3382	9	0	0.00518	0.00207	0.00241	0.001424	1.51	16.51	49.54
011099889002016	598121.19	3520401.17	3390	32	2	0.00517	0.00206	0.00240	0.001346	1.43	16.43	49.29
011099890003079	598848.60	3514996.29	3058	30	5	0.00513	0.00204	0.00228	0.002166	1.78	16.78	50.34
011099890003056	598131.34	3514730.43	2867	21	2	0.00503	0.00200	0.00223	0.002110	1.92	16.92	50.76
011099890001002	596175.22	3520800.01	3582	370	26	0.00502	0.00200	0.00223	0.001138	1.21	16.21	48.63
011099889002006	597632.14	3520610.17	3435	21	4	0.00501	0.00200	0.00233	0.001332	1.21	16.21	48.64
011099889003050	597533.52	3520664.66	3466	30	0	0.00499	0.00199	0.00232	0.001292	1.18	16.18	48.53
011099890003060	598295.14	3514708.81	2965	22	4	0.00498	0.00198	0.00221	0.002096	1.91	16.91	50.72
011099891004040	599963.79	3517992.13	3234	11	0	0.00494	0.00200	0.00223	0.001214	1.10	16.10	48.31
011099890003055	597902.92	3514756.47	2745	20	4	0.00492	0.00196	0.00219	0.002008	1.65	16.65	49.95
011099889001005	598110.45	3520535.10	3510	61	8	0.00491	0.00196	0.00228	0.001276	1.36	16.36	49.07
011099889002001	597892.80	3520617.69	3514	29	2	0.00490	0.00195	0.00228	0.001340	1.43	16.43	49.28
011099890003037	594081.71	3519661.00	3624	42	7	0.00482	0.00192	0.00214	0.001078	1.00	16.00	48.00
011099889001015	599751.71	3519624.72	3765	16	0	0.00481	0.00192	0.00224	0.001056	0.89	15.89	47.67
011099889003048	597541.16	3520766.52	3567	4	0	0.00480	0.00191	0.00223	0.001224	1.30	16.30	48.91
011099890001000	597097.55	3521178.54	3914	90	13	0.00479	0.00191	0.00213	0.001208	1.10	16.10	48.30
011099890003026	594907.94	3519747.20	3119	12	0	0.00472	0.00188	0.00210	0.001174	1.07	16.07	48.21
011099889002000	597803.81	3520745.84	3610	73	7	0.00469	0.00187	0.00218	0.001258	1.14	16.14	48.43
011099890001019	595621.60	3520370.57	3316	33	1	0.00469	0.00187	0.00209	0.001160	1.18	16.18	48.54
011099890003054	597901.91	3514680.88	2815	10	1	0.00468	0.00186	0.00208	0.001874	1.54	16.54	49.62
011099891004057	600129.25	3517883.89	3375	65	4	0.00465	0.00188	0.00210	0.001154	1.05	16.05	48.15
011099889001004	598472.90	3520696.79	3804	342	60	0.00464	0.00185	0.00216	0.001134	1.21	16.21	48.62
011099890003053	597797.77	3514676.87	2780	14	2	0.00460	0.00183	0.00204	0.001828	1.50	16.50	49.51
011099890003024	595096.85	3519978.72	3201	20	0	0.00460	0.00183	0.00204	0.001074	0.98	15.98	47.93
011099890001037	595839.10	3520670.90	3532	7	0	0.00455	0.00181	0.00202	0.001066	1.13	16.13	48.40
011099891004058	600131.15	3517777.08	3359	66	6	0.00453	0.00183	0.00205	0.001152	1.23	16.23	48.68

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890001001	596827.83	3521402.75	4128	15	1	0.00453	0.00180	0.00201	0.001144	1.04	16.04	48.12
011099891004031	599923.8	3518742.55	3442	166	16	0.00451	0.00182	0.00204	0.001058	1.13	16.13	48.38
011099891004039	600206.51	3517993.48	3472	30	2	0.00449	0.00182	0.00203	0.001084	0.99	15.99	47.96
011099891004038	600169.3	3518101.96	3460	36	1	0.00442	0.00179	0.00200	0.001042	0.95	15.95	47.84
011099891004037	600087.47	3518196.91	3405	54	6	0.00440	0.00178	0.00199	0.001026	0.93	15.93	47.80
011099890003099	596453.64	3513948.68	3345	1	0	0.00435	0.00173	0.00193	0.001306	1.21	16.21	48.63
011099890003114	594675.75	3515611.15	2706	156	8	0.00434	0.00173	0.00193	0.001284	1.06	16.06	48.17
011099889001012	599607.51	3520029.47	3926	49	3	0.00430	0.00171	0.00200	0.000950	0.86	15.86	47.59
011099889001013	599759.86	3520026.91	4034	42	5	0.00428	0.00171	0.00199	0.000930	0.85	15.85	47.54
011099890003064	597995.63	3514514.48	3004	19	1	0.00428	0.00170	0.00190	0.001668	1.52	16.52	49.55
011099890003065	597934.51	3514512.89	2982	21	3	0.00424	0.00169	0.00188	0.001638	1.35	16.35	49.04
011099889003042	597820.14	3521019.10	3878	26	3	0.00423	0.00169	0.00197	0.001084	1.15	16.15	48.46
011099890003073	597434.52	3514210.86	3127	10	2	0.00422	0.00168	0.00187	0.001558	1.64	16.64	49.92
011099890003068	597548.63	3514344.96	3022	57	10	0.00421	0.00168	0.00187	0.001604	1.69	16.69	50.06
011099890001003	595948.23	3521241.32	4059	19	2	0.00419	0.00167	0.00186	0.000880	0.80	15.80	47.40
011099890001005	596551.88	3521650.09	4383	3	1	0.00419	0.00167	0.00186	0.000996	1.06	16.06	48.18
011099889003043	597452.36	3521329.04	4105	176	22	0.00417	0.00166	0.00194	0.000980	1.00	16.00	47.99
011099889003044	596891.98	3521626.08	4352	12	3	0.00417	0.00166	0.00194	0.001028	0.94	15.94	47.81
011099890003072	597362.79	3514146.69	3177	28	1	0.00416	0.00166	0.00185	0.001522	1.60	16.60	49.81
011099890003061	598269.80	3514386.08	3237	101	16	0.00413	0.00165	0.00184	0.001634	1.74	16.74	50.21
011099890003069	597548.51	3514266.35	3098	27	2	0.00409	0.00163	0.00182	0.001536	1.62	16.62	49.85
011099890003052	597799.70	3514473.31	2971	21	1	0.00407	0.00162	0.00181	0.001564	1.29	16.29	48.86
011099889003041	598032.51	3521127.95	4042	37	7	0.00402	0.00160	0.00187	0.001042	1.11	16.11	48.32
011099890003030	591974.96	3519759.86	5436	14	0	0.00398	0.00158	0.00177	0.000792	0.85	15.85	47.55
011099890003066	597746.84	3514418.39	3006	3	1	0.00397	0.00158	0.00176	0.001526	1.25	16.25	48.76
011099890003128	590548.11	3517022.20	6267	54	6	0.00396	0.00158	0.00176	0.000808	0.86	15.86	47.58
011099889001002	599394.18	3520643.17	4245	85	4	0.00394	0.00157	0.00183	0.000880	0.92	15.92	47.76
011099890003063	598066.89	3514354.92	3179	20	0	0.00394	0.00157	0.00175	0.001496	1.23	16.23	48.69
011099891004054	600376.41	3517606.13	3582	50	5	0.00394	0.00159	0.00178	0.001012	0.83	15.83	47.49
011099889001014	599802.78	3520215.79	4196	33	3	0.00391	0.00156	0.00182	0.000840	0.89	15.89	47.68
011099890003120	596387.43	3513662.86	3637	13	0	0.00387	0.00154	0.00172	0.001106	1.19	16.19	48.57
011099890003071	597586.60	3514153.84	3216	31	4	0.00386	0.00154	0.00171	0.001428	1.50	16.50	49.51

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003067	597755.22	3514351.96	3072	13	1	0.00384	0.00153	0.00171	0.001456	1.20	16.20	48.59
011099889003051	597768.33	3521309.86	4147	69	19	0.00383	0.00152	0.00178	0.000928	0.99	15.99	47.96
011099890003032	591555.58	3519210.92	5600	11	0	0.00377	0.00150	0.00168	0.000770	0.70	15.70	47.10
011099891004056	600599.16	3517890.49	3839	43	2	0.00377	0.00152	0.00170	0.000902	0.82	15.82	47.46
011099890003070	597766.93	3514296.64	3128	25	3	0.00374	0.00149	0.00166	0.001410	1.16	16.16	48.48
011099890003155	599440.44	3514426.53	3877	51	5	0.00371	0.00148	0.00165	0.001400	1.15	16.15	48.45
011099889004015	599208.10	3521467.77	4830	39	3	0.00370	0.00147	0.00172	0.000784	0.66	15.66	46.98
011099890003028	593636.77	3520134.63	4272	12	0	0.00368	0.00147	0.00164	0.000790	0.80	15.80	47.41
011099890003076	598154.44	3514202.57	3354	10	1	0.00367	0.00146	0.00163	0.001364	1.44	16.44	49.31
011099891004055	600603.67	3517781.69	3827	46	4	0.00365	0.00148	0.00165	0.000892	0.81	15.81	47.44
011099890003031	591523.93	3519382.97	5691	4	2	0.00362	0.00144	0.00161	0.000748	0.80	15.80	47.39
011099890003153	600771.69	3516004.57	4160	2	0	0.00362	0.00144	0.00161	0.001150	0.91	15.91	47.74
011099890003075	598078.75	3514193.79	3332	5	0	0.00361	0.00144	0.00161	0.001328	1.09	16.09	48.27
011099890003074	598008.17	3514191.10	3308	6	0	0.00357	0.00142	0.00159	0.001302	1.07	16.07	48.21
011099890003051	597834.09	3514206.58	3235	68	9	0.00355	0.00141	0.00158	0.001312	1.11	16.11	48.33
011099890003050	597839.77	3514152.21	3288	24	2	0.00347	0.00138	0.00154	0.001274	1.08	16.08	48.23
011099890003152	601158.72	3515429.88	4724	8	1	0.00339	0.00135	0.00151	0.001046	0.95	15.95	47.86
011099889003052	596271.22	3522126.16	4881	5	0	0.00333	0.00133	0.00155	0.000708	0.75	15.75	47.26
011099889003028	598544.06	3521622.63	4681	17	1	0.00328	0.00131	0.00152	0.000738	0.78	15.78	47.35
011099890003049	597910.77	3514020.87	3435	40	2	0.00325	0.00129	0.00145	0.001170	1.24	16.24	48.73
011099890003159	601002.16	3514537.46	5007	21	1	0.00324	0.00129	0.00144	0.001098	0.87	15.87	47.61
011099889004011	599215.10	3521901.19	5214	10	0	0.00321	0.00128	0.00149	0.000676	0.72	15.72	47.16
011099890003014	594505.54	3520739.19	4161	5	1	0.00321	0.00128	0.00143	0.000676	0.72	15.72	47.16
011099889003027	598289.12	3521828.81	4788	43	4	0.00319	0.00127	0.00148	0.000764	0.81	15.81	47.44
011099890003023	593525.60	3520530.69	4625	8	0	0.00309	0.00123	0.00137	0.000658	0.70	15.70	47.10
011099891004030	601094.08	3517453.92	4288	8	2	0.00306	0.00124	0.00138	0.000728	0.60	15.60	46.79
011099889004020	600889.23	3520173.98	5004	12	0	0.00305	0.00122	0.00142	0.000598	0.64	15.64	46.91
011099889004014	599897.40	3521371.65	5130	59	2	0.00303	0.00121	0.00141	0.000626	0.65	15.65	46.96
011099890003115	594220.40	3515036.57	3423	54	6	0.00300	0.00120	0.00133	0.000802	0.73	15.73	47.19
011099889004016	600901.85	3520466.37	5189	15	4	0.00300	0.00119	0.00139	0.000582	0.62	15.62	46.86
011099891004072	600815.89	3519314.62	4495	16	2	0.00299	0.00121	0.00135	0.000642	0.54	15.54	46.62
011099889003012	596781.67	3522924.08	5649	231	20	0.00296	0.00118	0.00138	0.000650	0.69	15.69	47.07

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003158	599502.14	3513922.22	4300	9	0	0.00296	0.00118	0.00131	0.001042	0.88	15.88	47.63
011099890003018	591700.64	3520798.45	6206	3	0	0.00294	0.00117	0.00131	0.000550	0.57	15.57	46.72
011099889001001	600634.69	3520945.48	5301	56	1	0.00288	0.00115	0.00134	0.000560	0.60	15.60	46.79
011099889004018	601131.95	3520782.06	5566	4	0	0.00279	0.00111	0.00130	0.000520	0.54	15.54	46.63
011099890003127	592817.61	3515448.12	4391	5	2	0.00278	0.00111	0.00124	0.000688	0.74	15.74	47.22
011099890003160	601034.95	3513827.28	5453	14	2	0.00272	0.00108	0.00121	0.000882	0.95	15.95	47.84
011099890003110	593536.56	3515345.78	3800	44	2	0.00270	0.00108	0.00120	0.000700	0.64	15.64	46.91
011099889003026	598847.13	3522317.90	5439	401	70	0.00267	0.00107	0.00124	0.000556	0.59	15.59	46.77
011099889004021	601182.78	3519639.71	4971	9	1	0.00261	0.00104	0.00121	0.000536	0.57	15.57	46.71
011099890003020	592988.17	3520963.19	5311	30	4	0.00260	0.00103	0.00115	0.000526	0.54	15.54	46.61
011099890003121	597784.29	3513011.88	4373	142	17	0.00259	0.00103	0.00115	0.000822	0.87	15.87	47.60
011099890003125	595335.89	3512466.93	5029	6	0	0.00258	0.00103	0.00114	0.000528	0.42	15.42	46.26
011099890003007	595316.53	3522274.48	5218	47	5	0.00253	0.00101	0.00112	0.000520	0.48	15.48	46.45
011099890003005	595428.24	3522660.49	5560	13	0	0.00252	0.00100	0.00112	0.000472	0.44	15.44	46.31
011099891004079	602009.57	3515583.4	5468	2	0	0.00252	0.00102	0.00114	0.000702	0.56	15.56	46.67
011099889004022	601358.04	3519845.01	5224	19	5	0.00251	0.00100	0.00117	0.000494	0.45	15.45	46.35
011099890003122	598088.44	3513356.41	4122	19	2	0.00250	0.00100	0.00111	0.000822	0.68	15.68	47.03
011099889004017	601577.75	3520342.01	5669	30	4	0.00248	0.00099	0.00115	0.000456	0.49	15.49	46.46
011099890003113	593356.57	3515066.00	4099	8	0	0.00244	0.00097	0.00108	0.000604	0.65	15.65	46.95
011099890003123	598110.10	3513252.81	4227	14	1	0.00242	0.00096	0.00107	0.000786	0.65	15.65	46.94
011099889003013	595422.76	3523064.56	5953	15	3	0.00239	0.00095	0.00111	0.000428	0.44	15.44	46.31
011099889003023	599606.09	3522929.91	6308	60	7	0.00238	0.00095	0.00111	0.000468	0.49	15.49	46.47
011099890003006	595294.12	3522650.17	5585	5	2	0.00236	0.00094	0.00105	0.000460	0.49	15.49	46.47
011099890003112	593068.16	3515254.87	4252	2	1	0.00234	0.00093	0.00104	0.000594	0.54	15.54	46.62
011099892001067	594615.81	3512103.55	5618	3	0	0.00233	0.00106	0.00104	0.000436	0.35	15.35	46.04
011099892001034	592481.4	3515209.27	4796	5	0	0.00233	0.00106	0.00104	0.000554	0.60	15.60	46.79
011099891004076	602273.84	3516021.39	5606	6	0	0.00232	0.00094	0.00105	0.000596	0.62	15.62	46.87
011099890003004	595286.26	3522754.91	5688	78	6	0.00232	0.00092	0.00103	0.000446	0.45	15.45	46.36
011099890003124	597523.00	3512411.79	4915	19	0	0.00227	0.00091	0.00101	0.000674	0.53	15.53	46.60
011099892001030	593376.94	3514718.5	4280	9	0	0.00226	0.00103	0.00101	0.000550	0.50	15.50	46.50
011099889004009	600900.61	3522083.89	6313	23	0	0.00224	0.00089	0.00104	0.000400	0.42	15.42	46.25
011099889003015	598187.59	3523268.99	6150	5	0	0.00224	0.00089	0.00104	0.000450	0.46	15.46	46.37

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (μg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (μg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (μg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099890003002	595125.85	3522704.04	5684	6	2	0.00222	0.00088	0.00099	0.000442	0.45	15.45	46.35
011099890003015	593549.71	3521380.46	5243	18	2	0.00222	0.00088	0.00099	0.000448	0.33	15.33	46.00
011099890003129	589718.49	3515518.42	7306	3	1	0.00219	0.00087	0.00098	0.000466	0.38	15.38	46.15
011099890003003	595129.32	3522793.77	5769	4	1	0.00218	0.00087	0.00097	0.000428	0.44	15.44	46.31
011099890003000	595204.93	3522990.99	5937	2	0	0.00217	0.00086	0.00097	0.000410	0.38	15.38	46.14
011099890003021	592523.83	3521501.19	6019	6	0	0.00217	0.00086	0.00096	0.000418	0.35	15.35	46.06
011099892001029	593402.33	3514577.65	4346	14	1	0.00214	0.00098	0.00096	0.000526	0.48	15.48	46.44
011099892001031	593495.54	3514362.83	4412	43	1	0.00212	0.00097	0.00095	0.000510	0.46	15.46	46.39
011099890003017	592241.24	3521638.73	6318	20	0	0.00207	0.00083	0.00092	0.000392	0.33	15.33	45.99
011099892001033	592983.31	3514640.37	4646	2	0	0.00207	0.00095	0.00093	0.000486	0.40	15.40	46.20
011099892001027	593693.6	3512844.91	5416	70	1	0.00207	0.00094	0.00092	0.000408	0.43	15.43	46.30
011099891004025	603133.77	3516378.66	6387	72	11	0.00206	0.00083	0.00093	0.000456	0.48	15.48	46.43
011099891004084	603065.37	3514524.62	6833	9	0	0.00205	0.00083	0.00093	0.000552	0.59	15.59	46.76
011099890003001	594295.23	3522278.16	5600	20	1	0.00205	0.00082	0.00091	0.000402	0.30	15.30	45.89
011099889003017	598509.41	3523711.47	6657	15	2	0.00205	0.00082	0.00095	0.000406	0.41	15.41	46.24
011099892001028	593364.15	3514324.35	4537	30	3	0.00203	0.00093	0.00091	0.000482	0.44	15.44	46.32
011099892001068	593885.84	3511308.8	6644	60	12	0.00202	0.00092	0.00090	0.000330	0.26	15.26	45.78
011099891004028	602519.5	3517288.62	5710	24	5	0.00202	0.00081	0.00091	0.000428	0.39	15.39	46.17
011099889003033	600814.82	3523022.32	7005	3	2	0.00201	0.00080	0.00093	0.000362	0.38	15.38	46.13
011099889004005	602361.47	3522096.31	7353	3	0	0.00198	0.00079	0.00092	0.000324	0.34	15.34	46.03
011099889004006	602392.21	3521688.46	7116	31	5	0.00197	0.00078	0.00091	0.000332	0.35	15.35	46.06
011099889003025	599205.26	3523811.89	6962	4	0	0.00196	0.00078	0.00091	0.000376	0.32	15.32	45.95
011099891004082	603140.99	3515227.82	6654	1	0	0.00195	0.00079	0.00088	0.000504	0.54	15.54	46.61
011099889004023	602604.78	3519873.49	6351	7	2	0.00194	0.00077	0.00090	0.000350	0.37	15.37	46.12
011099889003016	598228.24	3524056.47	6928	16	1	0.00193	0.00077	0.00090	0.000358	0.27	15.27	45.80
011099890003016	592239.68	3521907.79	6508	5	0	0.00193	0.00077	0.00086	0.000366	0.37	15.37	46.12
011099891004024	603521.47	3516520.62	6754	14	1	0.00190	0.00077	0.00086	0.000400	0.34	15.34	46.01
011099889003018	598959.09	3524093.72	7149	5	0	0.00189	0.00075	0.00088	0.000376	0.38	15.38	46.15
011099890003161	600827.28	3512521.16	6224	17	0	0.00186	0.00074	0.00083	0.000538	0.58	15.58	46.73
011099891004089	602765.22	3512674.33	7525	66	3	0.00184	0.00075	0.00083	0.000506	0.54	15.54	46.61
011099891004081	603641.73	3514835.77	7254	21	1	0.00184	0.00074	0.00083	0.000448	0.48	15.48	46.43
011099891004083	603479.96	3515082.06	7021	2	0	0.00183	0.00074	0.00083	0.000452	0.41	15.41	46.23

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099889003019	599996.99	3524136.02	7565	5	0	0.00179	0.00071	0.00083	0.000320	0.34	15.34	46.02
011099889004007	601831.14	3522736.04	7419	13	0	0.00178	0.00071	0.00083	0.000292	0.30	15.30	45.91
011099891004026	603130.38	3517233.25	6321	4	0	0.00176	0.00071	0.00080	0.000360	0.33	15.33	45.98
011099889003011	598575.38	3524546.56	7483	3	0	0.00173	0.00069	0.00081	0.000324	0.33	15.33	45.99
011099889004008	601879.84	3522944.14	7605	21	3	0.00173	0.00069	0.00080	0.000282	0.30	15.30	45.90
011099891004027	603238.36	3517367.36	6429	2	0	0.00173	0.00070	0.00078	0.000346	0.31	15.31	45.94
011099889003022	601583.62	3523492.48	7839	2	0	0.00173	0.00069	0.00080	0.000290	0.30	15.30	45.89
011099891004092	604114.39	3514584.55	7784	80	17	0.00172	0.00069	0.00078	0.000400	0.42	15.42	46.25
011099891004091	604101.4	3514677.14	7740	11	3	0.00169	0.00068	0.00076	0.000394	0.41	15.41	46.23
011099891004019	603363	3517985.39	6591	78	6	0.00167	0.00067	0.00075	0.000338	0.36	15.36	46.08
011099889003035	602011.85	3523339.50	7990	10	1	0.00164	0.00065	0.00076	0.000260	0.27	15.27	45.81
011099891004018	603840.88	3516946.11	7039	47	3	0.00164	0.00066	0.00074	0.000318	0.27	15.27	45.80
011099892001066	595173.9	3510514.39	6956	41	1	0.00160	0.00073	0.00071	0.000302	0.25	15.25	45.76
011099889003020	600710.00	3525114.51	8756	7	1	0.00158	0.00063	0.00073	0.000266	0.27	15.27	45.81
011099892001004	597256.63	3510063.17	7226	85	15	0.00157	0.00072	0.00070	0.000360	0.30	15.30	45.91
011099889003010	598883.35	3525259.02	8249	5	1	0.00155	0.00062	0.00072	0.000272	0.28	15.28	45.84
011099891004012	604921.7	3514196.67	8676	3	0	0.00153	0.00062	0.00069	0.000340	0.36	15.36	46.07
011099891004013	604479.29	3514858.34	8041	27	5	0.00152	0.00062	0.00069	0.000358	0.37	15.37	46.12
011099891004015	604852.88	3516474.63	8083	32	0	0.00150	0.00061	0.00068	0.000288	0.30	15.30	45.90
011099891004014	604695.32	3515629.49	8055	196	21	0.00148	0.00060	0.00067	0.000314	0.33	15.33	45.98
011099889003021	601879.48	3524628.19	8931	14	1	0.00147	0.00059	0.00068	0.000240	0.26	15.26	45.77
011099892001001	599861.45	3511051.48	6931	105	15	0.00145	0.00066	0.00065	0.000390	0.33	15.33	45.99
011099889004032	604198.68	3520462.96	8047	6	0	0.00143	0.00057	0.00066	0.000234	0.24	15.24	45.73
011099891004011	605097.14	3513628.04	9054	50	3	0.00142	0.00057	0.00064	0.000338	0.31	15.31	45.92
011099891004093	604778.89	3515030.69	8279	5	1	0.00140	0.00057	0.00063	0.000328	0.34	15.34	46.03
011099891004094	604782.44	3515105.3	8262	12	0	0.00139	0.00056	0.00063	0.000328	0.34	15.34	46.03
011099889004000	603633.78	3523742.73	9402	249	21	0.00139	0.00055	0.00065	0.000210	0.18	15.18	45.53
011099892001036	589869.25	3514124.99	7622	38	2	0.00137	0.00062	0.00061	0.000258	0.19	15.19	45.57
011099891004017	604596.53	3517472.78	7789	4	1	0.00135	0.00055	0.00061	0.000250	0.27	15.27	45.80
011099892001002	598791.92	3510935.37	6642	36	2	0.00134	0.00061	0.00060	0.000348	0.29	15.29	45.88
011099889003009	600393.94	3525944.88	9381	10	0	0.00132	0.00052	0.00061	0.000206	0.21	15.21	45.63
011099892001003	598762.83	3510735.55	6825	2	0	0.00131	0.00060	0.00059	0.000340	0.29	15.29	45.86

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099891004007	606020.86	3513570.98	9928	28	6	0.00131	0.00053	0.00059	0.000282	0.26	15.26	45.77
011099892001000	601231.9	3510605.28	8002	5	1	0.00131	0.00060	0.00058	0.000336	0.35	15.35	46.06
011099892001006	598350.78	3509775.23	7656	9	5	0.00130	0.00059	0.00058	0.000306	0.24	15.24	45.73
011099892001008	597624.52	3509144.53	8171	20	3	0.00128	0.00058	0.00057	0.000286	0.27	15.27	45.80
011099889003006	602271.27	3526919.83	11084	4	0	0.00126	0.00050	0.00059	0.000176	0.15	15.15	45.45
011099891004095	605646.32	3515161.49	9086	9	1	0.00123	0.00050	0.00056	0.000258	0.27	15.27	45.82
011099891004098	605057.7	3510819.88	10473	102	9	0.00122	0.00049	0.00055	0.000290	0.26	15.26	45.79
011099891004096	605931.72	3515290.4	9335	45	8	0.00122	0.00049	0.00055	0.000244	0.26	15.26	45.78
011099889003002	603606.01	3524619.26	10006	60	4	0.00121	0.00048	0.00056	0.000176	0.19	15.19	45.56
011099892001007	598285.79	3509362.43	8049	19	5	0.00121	0.00055	0.00054	0.000280	0.24	15.24	45.71
011099891004004	606001.17	3514480.83	9607	198	35	0.00121	0.00049	0.00054	0.000264	0.28	15.28	45.84
011099891004010	606220.67	3511980.69	10798	23	2	0.00121	0.00049	0.00054	0.000294	0.27	15.27	45.80
011099892001005	598944.82	3510260.61	7332	69	14	0.00120	0.00055	0.00054	0.000294	0.25	15.25	45.75
011099891004008	606753.35	3513272.16	10719	1	0	0.00120	0.00048	0.00054	0.000250	0.23	15.23	45.68
011099889003003	602763.42	3526038.87	10595	136	8	0.00119	0.00047	0.00055	0.000182	0.19	15.19	45.56
011099889003005	602696.67	3526864.61	11252	2	0	0.00118	0.00047	0.00055	0.000160	0.14	15.14	45.41
011099891004006	607033.48	3513082.57	11050	3	1	0.00115	0.00046	0.00052	0.000240	0.19	15.19	45.57
011099891004005	607098.13	3513491.41	10962	6	1	0.00113	0.00046	0.00051	0.000230	0.21	15.21	45.63
011099892001009	597644.18	3508067.4	9245	175	31	0.00112	0.00051	0.00050	0.000236	0.22	15.22	45.66
011099891004003	607440.78	3513252.09	11366	25	3	0.00110	0.00045	0.00050	0.000216	0.18	15.18	45.53
011099889003001	605529.50	3525201.21	11784	6	0	0.00109	0.00043	0.00050	0.000142	0.12	15.12	45.36
011099892001026	593147.92	3508230.45	9758	118	12	0.00108	0.00049	0.00048	0.000162	0.17	15.17	45.51
011099892001011	601425.91	3509094.49	9393	16	2	0.00107	0.00049	0.00048	0.000252	0.23	15.23	45.69
011099892001010	599363.92	3509317.32	8357	98	12	0.00101	0.00046	0.00045	0.000226	0.19	15.19	45.57
011099892001038	591623.69	3510966.99	8166	6	2	0.00101	0.00046	0.00045	0.000168	0.18	15.18	45.53
011099892001037	590625.3	3512158.41	8027	121	20	0.00100	0.00046	0.00045	0.000180	0.15	15.15	45.45
011099889003000	606421.83	3525999.55	12981	1	0	0.00096	0.00038	0.00045	0.000122	0.10	15.10	45.31
011099891004001	607646.95	3514538.2	11177	3	0	0.00095	0.00038	0.00043	0.000186	0.15	15.15	45.46
011099892001013	596874.96	3506579.74	10695	55	3	0.00095	0.00043	0.00042	0.000178	0.15	15.15	45.45
011099891004000	608383.15	3513638.88	12131	13	1	0.00092	0.00037	0.00042	0.000176	0.16	15.16	45.48
011099892001012	600307.01	3508365.01	9572	244	40	0.00089	0.00041	0.00040	0.000182	0.15	15.15	45.46
011099892001014	598595.19	3506820.74	10606	10	0	0.00086	0.00039	0.00038	0.000170	0.16	15.16	45.47

Exhibit G-2. Secondary Pb Smelter: Current Conditions Scenario Media Concentrations

Block FIPS	UTMx	UTMy	Distance from Source (m)	Pop 2000	Children Ages 0 to 7 Years 2000	Modeled Average Annual Pb Air Conc. (µg/m^3)	Modeled Average Annual Pb Air Exposure Conc. for Population (µg/m^3)	Children Ages 0 to 4 Years Modeled Average Annual Pb Air Exposure Conc. (µg/m^3)	Total Deposition (g/m^2/year)	Modeled Soil Pb Conc. (mg/kg)	Modeled Soil Pb Conc. Plus Background (mg/kg)	Hybrid Scaled Soil Pb Conc. (mg/kg)
	[Centroid coordinates in NAD83]			[From 2000 U.S. Census]		[From AERMOD modeling]	[From NATA ratios]	[For children ages 0 to 4 years, from NATA ratios]	[From AERMOD modeling]	[From MPE soil mixing]	[From MPE soil mixing]	[Scaled three times modeled results]
011099892001042	591017.4	3506462	12267	40	2	0.00085	0.00039	0.00038	0.000098	0.10	15.10	45.31
011099891004100	603343.55	3507723.76	11572	45	3	0.00081	0.00033	0.00037	0.000178	0.15	15.15	45.45
011099892001039	590400.65	3509292.4	10237	142	17	0.00079	0.00036	0.00035	0.000120	0.10	15.10	45.30
011099892001053	588438.07	3511127.65	10386	23	1	0.00076	0.00034	0.00034	0.000122	0.10	15.10	45.29
011099892001047	590238.95	3505811.22	13214	15	3	0.00074	0.00034	0.00033	0.000084	0.09	15.09	45.27
011099892001048	589974.13	3506336.98	12898	3	0	0.00073	0.00033	0.00032	0.000090	0.08	15.08	45.23
011099892001046	591120.9	3504299.27	14168	1	0	0.00071	0.00032	0.00032	0.000090	0.08	15.08	45.25
011099892001070	602579.05	3506011.96	12655	22	1	0.00070	0.00032	0.00031	0.000140	0.13	15.13	45.39
011099892001049	589776.84	3506531.77	12841	7	0	0.00068	0.00031	0.00030	0.000088	0.07	15.07	45.20
011099892001062	589731.19	3505039.91	14135	10	2	0.00068	0.00031	0.00030	0.000076	0.06	15.06	45.19
011099892001045	591787.32	3504083.46	14115	3	0	0.00068	0.00031	0.00030	0.000082	0.09	15.09	45.26
011099892001050	589105.38	3506456.43	13282	11	0	0.00067	0.00031	0.00030	0.000088	0.08	15.08	45.24
011099892001052	588221.88	3509716.96	11440	25	1	0.00066	0.00030	0.00029	0.000102	0.08	15.08	45.24
011099892001061	589416	3504614.93	14661	1	0	0.00065	0.00030	0.00029	0.000072	0.06	15.06	45.18
011099892001059	588803.48	3503884.08	15602	41	2	0.00060	0.00028	0.00027	0.000066	0.06	15.06	45.17
011099892001051	587247.79	3507863.51	13417	45	7	0.00055	0.00025	0.00025	0.000076	0.07	15.07	45.21
011099892001055	584809.18	3508859	14658	6	0	0.00052	0.00024	0.00023	0.000070	0.08	15.08	45.23
011099892001058	587500.15	3503800.42	16378	10	0	0.00052	0.00024	0.00023	0.000058	0.05	15.05	45.15
011099892001057	587559.57	3505739.81	14786	23	0	0.00051	0.00023	0.00023	0.000062	0.06	15.06	45.19

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099890003046	2	60	73	133
011099890002042	1	60	54	114
011099890003042	6	60	35	95
011099890002050	5	60	27	87
011099890002041	1	60	22	82
011099890003137	1	60	21	81
011099891003011	1	60	18	78
011099891003012	2	60	17	77
011099890002047	3	60	17	77
011099890003138	4	60	16	76
011099890002039	3	60	16	76
011099890002026	5	60	15	75
011099890002023	32	60	15	75
011099891003013	5	60	15	75
011099890002025	2	60	15	75
011099890002038	5	60	15	75
011099891003010	1	60	14	74
011099891003009	2	60	14	74
011099890002024	14	60	14	74
011099890002036	3	60	14	74
011099891003022	1	60	13	73
011099890002037	1	60	13	73
011099891003023	4	60	13	73
011099890003140	5	60	13	73
011099890002027	9	60	13	73
011099890003094	1	60	12	72
011099891002018	5	60	12	72
011099891003025	9	60	12	72
011099890002029	1	60	12	72
011099890002028	4	60	11	71
011099891002019	2	60	11	71
011099891003008	7	60	11	71
011099890002018	4	60	11	71
011099890002019	2	60	11	71
011099891003016	5	60	11	71
011099890003087	3	60	11	71
011099890003093	4	60	11	71
011099890002015	1	60	10	70
011099891002020	2	60	10	70
011099890002022	4	60	10	70
011099890003083	5	60	10	70
011099891002013	1	60	10	70
011099890003088	2	60	10	70
011099890003086	1	60	10	70
011099891003005	2	60	10	70
011099891002017	1	60	10	70
011099890001035	3	60	9	69
011099891001017	1	60	9	69
011099891002011	1	60	9	69
011099891003000	10	60	9	69
011099891002012	4	60	9	69

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099890003089	6	60	9	69
011099891002007	1	60	9	69
011099891003004	3	60	9	69
011099891002014	8	60	9	69
011099890003082	3	60	8	68
011099890002017	4	60	8	68
011099891003006	6	60	8	68
011099890001026	7	60	8	68
011099890003085	4	60	8	68
011099891003028	3	60	8	68
011099890001025	2	60	8	68
011099891002002	3	60	8	68
011099891002015	8	60	8	68
011099891003003	1	60	8	68
011099890001027	4	60	8	68
011099890003040	36	60	8	68
011099891002003	5	60	8	68
011099890003142	2	60	8	68
011099891003007	2	60	7	67
011099891002016	4	60	7	67
011099890003143	1	60	7	67
011099891004068	9	60	7	67
011099890001029	10	60	7	67
011099891002001	32	60	7	67
011099890003144	3	60	7	67
011099890001023	16	60	7	67
011099890001032	3	60	7	67
011099891004060	3	60	7	67
011099889002029	2	60	6	66
011099889002026	15	60	6	66
011099891003001	3	60	6	66
011099890001031	1	60	6	66
011099890003107	5	60	6	66
011099890001024	3	60	6	66
011099891001016	1	60	6	66
011099889002023	7	60	6	66
011099890001015	8	60	6	66
011099891004050	7	60	6	66
011099889002022	1	60	6	66
011099890003048	55	60	6	66
011099891004047	6	60	6	66
011099889002030	5	60	6	66
011099889002011	3	60	6	66
011099889002021	5	60	5	65
011099891004046	2	60	5	65
011099891004043	1	60	5	65
011099890001011	3	60	5	65
011099889001010	6	60	5	65
011099889002031	1	60	5	65
011099890001012	5	60	5	65
011099891004059	6	60	5	65

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099891004051	4	60	5	65
011099891004034	1	60	5	65
011099890001006	5	60	5	65
011099891004049	6	60	5	65
011099891004048	2	60	5	65
011099891004041	9	60	5	65
011099891004052	2	60	5	65
011099890003077	1	60	5	65
011099890001018	1	60	5	65
011099890003080	18	60	5	65
011099890001008	2	60	5	65
011099889002012	2	60	5	65
011099889002014	1	60	5	65
011099891004045	2	60	5	65
011099889001011	20	60	5	65
011099890001020	1	60	5	65
011099889002019	1	60	5	65
011099889002015	8	60	5	65
011099890003036	2	60	5	65
011099890003109	1	60	5	65
011099890001009	8	60	5	65
011099889001009	2	60	5	65
011099890003078	2	60	5	65
011099889002017	2	60	5	65
011099889002020	1	60	5	65
011099890001010	1	60	5	65
011099891004033	2	60	5	65
011099890003058	1	60	5	65
011099891004036	8	60	5	65
011099890001013	2	60	4	64
011099889001007	32	60	4	64
011099889002007	1	60	4	64
011099889002016	2	60	4	64
011099890003079	5	60	4	64
011099890003056	2	60	4	64
011099890001002	26	60	4	64
011099889002006	4	60	4	64
011099890003060	4	60	4	64
011099890003055	4	60	4	64
011099889001005	8	60	4	64
011099889002001	2	60	4	64
011099890003037	7	60	4	64
011099890001000	13	60	4	64
011099889002000	7	60	4	64
011099890001019	1	60	4	64
011099890003054	1	60	4	64
011099891004057	4	60	4	64
011099889001004	60	60	4	64
011099890003053	2	60	4	64
011099891004058	6	60	4	64
011099890001001	1	60	4	64

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099891004031	16	60	4	64
011099891004039	2	60	4	64
011099891004038	1	60	4	64
011099891004037	6	60	4	64
011099890003114	8	60	4	64
011099889001012	3	60	4	64
011099889001013	5	60	4	64
011099890003064	1	60	4	64
011099890003065	3	60	4	64
011099889003042	3	60	4	64
011099890003073	2	60	4	64
011099890003068	10	60	4	64
011099890001003	2	60	4	64
011099890001005	1	60	4	64
011099889003043	22	60	4	64
011099889003044	3	60	4	64
011099890003072	1	60	4	64
011099890003061	16	60	3	63
011099890003069	2	60	3	63
011099890003052	1	60	3	63
011099889003041	7	60	3	63
011099890003066	1	60	3	63
011099890003128	6	60	3	63
011099889001002	4	60	3	63
011099891004054	5	60	3	63
011099889001014	3	60	3	63
011099890003071	4	60	3	63
011099890003067	1	60	3	63
011099889003051	19	60	3	63
011099891004056	2	60	3	63
011099890003070	3	60	3	63
011099890003155	5	60	3	63
011099889004015	3	60	3	63
011099890003076	1	60	3	63
011099891004055	4	60	3	63
011099890003031	2	60	3	63
011099890003051	9	60	3	63
011099890003050	2	60	3	63
011099890003152	1	60	3	63
011099889003028	1	60	3	63
011099890003049	2	60	3	63
011099890003159	1	60	3	63
011099890003014	1	60	3	63
011099889003027	4	60	3	63
011099891004030	2	60	3	63
011099889004014	2	60	3	63
011099890003115	6	60	3	63
011099889004016	4	60	3	63
011099891004072	2	60	3	63
011099889003012	20	60	3	63
011099889001001	1	60	2	62

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099890003127	2	60	2	62
011099890003160	2	60	2	62
011099890003110	2	60	2	62
011099889003026	70	60	2	62
011099889004021	1	60	2	62
011099890003020	4	60	2	62
011099890003121	17	60	2	62
011099890003007	5	60	2	62
011099889004022	5	60	2	62
011099890003122	2	60	2	62
011099889004017	4	60	2	62
011099890003123	1	60	2	62
011099889003013	3	60	2	62
011099889003023	7	60	2	62
011099890003006	2	60	2	62
011099890003112	1	60	2	62
011099890003004	6	60	2	62
011099890003002	2	60	2	62
011099890003015	2	60	2	62
011099890003129	1	60	2	62
011099890003003	1	60	2	62
011099892001029	1	60	2	62
011099892001031	1	60	2	62
011099892001027	1	60	2	62
011099891004025	11	60	2	62
011099890003001	1	60	2	62
011099889003017	2	60	2	62
011099892001028	3	60	2	62
011099892001068	12	60	2	62
011099891004028	5	60	2	62
011099889003033	2	60	2	62
011099889004006	5	60	2	62
011099889004023	2	60	2	62
011099889003016	1	60	2	62
011099891004024	1	60	2	62
011099891004089	3	60	2	62
011099891004081	1	60	2	62
011099889004008	3	60	1	61
011099891004092	17	60	1	61
011099891004091	3	60	1	61
011099891004019	6	60	1	61
011099889003035	1	60	1	61
011099891004018	3	60	1	61
011099892001066	1	60	1	61
011099889003020	1	60	1	61
011099892001004	15	60	1	61
011099889003010	1	60	1	61
011099891004013	5	60	1	61
011099891004014	21	60	1	61
011099889003021	1	60	1	61
011099892001001	15	60	1	61

Exhibit G-3. Secondary Pb Smelter: Modeled Indoor Dust Concentrations

Block FIPS	Children Ages 0 to 7 Years in 2000	Current Conditions Scenario: Predicted Indoor Dust Concentrations (mg/kg)		
		From Non-air Sources	From Air-related Sources	Total
011099891004011	3	60	1	61
011099891004093	1	60	1	61
011099889004000	21	60	1	61
011099892001036	2	60	1	61
011099891004017	1	60	1	61
011099892001002	2	60	1	61
011099891004007	6	60	1	61
011099892001000	1	60	1	61
011099892001006	5	60	1	61
011099892001008	3	60	1	61
011099891004095	1	60	1	61
011099891004096	8	60	1	61
011099891004098	9	60	1	61
011099889003002	4	60	1	61
011099892001007	5	60	1	61
011099891004010	2	60	1	61
011099891004004	35	60	1	61
011099892001005	14	60	1	61
011099889003003	8	60	1	61
011099891004006	1	60	1	61
011099891004005	1	60	1	61
011099892001009	31	60	1	61
011099891004003	3	60	1	61
011099892001026	12	60	1	61
011099892001011	2	60	1	61
011099892001010	12	60	1	61
011099892001038	2	60	1	61
011099892001037	20	60	1	61
011099892001013	3	60	1	61
011099891004000	1	60	1	61
011099892001012	40	60	1	61
011099892001042	2	60	1	61
011099891004100	3	60	1	61
011099892001039	17	60	1	61
011099892001053	1	60	1	61
011099892001047	3	60	1	61
011099892001070	1	60	1	61
011099892001062	2	60	1	61
011099892001052	1	60	1	61
011099892001059	2	60	1	61
011099892001051	7	60	0	60

Exhibit G-4. Input Parameters for Secondary Pb Smelting Facility Soil Calculations

Use in model	Parameter	Description	Value Used	Source and Reason[a]
Mixing equation parameters	Dyd	Yearly dry deposition rate of contaminant	Varies by block (g/m^2-yr) (See Exhibit G-2 for values)	AERMOD results – deposition at each block was assumed constant for modeling period.
	Dyw	Yearly wet deposition rate of contaminant	0	AERMOD results indicated very small wet deposition.
	tD	Total time period over which deposition occurs	37 years	Lifetime of the facility (1969 to present, according to Alabama Department of Environmental Management [2006]).
	Zs	Soil mixing depth	1 cm	HHRAP; California Office of Environmental Health Hazard Assessment (2000); and for consistency with primary Pb smelter soil samples.
	BD	Bulk density of soil	Varies (g/cm^3) (Average 1.47)	From soil survey for Pike county (NRCS 2006). Soil type at each block centroid was identified.
Loss equation meteorological parameters	My	Rainfall	136.7 cm/year	Annual normal precipitation from 1971 to 2000 for Troy, AL (NCDC 2002).
	I	Irrigation	0	Assumption.
	Ev	Evapo-transpiration	82.5 cm/yr	Midpoint of estimated evapotranspiration for Alabama based on hydrologic budget of the state (Hanson 1991).
Loss equation soil and contaminant properties	RO	Average annual surface runoff	51.1 cm/yr	Value for the south east central United States (McKone and Bodnar 2001).
	esw	Volumetric soil water content	0.2 mL/cm^3	HHRAP midpoint value default.
	Kds	Soil-water partitioning coefficient	900 mL/g	HHRAP default for Pb.
	SD	Sediment delivery ratio	0.18	MPE default.
	ER	Contaminant enrichment ratio	1	HHRAP default.
Loss equation Universal Soil Loss Equation (USLE) additional parameters	R	Erosivity factor	350 yr^{-1}	Estimated from U.S. Soil Conservation Service Map in Schwab et al. (1993).
	K	Erodibility factor	Varies (ton/acre) (average 0.18)	From soil survey for Pike county (NRCS 2006). Soil type at each block centroid was identified.
	LS	Topographical or slope-length factor	1.5	HHRAP default that represents a variety of distance and slope conditions. Default was selected because of the large area used relative to the intended design of USLE.
	C	Cover management factor	0.1	HHRAP value for grass and agricultural crops.
	P	Supporting practice factor	0	HHRAP conservative assumption that no erosion prevention methods are in place.

[a] HHRAP refers to USEPA (2006) and MPE refers to USEPA (1998).

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Appendix H

Data Supporting National-Scale Surface Water Ecological Risk Screening Assessment

Appendix H presents step-by-step instructions for performing queries in the National Water Quality Assessment (NAWQA) Database to obtain Pb concentration data in surface waters and sediment, as well as a list of U.S. Geological Survey study units/basins in the NAWQA Database. Exhibit H-1 lists the NAWQA study units/basins, the number of sampling stations in each study unit/basin, and the number of sampling stations with available dissolved Pb concentration data. A discussion of these results is provided in Chapter 4 of the report.

The remainder of Appendix H presents a discussion of dissolved Pb measurements at NAWQA stations as well as characteristics of sampling locations where dissolved Pb concentrations exceed EPA ambient water quality criteria for the protection of aquatic life and their uses. These results are discussed in Chapter 7 of the report.

H.1 Instructions for Downloading Data from the NAWQA Database

1) Go to the Web page:
   http://infotrek.er.usgs.gov/traverse/f?p=NAWQA:HOME:608661097958737633 7

2) Under "Retrieve Data" on the left-hand panel, select **Surface Water/Bed Sediment**.

3) On the Surface Water/Bed Sediment page, select **Expanded Cross-tab (Pivot Table) Output**.

4) On the SWmaster – crosstab-expanded page, selected the **Search icon** ().

5) Choose **NAWQA Study Unit(s)**
   - Select/highlight multiple study units from the list under the "Available" box on the left, then select the Move icon (
). Highlighted study units should appear under the "Selected" box on the right. Click the Select button below the "Selected" box. This returns you to the SWmaster – crosstab-expanded page.

6) Next choose **Lab Schedule(s)**
   - Select/highlight lab schedule(s) of interest (i.e., "Trace Elements in Water (2703) [17]") from the list under the "Available" box on the left, then select the Move icon (
). Highlighted lab schedule(s) should appear under the "Selected" box on the right. Click the Select button below the "Selected" box. This returns you to the SWmaster – crosstab-expanded page. (To query sediment data instead of and/or in addition to surface water data, select the "Trace Elements in Sediment (2420) [48]" option instead of and/or in addition to "Trace Elements in Water (2703) [17]" when highlighting lab schedule(s) of interest.)

7) Next choose **Water Year(s)**
   - Click on "Next 25" under "Available" box four times, so that the years displayed are 1995 through 2010. Select/highlight 1995 through 2004 from the list under the "Available" box on the left, then select the Move icon (
). Highlighted years should appear under the "Selected" box on the right. Click the Select button below the "Selected" box.

8) On the SWmaster – crosstab-expanded page, select **Go** at the bottom of the page. Once the Query progress page progresses into a page where available data is displayed, click **Export**, in the top left corner of the page under "Actions."

10) On the Choose Export Type page, select the type of file to be exported (i.e., .csv) and select the **Export** button on the right.

11) On the Export Ready page, select **Click to View or Save**. The .csv file (or other requested file type) should download.

Exhibit H-1. USGS NAWQA Study Units and Sampling Stations for which Dissolved Pb was Measured[a]

	Study Unit ID	Study Unit (Basin) Name (Year Sampling Started)	Number of Stations in Unit	Number of Stations With No Dissolved Pb Measurements	Number of Stations With Dissolved Pb Measurements	Fraction of Stations with Dissolved Pb Measurements
28	ACAD	Acadian-Pontchartrain (1997)	69	64	5	7.2%
19	ALBE	Albemarle-Pamlico Drainage (1991)	93	84	9	9.7%
9	ALMN	Allegheny and Monongahela (1994)	130	119	11	8.5%
22	ACFB	Apalachicola-Chattahoochee-Flint River Basin (1991)	104	101	3	2.9%
49	CAZB	Central Arizona Basins (1994)	17	12	5	29.4%
50 51	CCYK	Central Columbia Plateau & Yakima River Basin (1991, 1999)	89	55	34	38.2%
35	CNBR	Central Nebraska Basins (1991)	17	8	9	52.9%
2	CONN	Connecticut - Housatonic - and Thames River Basins (1991)	68	46	22	32.4%
59	COOK	Cook Inlet Basin	43	31	12	27.9%
5	DELR	Delaware River Basin (1997)	94	92	2	2.1%
30	EIWA	Eastern Iowa Basins (1994)	33	32	1	3.0%
23	GAFL	Georgia-Florida Coastal Plain (1991)	24	24	0	0.0%
47	GRSL	Great Salt Lake Basins (1997)	112	67	45	40.2%
3	HDSN	Hudson River Basin (1991)	32	31	1	3.1%
10	KANA	Kananha-New River Basin (1994)	66	62	4	6.1%
11	LERI	Lake Erie - Lake St. Clair Drainage (1994)	11	11	0	0.0%
4	LINJ	Long Island and New Jersey Coastal Drainage (1994)	62	62	0	0.0%
15	LIRB	Lower Illinois River Basin (1994)	29	29	0	0.0%
6	LSUS	Lower Susquehanna River Basin (1991)	57	57	0	0.0%
27	MISE	Mississippi Embayment (1994)	11	11	0	0.0%
26	MOBL	Mobile River and Tributaries (1997)	39	31	8	20.5%
55	NVBR	Nevada Basin and Range (1991)	16	13	3	18.8%
1	NECB	New England Coastal Basins (1997)	36	35	1	2.8%
46	NROK	Northern Rockies Intermontane Basins (1997)	30	1	29	96.7%
58	OAHU	Oahu (1997)	16	8	8	50.0%

Exhibit H-1. USGS NAWQA Study Units and Sampling Stations for which Dissolved Pb was Measured[a]

	Study Unit ID	Study Unit (Basin) Name (Year Sampling Started)	Number of Stations in Unit	Number of Stations With No Dissolved Pb Measurements	Number of Stations With Dissolved Pb Measurements	Fraction of Stations with Dissolved Pb Measurements
31	OZRK	Ozark Plateaus (1991)	51	14	37	72.5%
8 7	PODL	Potomac River Basin & Delmarva Peninsula (1991, 1999)	68	68	0	0.0%
52	PUGT	Puget Sound Basin (1994)	11	7	4	36.4%
18	REDN	Red River of the North Basin (1991)	23	23	0	0.0%
45	RIOG	Rio Grande Valley (1991)	18	0	18	100.0%
54	SACR	Sacramento River Basin (1994)	34	22	12	35.3%
56	SANJ	San Joaqin-Tulare Basins (1991)	36	36	0	0.0%
57	SANA	Santa Ana River Basin (1997)	41	33	8	19.5%
21	SANT	Santee Basin and Coastal Drainages (1994)	48	48	0	0.0%
34	SCTX	South central Texas (1994)	14	4	10	71.4%
40	SPLT	South Platte River Basin (1991)	48	44	4	8.3%
24	SOFL	Southern Florida (1994)	26	26	0	0.0%
20 29	TENN	Tennessee River Basin (upper & lower; 1994, 1997)	130	130	0	0.0%
33	TRIN	Trinity River Basin (1991)	19	18	1	5.3%
44	UCOL	Upper Colorado River Basin (1994)	68	23	45	66.2%
14	UIRB	Upper Illinois River Basin (1997)	56	56	0	0.0%
17	UMIS	Upper Mississippi River Basin (1994)	44	44	0	0.0%
48	USNK	Upper Snake River Basin (1991)	35	29	6	17.1%
16	WMIC	Western Lake Michigan Drainage (1991)	72	72	0	0.0%
13 12	WHMI	White River & Great and Little Miami River Basins (1991, 1997)	104	104	0	0.0%
53	WILL	Williamette Basin (1991)	47	46	1	2.1%
43	YELL	Yellowstone Basin (1997)	14	3	11	78.6%
		TOTAL	**2305**	**1936**	**369**	**16.0%**

[a] Listed in alphabetical order by four-letter code; numbers correspond to those on the map in Exhibit 4-32.
Note: The NAWQA Web site (water.usgs.gov/nawqa/nawqamap.html) lists a total of 59 study units; however, sampling has not started at eight of those units, and some of the other units appear to have been combined into a single unit in the database (e.g., the Central Columbia Plateau (CCPT) Unit, started in 1991, and the Yakima River Basin (YAKI) Unit, started in 1999, appear to have been combined into the Central Columbia Plateau-Yakima River Basin (CCYK) Unit in the data warehouse).

H.2 Dissolved Pb Measurements

This section presents the dissolved Pb concentrations at individual NAWQA sampling stations where one or more samples exceeded the initial screening value of 1.2 µg/L. Dissolved Pb concentrations are also reported for those stations which exceeded the second screening value for the water hardness-specific Criterion Continuous Concentration (CCC) for areas with very soft water (i.e., hardness less than 50 mg/L as $CaCO_3$). The CCC is also known as the chronic Ambient Water Quality Criteria (AWQC) for the protection of aquatic life and its uses. The dissolved Pb concentration of 1.2 µg/L was selected for the initial screening assessment because it is the CCC for a water hardness of 50 mg/L, considered to be soft water. However, for areas of the country with even softer water, the CCC is less than 1.2 µg/L. To determine how much less, for the second screening assessment, the co-located (or nearby) measures of $CaCO_3$ were identifies and used to calculate the hardness-specific CCC for comparison with the Pb concentrations.

For ease of data management, the results from the 47 NAWQA Study Units are divided into 2 groups: 1) data from the first 25 Units (alphabetically by Unit code) and 2) data from the remaining 22 Units. Exhibits H-2 and H-4 present the results of the initial screening assessment against a concentration of 1.2 µg/L dissolved Pb. In these data sets, most measurements were made with a quantitation limit (QL) of 1 µg/L, although some QLs were lower and a few QLs were higher (2 µg/L). The QL was less than the screening value for almost all samples. For samples with a QL of 2 µg/L, the reported concentration is listed in the table as "< 2" µg/L. Exhibits H-3 and H-5 present the results of the second screening assessment for which hardness-specific CCC values of less than 1.2 µg/L were calculated. The interpretation of these data was complicated by the most frequent QL of 1 µg/L, which was higher than the CCC. For cases where all reported concentrations for a sampling station were less than the location-specific CCC or below the QL, the sampling station was removed from the analysis. The fraction of samples exceeding the screening value is reported in all cases.

Each exhibit presents the individual measured dissolved Pb concentrations for single sampling events that exceed the screening value (either 1.2 µg/L or the location-specific CCC) and the mean value of the measurements that exceed the screening value. Measurements less than the screening value are not included in the estimate of the mean, nor are the QL or one half of the QL included in the estimate of the mean for measures less than the QL. The mean value simply describes the average amount by which the screening value is exceeded when exceedance can be demonstrated.

The risk to aquatic communities were considered to be negligible, with no further analysis needed for stations at which less than 5 percent of the samples demonstrated to exceed the screening value (1.2 µg/L or the location-specific CCC) and the ratio of the few measured values to the screening assessment was less than five. This is represented in Exhibits H-2 through H-5 by "na."

Exhibit H-2. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for First 25 Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > 1.2 µg/L / Total N	Measurement Date and Time		[Pb] (µg/L) Single	Mean[a]
AZ	CAZB	9517000	Hassayampa River nr Arlington	Agriculture	33.3	-112.7	1/1	1/22/1997 11:30	<	2	<2
WA	CCYK	461850120005800	Sunnyside WWTP	Other/Mixed	46.31385	-120.0174	1/1	8/4/1999 15:30	--	1.2	1.2
NE	CNBR	6805500	Platte River at Louisville	Mixed	41	-96.2	2/45 – na	12/16/1999 11:00	--	3.812	4.469
								6/17/1999 10:30	--	5.125	
CT	CONN	1208500	Naugatuck R at Beacon Falls	Mixed	41.4	-73.1	1/23 –	3/7/1995 13:25	--	2	2
CT	CONN	1196500	Quinnipiac River at Wallingford	Urban	41.4	-72.8	1/25 –	8/3/1995 9:30	--	2	2
CT	CONN	1125100	French R at N Grosvenordale	Mixed	42	-71.9	1/23 –	6/11/1996 10:45	--	4	4
AK	COOK	600715152572800	Ef Ore C near Mth near Johnson Gl near Tuxedni Bay	Reference	60.12022	-152.96	1/1	7/25/2000 16:00	--	1.640	1.640
UT	GRSL	404847111240501	Silver Creek at Wanship	Rangeland	40.81306	-111.4014	2/2	8/21/2000 13:30	--	2.587	5.495
								3/13/2000 15:20	--	8.403	
UT	GRSL	404431111282901	Silver Creek near Atkinson	Urban	40.74194	-111.4747	2/2	3/10/2000 16:00	--	3.237	3.754
								8/16/2000 15:30	--	4.271	
UT	GRSL	404026111273001	Silver Creek above Richardson Flat	Rangeland	40.67678	-111.4613	4/5	5/16/2000 10:00	--	2.063	2.319
								4/24/2000 12:00	--	2.185	
								6/12/2000 10:55	--	2.201	
								8/16/2000 13:00	--	2.828	
UT	GRSL	403938111300201	Silver Cr at Bonanza Dr., Park City	Urban	40.7	-111.5	1/2	8/16/2000 10:20	--	1.432	1.432
UT	GRSL	10168000	Little Cottonwood Creek @ Jordan River near SLC	Residential	40.7	-111.9	2/49 – na	3/23/1999 11:00	--	1.232	1.515
								2/23/1999 10:00	--	1.314	
								12/22/1999 10:30	<	2	
UT	GRSL	10130500	Weber River near Coalville	Forest	40.9	-111.4	1/20 –	3/21/2000 13:30	--	1.576	1.576

Exhibit H-2. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for First 25 Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > 1.2 µg/L / Total N	Measurement Date and Time		[Pb] (µg/L)	
										Single	Mean[a]
RI	NECB	1112900	Blackstone River at Manville	Mixed	41.97121	-71.47006	1/3	6/19/2001 12:30	--	1.551	1.551
								7/18/2001 9:45	--	1.138	
								8/28/2001 13:30	--	0.62	
WA	NROK	12424500	Spokane River at 7-mile Bridge nr Spokane	Urban	47.7	-117.5	1/25 – na	5/3/2000 12:45	--	1.366	1.366
WA	NROK	12422500	Spokane River at Spokane	Urban	47.65934	-117.4491	4/28	4/3/2000 12:00		1.028	1.131
								4/3/2000 17:00		1.028	
								6/3/1999 14:30	--	1.233	
								6/3/1999 19:30	--	1.233	
WA	NROK	12422000	Spokane River below Green St at Spokane	Urban	47.7	-117.4	2/20	4/5/2000 10:00	--	1.158	1.158
								4/5/2000 15:00	--	1.158	
ID	NROK	12413470	SF Coeur D'Alene River near Pinehurst	Mining	47.55159	-116.2379	33/33	12/2/1999 8:50	--	2.091	4.6184
								3/17/1999 10:00	--	2.462	
								4/10/2000 13:15	--	2.6	
								2/28/2000 11:00	--	2.741	
								5/27/1999 12:45	--	2.782	
								12/9/1998 12:10	--	3.1	
								4/14/2000 13:15	--	3.131	
								5/3/2001 13:00	--	3.164	

Exhibit H-2. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for First 25 Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > 1.2 µg/L / Total N	Measurement Date and Time		[Pb] (µg/L)	
										Single	Mean[a]
			SF Coeur D'Alene River near Pinehurst (continued)					4/17/2000 13:15	--	3.233	
								3/23/1999 13:30	--	3.406	
								6/29/1999 13:00	--	3.563	
								3/27/2000 13:20	--	3.752	
								1/11/2000 14:30	--	3.793	
								5/2/2000 11:45	--	3.794	
								5/18/2000 10:00	--	3.839	
								3/14/2001 11:45	--	4.362	
								6/2/2000 9:30	--	4.393	
								12/18/2000 12:00	--	4.452	
								5/25/1999 12:45	--	4.619	
								9/8/1999 13:00	--	4.823	
								6/12/2001 12:30	--	4.899	
								4/10/2001 11:00	--	5.114	
								1/23/2001 14:30	--	5.192	
								4/20/1999 12:00	--	5.337	
								9/10/2001 11:30	--	5.432	
								6/29/2000 11:30	--	5.566	
								9/6/2000 14:00	--	5.587	
								11/6/2000 13:30	--	5.608	
								8/31/2000 12:15	--	6.164	
								10/19/1999 14:00	--	6.292	
								7/24/2000 13:00	--	6.774	
								7/26/1999 13:15	--	8.721	
								11/4/1998 12:00	--	11.62	

Exhibit H-2. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for First 25 Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > 1.2 µg/L / Total N	Measurement Date and Time		[Pb] (µg/L)	
										Single	Mean[a]
ID	NROK	12413150	SF Coueur D'Alene River at Silverton	Mining	47.55159	-116.2379	1/1	8/25/2000 10:00	--	10.52	10.518
ID	NROK	12413123	Canyon Creek at Woodland Park	Mining	47.48854	-115.8904	1/1	8/23/2000 15:00	--	29.78	29.777
NV	NVBR	94196783	Lv Wash below Flamingo Wash confluence near Las Vegas	Urban	36.1	-115	1/19 [b]	12/6/1994 10:05	--	3	3
								2/21/1995 9:15	<	2	
								11/2/1994 10:05	<	2	
								1/7/1995 9:40	<	2	
								1/10/1995 14:40	<	2	

[a] Mean of samples greater than 1.2 µg/L or greater than the quantitation limit (QL), whichever is higher.
[b] At this station, there were fourteen samples less than a QL of 1 µg/L and four samples less than a QL of 2 µg/L.

Exhibit H-3. Dissolved Pb Measurements Exceeding the CCC at NAWQA Sampling Stations with Soft Water (Hardness < 50 mg/L as $CaCO_3$) between 1994 and 2004 for First 25 Study Units

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > CCC / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean [a]
CT	CONN	1208049	Naugatuck River near Waterville	Mixed	41.6	-73.1	1/21 - na	7/9/2001 14:45	--	0.635	0.635
				$CaCO_3$ = 23.5 mg/L; CCC = 0.51 µg/L; 13 samples < 1 µg/L; 7 samples < CCC; 1 > CCC							
CT	CONN	1127000	Quinebaug River at Jewett City	Mixed	41.6	-72	3/22	5/23/2001 10:40	--	0.329	0.408
								6/6/2001 11:25	--	0.422	
								7/18/2001 9:50	--	0.472	
				$CaCO_3$ = 17.4 mg/L; CCC = 0.36 µg/L; 14 samples < 1 µg/L; 5 samples < CCC; 3 > CCC							
CT	CONN	1124000	Quinebaug River at Quinebaug	Mixed	42	-72	11/23	9/24/2001 10:00	--	0.391	0.759
								11/6/2000 11:20	--	0.409	
								5/21/2001 9:50	--	0.437	
								8/22/2001 9:30	--	0.455	
								7/16/2001 9:15	--	0.657	
								2/7/1995 10:35	--	1	
								6/15/1995 9:40	--	1	
								8/10/1995 9:15	--	1	
								7/10/1996 9:15	--	1	
								8/26/1996 9:15	--	1	
								9/12/1996 9:15	--	1	
				$CaCO_3$ = 14.7 mg/L CCC = 0.30 µg/L; 9 samples < 1 µg/L; 3 samples < CCC; 11 > CCC							
CT	CONN	1119375	Willimantic River at Merrow	Mixed	41.8	-72.3	5/20	1/22/2001 15:45	--	0.21	0.302
								9/12/2001 10:15	--	0.211	
								11/14/2000 11:05	--	0.349	
								6/25/2001 12:45	--	0.363	
								8/15/2001 12:50	--	0.377	
				$CaCO_3$ = 9.5 mg/L; CCC = 0.18 µg/L; 13 samples < 1 µg/L; 2 samples < CCC; 5 > CCC							

Exhibit H-3. Dissolved Pb Measurements Exceeding the CCC at NAWQA Sampling Stations with Soft Water (Hardness < 50 mg/L as $CaCO_3$) between 1994 and 2004 for First 25 Study Units

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No. [Pb] > CCC / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean [a]
ID	NROK	12419000	Spokane River near Post Falls	Mixed	47.7	-117	2/26	5/3/2000 8:00	--	1.579	0.995
								5/7/2001 13:45	--	0.411	
				$CaCO_3$ = 17.9 mg/L; CCC = 0.37 µg/L; 16 samples < 1 µg/L; 8 samples < CCC; 2 > CCC							
ID	NROK	12392155	Lightning Creek at Clark Fork	Forest	48.2	-116.2	4/17	11/9/2000 10:15	--	0.185	0.224
								4/11/2001 11:15	--	0.252	
								5/4/2001 13:15	--	0.196	
								6/14/2001 13:00	--	0.261	
				$CaCO_3$ = 8.8 mg/L; CCC = 0.17 µg/L; 10 samples < 1 µg/L; 3 samples < CCC; 4 > CCC							

[a] Mean of values greater than CCC.

Exhibit H-4. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for Remaining Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No [Pb] > 1.2 µg/L / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean[a]
AR	OZRK	7050500	Kings River near Berryville	Mixed	36.42599	-93.62319	1/8	6/6/1995 10:06	--	9	9
MO	OZRK	7018100	Big River near Richwoods	Forest	38.1595	-90.70624	½	5/11/1995 12:00	--	7	7
MO	OZRK	7061135	West Fork Black River at West Fork	Mining	37.49144	-91.09929	1/1	9/11/1995 15:15	--	11	11
MO	OZRK	7061155	Strother Creek near Oates	Mining	37.59005	-91.05485	1/1	9/19/1995 11:30	--	3	3
NM	RIOG	8317200	Santa Fe River above Cochiti Lake	Urban	35.54698	-106.2286	3/3	12/2/1994 10:15	-	2	2.3
								5/12/1995 8:00	-	2	
								8/2/1995 9:15	-	3	
NM	RIOG	8331000	Rio Grande at Isleta	Mixed	34.90589	-106.685	1/12	8/27/1996 13:00	--	3	3
TX	RIOG	8364000	Rio Grande at El Paso	Mixed	31.80289	-106.5408	2/52 – na	11/19/1996 8:15	<	2	<2
								12/12/1996 9:00	<	2	
CA	SACR	11447360	Arcade c near Del Paso Heights	Urban	38.64185	-121.3827	1/28-na	5/23/1997 13:10	--	1.27	1.27
CO	SPLT	6752260	Cache La Poudre River at Fort Collins	Mixed	40.58915	-105.0697	1/4	7/26/1995 13:15	--	4	4
CO	SPLT	6752270	Cahe La Poudre River below Fort Collins	Mixed	40.56693	-105.0272	1/4	7/21/1995 11:25	--	2	2
CO	SPLT	6752280	Cahe La Poudre River r above Boxelder c, near Timnath	Mixed	40.55193	-105.0114	1/4	7/27/1995 12:50	--	3	3

Exhibit H-4. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for Remaining Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No [Pb] > 1.2 µg/L / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean[a]
CO	UCOL	9046530	French Gulch at Breckenridge	Mining	39.49304	-106.0447	50/60	5/12/1997 14:50	-	1.04	3.71
								5/6/1999 10:20	-	1.105	
								5/22/1997 13:45	-	1.14	
								6/10/1999 14:40	-	1.28	
								5/18/1999 10:05	-	1.383	
								6/2/1998 8:20	-	1.46	
								8/11/1997 13:40	-	1.65	
								3/23/1998 11:45	-	1.68	
								5/7/1998 12:45	-	1.72	
								6/10/1998 11:15	-	1.73	
								7/17/1997 12:15	-	1.8	
								4/26/1999 14:15	-	1.803	
								6/3/1997 8:20	-	1.84	
								5/18/1998 14:25	-	1.87	
								7/28/1997 9:30	-	1.9	
								4/17/1996 8:25	-	2	
								5/9/1996 10:15	-	2	
								5/16/1996 13:50	-	2	
								6/21/1996 9:50	-	2	
								6/16/1998 11:30	-	2	
								7/29/1998 12:55	-	2.16	
								8/5/1998 12:00	-	2.27	
								8/18/1999 13:05	-	2.315	
								6/12/1997 12:45	-	2.35	
								4/21/1998 12:55	-	2.41	
								4/6/1999 12:50	-	2.87	

Exhibit H-4. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for Remaining Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No [Pb] > 1.2 µg/L / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean[a]
			French Gulch at Breckenridge (continued)					9/17/1998 15:05	-	2.99	
								5/22/1996 14:50	-	3	
								6/25/1996 12:00	-	3	
								7/18/1996 15:10	-	3	
								4/15/1999 11:45	-	3.232	
								9/17/1999 15:10	-	3.705	
								5/26/1996 8:20	-	4	
								9/16/1997 13:25	-	4.47	
								11/19/1997 14:30	-	4.75	
								10/8/1996 13:40	-	4.89	
								3/11/1999 10:15	-	4.947	
								8/15/1996 9:30	-	5	
								9/9/1996 13:20	-	5	
								3/19/1998 15:15	-	5.35	
								10/23/1997 13:55	-	5.44	
								11/13/1996 11:05	-	6	
								12/15/1997 15:45	-	6.38	
								1/20/1999 14:25	-	6.939	
								10/23/1995 13:20	-	7	
								11/21/1995 14:55	-	7	
								2/22/1996 11:20	-	7	
								1/20/1998 15:00	-	7.02	
								12/13/1996 10:40	-	7.28	
								2/17/1998 12:45	-	7.36	
								1/19/1996 10:40	-	8	
								1/16/1997 9:45	-	8	

Exhibit H-4. Dissolved Pb Measurements Exceeding 1.2 µg/L at NAWQA Sampling Stations Between 1994 and 2004 for Remaining Study Units (1.2 µg/L = CCC at a Water Hardness of 50 mg/L as $CaCO_3$)

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No [Pb] > 1.2 µg/L / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean[a]
			French Gulch at Breckenridge (continued)					2/21/1997 10:20	-	8	
								3/21/1996 13:20	<	1	
								3/19/1997 14:05	<	1	
								4/18/1997 11:50	<	1	
								4/28/1997 11:15	<	1	
								5/27/1997 14:35	<	1	
								4/30/1999 10:00	<	1	
								7/8/1999 11:10	<	1	
CO	UCOL	9146200	Uncompahgre River near Ridgway	Mining	38.18388	-107.7459	1/3	1/10/1996 13:47	<	2	<2
CO	UCOL	375732107394000	Red Mountain Creek above Crystal Lake near Ironton	Mining	37.95888	-107.6617	2/2	7/22/1997 8:00	-	20.26	21.63
								5/13/1996 16:40	-	23	
CO	UCOL	385437107015600	Oh-Be-Joyful Creek at Mo near Crested Butte	Mining	38.91027	-107.0328	1/1	7/29/1998 11:50	- -	6.02	6.02
CO	UCOL	392907106013900	French Gulch above Gibson Gulch	Mining	39.48526	-106.0281	1/3	6/5/1996 14:50	-	1	2
								7/28/1997 13:00	<	1	
								5/25/1996 13:45	-	2	
CO	UCOL	392947106024500	Blue River below French Gulch near Breckenridge	Mining	39.49638	-106.0464	1/3	5/22/1996 9:30	-	1	2
								7/30/1997 13:00	<	1	
								10/25/1995 8:45	-	2	
CO	UCOL	393557105512400	Peru Creek at mouth near Montezuma	Mining	39.59915	-105.8572	1/1	8/6/1998 8:00	- -	1.26	1.26
WY	YELL	6324970	Little Powder River above Dry Creek, near Weston	Rangeland	44.92693	-105.3533	2/37 - na	4/28/1999 11:15	<	2	<2
								9/12/2000 14:40	<	2	

[a] Mean of values greater than 1.2 µg/L or greater than the quantitation limit (QL), whichever is higher.

Exhibit H-5. Dissolved Pb Measurements Exceeding CCC at NAWQA Sampling Stations with Soft Water (Hardness < 50 mg/L as $CaCO_3$) Between 1994 and 2004 for Remaining Study Units

State	Study Unit ID	Station ID	Place Name	Land Use	Latitude	Longitude	No [Pb] > 1.2 µg/L / Total N	Measurement Date and Time	[Pb] (µg/L)		
									Single		Mean[a]
HI	OAHU	16212700	Waikakalaua Str near Wahiawa, Oahu	Mixed	21.46072	-158.0242	1/2	6/20/2001 12:15	--	0.337	0.337
				$CaCO_3$ = 9 mg/L; CCC = 0.17 µg/L; one sample < 1 µg/L; one sample > CCC							
CO	UCOL	385240106583600	Slate River above Coal Creek nr Crested Butte	Other/Mixed	38.88944	-106.9973	1/4	6/7/2001 8:20	E	0.971	0.971
								8/30/2001 7:50	E	0.713	
				$CaCO_3$ = 39 mg/L; CCC = 0.89 µg/L; two samples < 1 µg/L; one sample < CCC; one > CCC							

[a] Mean of values greater than CCC.

H.3 Characteristics of Sampling Locations where Dissolved Pb Concentrations Exceed EPA Ambient Water Quality Criteria for the Protection of Aquatic Life and Their Uses

Exhibits H-6 through H-20 provide additional information characterizing the fifteen sampling sites in the NAWQA database with land use characterizations *other than* mining at which measured dissolved Pb concentrations exceeded the CCC, or AWQC. For each of the fifteen sampling sites, four types of information are presented:

1. Site Information: The sampling location (state, county, basin study unit), stated land use for the site (as of 1983), and a brief summary of the measured dissolved Pb concentrations compared with the CCC are presented, along with the hazard quotient (HQ) for the mean dissolved Pb concentration for samples that exceed the CCC. The number of samples with dissolved Pb concentrations less than the CCC also is noted.

2. Land Use: More current data on the land uses surrounding the sampling sites were obtained from the 1992 National Land Cover Data (MRLC 1992) for land uses within 20 km of each sampling site, if available.

3. Air Pb Emissions: The number of facilities that emit Pb to the air and the total annual quantity of Pb emitted to the air, within 20 and 50 km of the sampling site were determined from the 2002 National Emissions Inventory (USEPA 2006). The facility emissions to the air within 20 km are likely much more important than the emissions between 20 and 50 km. Data on non-point and mobile source emissions of Pb were available only at the county level.

4. National Pollutant Discharge Elimination System (NPDES): For each sampling site, the watershed was examined to identify facilities in the NPDES database upstream of the sampling site. For permitted facilities in the database, data are available on the approximate distance to the sampling site, the Pb permit levels or measurements if available, and the name and type of facility. However, facilities identified by a Pb query in NPDES, but without information provided on Pb limits, are also identified and included.

At the end of the exhibit for each sampling station, there is a brief synopsis of conclusions concerning the likelihood that aquatic risks are of concern and which sources are potentially most responsible for the Pb levels measured at the sampling station.

Exhibit H-6. Station 7050500 in Arkansas

Sampling Site Information

State – Site ID – Land Use	AR – 7050500 – Mixed
Dissolved Pb	8 samples: 7 < CCC; 1 > CCC; HQ = 3.46
Watershed, County	OZRK, CARROLL
Place Name	KINGS RIVER NEAR BERRYVILLE, AR

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	4.80%
Developed	Low Intensity Residential	0.63%
	High Intensity Residential	0.22%
	Commercial/Industrial/Transportation	0.30%
Barren	Bare Rock/Sand/Clay	0.04%
	Quarries/Strip Mines/Gravel Pits	0.02%
	Transitional	0.21%
Forested Upland	Deciduous Forest	32.05%
	Evergreen Forest	13.24%
	Mixed Forest	11.88%
Shrubland	Shrubland	0.59%
Herbaceous Upland	Grasslands/Herbaceous	0.03%
Herbaceous Planted/Cultivated	Pasture/Hay	34.25%
	Row Crops	1.28%
	Small Grains	0.03%
	Urban/Recreational Grasses	0.24%
Wetlands	Woody Wetlands	0.16%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	2	
Emissions to Air within 50 km	0.00509	tons/year
Emissions in county from mobile and non-point sources	0.00642	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Notes
BERRYVILLE CITY OF WWTP	CARROLL	State	4 km	SEWERAGE SYSTEMS	This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

Conclusions: One of eight measurements of dissolved Pb exceeded the CCC; for that site, the HQ was 3.46. Two air Pb emission sources are relatively far from the site and have relatively low emissions. Pb might come from Berryville waste water treatment plant (WWTP).

Exhibit H-7. Station 7018100 in Missouri[a]

Sampling Site Information

State – Site ID – Land Use	MO – 7018100 – Forest
Dissolved Pb	2 samples: 1 < CCC; 1 > CCC; HQ = 1.89
Watershed, County	OZRK, JEFFERSON
Place Name	BIG RIVER NEAR RICHWOODS MO

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	1.04%
Developed	Low Intensity Residential	0.76%
	High Intensity Residential	0.11%
	Commercial/Industrial/Transportation	0.41%
Barren	Bare Rock/Sand/Clay	0.02%
	Quarries/Strip Mines/Gravel Pits	0.05%
	Transitional	0.04%
Forested Upland	Deciduous Forest	65.91%
	Evergreen Forest	4.86%
	Mixed Forest	9.27%
Shrubland	Shrubland	0.01%
Herbaceous Upland	Grasslands/Herbaceous	1.71%
Herbaceous Planted/Cultivated	Pasture/Hay	15.83%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	14	
Emissions to Air within 50 km	0.344	tons/year
Emissions in county from mobile and non-point sources	0.0179	tons/year

[a] There is no permit discharge information for Pb from facilities upstream of this sampling site in NPDES.

Conclusions: The aquatic risk HQ is relatively low. It is possible that the numerous facilities emitting Pb to air between 20 and 50 km from the station are contributing to the Pb concentration in water. A small proportion (0.05 percent) of the land within 20 km of the sampling site is designated as “quarries/strip mines/gravel pits”; however, most such locations do not have metal ores exposed.

Exhibit H-8. Station 8331000 in New Mexico

Sampling Site Information

State – Site ID – Land Use	NM – 8331000 – Mixed
Dissolved Pb	12 samples; 11 < CCC; 1 > CCC; HQ = 1.03
Watershed, County	RIOG, VALENCIA
Place Name	RIO GRANDE AT ISLETA, NM

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	0.67%
Developed	Low Intensity Residential	4.81%
	High Intensity Residential	0.04%
	Commercial/Industrial/Transportation	3.33%
Barren	Bare Rock/Sand/Clay	7.13%
	Quarries/Strip Mines/Gravel Pits	0.19%
Forested Upland	Deciduous Forest	0.23%
	Evergreen Forest	0.13%
	Mixed Forest	0.01%
Shrubland	Shrubland	52.32%
Non-natural Woody	Orchards/Vineyards/Other	0.14%
Herbaceous Upland	Grasslands/Herbaceous	24.20%
Herbaceous Planted/Cultivated	Pasture/Hay	3.39%
	Row Crops	2.35%
	Small Grains	0.00%
	Fallow	0.00%
	Urban/Recreational Grasses	0.61%
Wetlands	Woody Wetlands	0.44%
	Emergent Herbaceous Wetlands	0.00%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	1	
Emissions to Air within 20 km	0.0678	tons/year
Number of Facilities in 50 km	6	
Emissions to Air within 50 km	0.0945	tons/year
Emissions in county from mobile and non-point sources	0.0291	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name[a]	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values
SOUTHSIDE WATER RECLAMATION PLANT	BERNALILLO		13 km	SEWERAGE SYSTEMS	Conc. Max: 840mg/kg Conc. Avg: 300mg/kg QNT Max: 300 kg/Ha	
RIO RANCHO CITY OF WASTEWATER FACILITIES	SANDOVAL		40 km	SEWERAGE SYSTEMS	Conc. Max: 840mg/kg Conc. Avg: 300mg/kg QNT Max: 300 kg/Ha	
RIO GRANDE PORTLAND CEMENT CORPORATION	BERNALILLO		40 or 50 km (likely upstream, hard to tell)	CEMENT, HYDRAULIC	Conc. Max: ADDMON Conc. Avg: DELMON	

[a] Only facilities in the nearest counties (within a range of about 100 km along the river) were identified. Note that this sampling site is on the Rio Grande in New Mexico, and the watershed includes a large amount of land area. It is likely there are many discharges upriver of this point on the Rio Grande.

Conclusions: Only one of twelve samples exceeded the CCC, and for that sample, the HQ was 1.03. Thus, aquatic risks at this location are marginal. There is one facility emitting Pb to air within 20 km, but the quantity of Pb emitted is relativly low. There are only three permitted discharges upstream of the sample site, none of which are likely to have high levels of Pb.

Exhibit H-9. Station 1112900 in Rhode Island

Sampling Site Information

State – Site ID – Land Use	RI – 1112900 – Mixed
Dissolved Pb	3 samples: 3 > CCC; mean HQ = 2.51; max HQ = 3.53
Watershed, County	NECB – PROVIDENCE
Place Name	Blackstone River at Manville

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	2.44%
Developed	Low Intensity Residential	16.26%
	High Intensity Residential	2.69%
	Commercial/Industrial/Transportation	4.62%
Barren	Bare Rock/Sand/Clay	0.04%
	Quarries/Strip Mines/Gravel Pits	0.44%
	Transitional	0.14%
Forested Upland	Deciduous Forest	41.94%
	Evergreen Forest	1.84%
	Mixed Forest	14.57%
Shrubland	Shrubland	0.06%
Non-natural Woody	Orchards/Vineyards/Other	0.09%
Herbaceous Planted/Cultivated	Pasture/Hay	2.29%
	Row Crops	3.50%
	Urban/Recreational Grasses	2.71%
Wetlands	Woody Wetlands	4.30%
	Emergent Herbaceous Wetlands	2.08%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	151	
Emissions to Air within 20 km	4.07	tons/year
Number of Facilities in 50 km	284	
Emissions to Air within 50 km	11.7	tons/year
Emissions in county from mobile and non-point sources	0.146	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
HEALY BROTHERS CORP	PROVIDENCE	State	At approx. same location as monitor.	NONFERROUS FOUNDRIES, EXCEPT ALUMINUM AND COPPER	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
NEW ENGLAND TREATMENT COMPANY	PROVIDENCE	EPA	4 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
ULTRAFINE POWDER TECHNOLOGY INC	PROVIDENCE	State	4 km	PRIMARY METAL PRODUCTS, NOT ELSEWHERE CLASSIFIED	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
WOONSOCKET REGIONAL WASTEWATER COMMISSION	PROVIDENCE	State	4 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
FAIRMONT FOUNDRY COMPANY	PROVIDENCE	State	5 km	GRAY AND DUCTILE IRON FOUNDRIES	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
CUMBERLAND FOUNDRY COMPANY	PROVIDENCE	State	6 km	GRAY AND DUCTILE IRON FOUNDRIES	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
HOPEDALE WASTE WATER TREATMENT PLANT	WORCESTER	EPA	>10 and < 40 km	SEWERAGE SYSTEMS		Up to 150mg/kg	
NORTHBRIDGE WWTP	WORCESTER	EPA	>10 and < 40 km	SEWERAGE SYSTEMS	Conc. Max: 40µg/L Daily Avg: DELMON Min.:10µg/L Monthly	Up to 65.4 µg/L	
UPPER BLACKSTONE WPAD	WORCESTER	EPA	>10 and < 40 km	SEWERAGE SYSTEMS		Up to 150mg/kg	Not in violation of permit
UPTON WWTF UPGRADE AND EXPANSION	WORCESTER	EPA	>10 and < 40 km	SEWERAGE SYSTEMS	Conc. Max: ADDMON Avg: DELMON (µg/L)		

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
WYMAN GORDON COMPANY	WORCESTER	EPA	>10 and < 40 km	NONFERROUS FORGINGS	Conc. Max: ADDMON Avg: ADDMON (mg/L)	Up to .013 mg/L	
WYMAN GORDON COMPANY	WORCESTER	EPA	>10 and < 40 km	SECONDARY SMELTING AND REFINING OF NONFERROUS METALS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
BURRILLVILLE WWTF	PROVIDENCE	State	>10 and < 40 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
LANDFILL & RESOURCE RECOVERY INC. (L&RR)	PROVIDENCE	State	>10 and < 40 km	REFUSE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

[a] Most of the Rhode Island facilities in NPDES do not have discharge data on Pb, even though they showed up as having Pb discharges in the query.

Conclusions: All three samples exceeded the CCC for Pb. The HQ for the mean of all three samples is relatively low (2.5); the HQ for the maximum of the three samples was slightly higher (3.5). There are 151 facilities that emit Pb to air within 20 km, and 284 facilities within 50 km, but there also are some metal refining facilities upstream with NPDES permits that include Pb. The proportion of land use within 20 km of the site with quarries, strip mines, or gravel pits is 0.44 percent.

Exhibit H-10. Station 12422500 in Washington State

Sampling Site Information

State – Site ID – Land Use	WASHINGTON – 12422500 – Urban
Dissolved Pb	28 Samples: 24 < QL of 1 µg/L which is > CCC; 4 > CCC; mean HQ = 1.14; max HQ = 1.25
Watershed, County	NROK, SPOKANE
Place Name	Spokane River at Spokane

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	1.10%
	Low Intensity Residential	13.47%
	High Intensity Residential	0.17%
Developed	Commercial/Industrial/Transportation	5.80%
	Bare Rock/Sand/Clay	0.24%
Barren	Transitional	0.93%
	Deciduous Forest	0.16%
	Evergreen Forest	23.17%
Forested Upland	Mixed Forest	0.81%
Shrubland	Shrubland	17.11%
Non-natural Woody	Orchards/Vineyards/Other	0.20%
Herbaceous Upland	Grasslands/Herbaceous	8.30%
	Pasture/Hay	9.62%
	Row Crops	0.06%
	Small Grains	8.58%
	Fallow	9.24%
Herbaceous Planted/Cultivated	Urban/Recreational Grasses	0.89%
	Woody Wetlands	0.06%
Wetlands	Emergent Herbaceous Wetlands	0.11%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	7	
Emissions to Air within 20 km	0.393	tons/year
Number of Facilities in 50 km	12	
Emissions to Air within 50 km	0.427	tons/year
Emissions in county from mobile and non-point sources	0.239	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
WASTEWATER TREATMENT PLANT (I)	KOOTENAI (ID)	EPA	40 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
WASTEWATER TREATMENT PLANT (II)	KOOTENAI (ID)	EPA	50 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
HAYDEN AREA REGIONAL SEWER BOARD	KOOTENAI (ID)	EPA	50 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

Conclusions: Of 28 samples, 24 were below the detection limit of 1 µg/L; however, the CCC was 0.99 µg/L for the average water hardness of 36.3 mg/L as $CaCO_3$ at this site. Thus, the 24 samples are likely to be below the CCC. For the remaining four samples, the HQ for the mean concentration was 1.1, and the HQ for the maximum concentration was 1.3, both of which are relatively low. Thus, aquatic risks at this site appear to be relatively low. There are 7 facilities emitting Pb to the air within 20 km, which may be contributing to the Pb in water. There also are a few sewage systems upstream, but no metal refining facilities.

Exhibit H-11. Station 600715152572800 in Alaska[a]

Sampling Site Information

State – Site ID – Land Use	ALASKA – 600715152572800 – Ref.
Dissolved Pb	1 sample; 1 > CCC; HQ = 15
Watershed – County	COOK – Kenai Peninsula Borough
Place Name	Ef Ore C near Mth near Johnson Gl near Tuxedni Bay

Percent Land Use Within 20 km (from NLCD 1992)[b]

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	0	
Emissions to Air within 50 km	0	tons/year
Emissions in county from mobile and non-point sources	0.0999	tons/year

[a] There is no permit discharge information for Pb from facilities upstream of this sampling site in NPDES.
[b] NLCD land use data are not available for Alaska. According to a USGS topographic map, the area appears to be glaciers and mountains.

Conclusions: The single sample for dissolved Pb at this “reference” site measured 1.64 µg/L. The HQ is relatively high (15) because the CCC for Pb at this location was calculated to be 0.11 µg/L due to the extremely soft water measurement (6 mg/L as $CaCO_3$ in a single measurement). It is unknown whether the Pb in the water might come from natural sources or from the mobile and non-point sources within the county. If the Pb is from natural sources and the water is always soft, it may be that the local biota are adapted to the conditions.

Exhibit H-12. Station 16212700 in Hawaii[a]

Sampling Site Information

State – Site ID – Land Use	HI – 16212700 – Mixed
Dissolved Pb	2 samples; 1 < CCC; 1 > CCC; 1 HQ = 1.98
Watershed, County	OAHU, Honolulu
Place Name	Waikakalaua Stream near Wahiawa, Oahu

Percent Land Use Within 20 km (Land cover for year 2000 from NOAA)[b]

Water	12.42%
High Intensity Developed	4.44%
Low Intensity Developed	7.74%
Bare Land	1.60%
Unconsolidated Shore	0.20%
Evergreen Forest	19.25%
Scrub/Shrub	35.34%
Grassland	11.52%
Cultivated Land	7.28%
Palustrine Forested Wetland	0.03%
Palustrine Scrub/Shrub Wetland	0.01%
Palustrine Emergent Wetland	0.06%
Estuarine Forested Wetland	0.11%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	9	
Emissions to Air within 20 km	4.91	tons/year
Number of Facilities in 50 km	11	
Emissions to Air within 50 km	4.91	tons/year
Emissions in county of monitor from mobile and non-point sources	0.491	tons/year

[a] There is no permit discharge information for Pb from facilities upstream of this monitor in NPDES.
[b] NLCD for 1992 was not available for Hawaii. This year 2000 data set did not include mining land use. However, a 1976 land cover data set analyzed showed that 0.02 percent of the land within 20 km was strip mining.

Conclusions: There is an excellent chance that a major source of the dissolved Pb at this location is air deposition from the nine facilities within 20 km discharging 4.91 tons of Pb per year to the air.

Exhibit H-13. Station 12422000 in Washington

Sampling Site Information

State – Site ID – Land Use	WA – 12422000 – Urban
Dissolved Pb	20 samples; 18 < QL of 1 µg/L which is > CCC; 2 > CCC; mean and max HQ = 1.17
Watershed, County	NROK, Spokane
Place Name	Spokane River below Green Street at Spokane

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	0.75%
Developed	Low Intensity Residential	13.21%
	High Intensity Residential	0.17%
	Commercial/Industrial/Transportation	5.27%
Barren	Bare Rock/Sand/Clay	0.20%
	Transitional	0.71%
Forested Upland	Deciduous Forest	0.16%
	Evergreen Forest	22.33%
	Mixed Forest	0.94%
Shrubland	Shrubland	16.44%
Non-natural Woody	Orchards/Vineyards/Other	0.72%
Herbaceous Upland	Grasslands/Herbaceous	9.05%
Herbaceous Planted/Cultivated	Pasture/Hay	12.44%
	Row Crops	0.13%
	Small Grains	8.53%
	Fallow	8.04%
	Urban/Recreational Grasses	0.73%
Wetlands	Woody Wetlands	0.06%
	Emergent Herbaceous Wetlands	0.12%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	8	
Emissions to Air within 20 km	0.411	tons/year
Number of Facilities in 50 km	12	
Emissions to Air within 50 km	0.427	tons/year
Emissions in county of monitor from mobile and non-point sources	0.239	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)[a]

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
WASTEWATER TREATMENT PLANT (I)	KOOTENAI (ID)	EPA	35 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
WASTEWATER TREATMENT PLANT (II)	KOOTENAI (ID)	EPA	45 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)[a]

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
HAYDEN AREA REGIONAL SEWER BOARD	KOOTENAI (ID)	EPA	45 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

[a] All facilities in Shoshone County, Idaho listed for the 12419000 sample in Idaho are also upstream of this monitor, but by more than 110 km.

Conclusions: It is possible that a major source of the dissolved Pb at this location is air deposition from the eight facilities within 20 km discharging 0.411 tons of Pb per year to the air.

Exhibit H-14. Station 12419000 in Idaho

Sampling Site Information

State – Site ID – Land Use	ID - 12419000 – Mixed
Dissolved Pb	26 samples; 16 < QL of 1.0 µg/L which is > CCC; 8 < CCC; 2 > CCC; mean HQ = 2.69; max HQ = 4.27
Watershed, County	NROK, Kootenai
Place Name	Spokane River near Post Falls, ID

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	4.96%
Developed	Low Intensity Residential	4.57%
	High Intensity Residential	0.01%
	Commercial/Industrial/Transportation	2.17%
Barren	Bare Rock/Sand/Clay	0.07%
	Transitional	4.62%
Forested Upland	Deciduous Forest	0.18%
	Evergreen Forest	39.54%
	Mixed Forest	5.57%
Shrubland	Shrubland	7.63%
Non-natural Woody	Orchards/Vineyards/Other	2.33%
Herbaceous Upland	Grasslands/Herbaceous	6.37%
Herbaceous Planted/Cultivated	Pasture/Hay	10.04%
	Row Crops	0.10%
	Small Grains	5.68%
	Fallow	5.72%
	Urban/Recreational Grasses	0.31%
Wetlands	Woody Wetlands	0.05%
	Emergent Herbaceous Wetlands	0.06%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	6	
Emissions to Air within 20 km	0.342	tons/year
Number of Facilities in 50 km	13	
Emissions to Air within 50 km	0.427	tons/year
Emissions in county of monitor from mobile and non-point sources	0.597	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)[a]

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
WASTEWATER TREATMENT PLANT (I)	KOOTENAI (ID)	EPA	3 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
WASTEWATER TREATMENT PLANT (II)	KOOTENAI (ID)	EPA	15 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
HAYDEN AREA REGIONAL SEWER BOARD	KOOTENAI (ID)	EPA	15 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
Coeur Silver Valley	Shoshone	EPA	between 100 and 130 km	Pb AND ZINC ORES	max. conc.- 1.2 mg/L (daily) avg. conc.-.6 mg/L (monthly)	max. conc.- .101 mg/L avg. conc.- .055mg/L	Data is for 3 pipes (2 have limits, 3rd is ADDMON/ DELMON) data presented is summed for 3 pipes.
Hecla Mining Co. Lucky Friday Mine Unit	Shoshone	EPA	between 100 and 130 km	Pb AND ZINC ORES	max. conc.- .4 mg/L (daily) avg. conc.-. 2 mg/L (monthly)	No apparent Pb discharge	Two pipes (one ADDMON/ ADDMON) no measurements of Pb discharge for either.
Hecla Mining Company Star Phoenix Unit	Shoshone	EPA	between 100 and 130 km	Pb AND ZINC ORES	max. conc.- 1.086 mg/L (daily) avg. conc.- .30 mg/L (monthly)	max. conc.- .173 mg/L avg. conc.- .08mg/L	Values reported are the sum of discharges from two pipes
Smelterville, City of	Shoshone	EPA	between 100 and 130 km	SEWERAGE SYSTEMS	max. quantity- .18 lbs/day avg. quantity- .096 lbs/day max conc. - 85 µg/L (daily) avg. conc.- 46 µg/L (monthly)		No Pb discharges reported.
South Fork, Coeur D'Alene RSD	Shoshone	EPA	between 100 and 130 km	SEWERAGE SYSTEMS	max. quantity- 6.5 lbs/day max conc.- 182 µg/L (daily) avg. conc.- 84 µg/L (monthly)	max .quantity- 3.8 lbs/day avg. quantity- 3.8 lbs/day max conc.- 40 µg/L (daily) avg. conc.- 40 µg/L(monthly)	Measured values recorded were the highest in the last 5 years.

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)[a]

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
South Fork, Coeur D'Alene RSD	Shoshone		between 100 and 130 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg.conc.- DELMON	max. conc.- 11.7 µg/kg	Measured values recorded were the highest in the last 5 years.
Sunshine Mine	Shoshone	EPA	between 100 and 130 km	PRIMARY SMELTING AND REFINING OF NONFERROUS METALS, EXCEPT COPPER AND ALUMINUM	max. quantity- 12.8 lbs/day avg. quantity- 6.4 lbs/day max conc.- .550 mg/L (daily) avg. conc.- .274 mg/L (monthly)	max. quantity- 4.7 lbs/day avg. quantity- 1.3 lbs/day max conc.- .241 mg/L (daily) avg. conc.- .115 mg/L (monthly)	4 pipes present, only one active measured values recorded were the highest in the last 5 years.
Sunshine Precious Metals Inc	Shoshone	EPA	between 100 and 130 km	SILVER ORES	max. conc.- .6 mg/L (daily) avg. conc.- .30 mg/L (monthly)	No apparent Pb discharge	

[a] The facilities in Shoshone County are fairly far upstream from the sample, but seemed very relevant because of their large Pb discharges.

Conclusions: Permitted discharges of Pb from four mining companies are likely to be the major source of dissolved Pb at this location.

Exhibit H-15. Station 12392155 in Idaho

Sampling Site Information

State – Site ID – Land Use	ID - 12392155 – Forest
Dissolved Pb	17 samples; 10 < 1.0 µg/L which is > CCC; 3 < CCC; 4 > CCC; mean HQ = 1.32; max HQ = 1.54
Watershed, County	NROK, Bonner
Place Name	Lightning Creek at Clark Fork, ID

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	13.27%
Developed	Low Intensity Residential	0.17%
	Commercial/Industrial/Transportation	0.24%
Barren	Bare Rock/Sand/Clay	1.44%
	Transitional	2.55%
Forested Upland	Deciduous Forest	0.10%
	Evergreen Forest	70.65%
	Mixed Forest	0.83%
Shrubland	Shrubland	5.05%
Herbaceous Upland	Grasslands/Herbaceous	2.96%
Herbaceous Planted/Cultivated	Pasture/Hay	2.05%
	Small Grains	0.01%
	Fallow	0.01%
	Urban/Recreational Grasses	0.01%
Wetlands	Woody Wetlands	0.65%
	Emergent Herbaceous Wetlands	0.00%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	1	
Emissions to Air within 50 km	0.00153	tons/year
Emissions in county of monitor from mobile and non-point sources	0.221	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Revett Silver Company	Sanders	STATE	40 km	COPPER ORES	avg. quantity- .074 lbs/hr max conc.- .098 mg/L (daily) avg. conc.- .064 mg/L (monthly)	No apparent Pb discharges	

Conclusions: The only likely source of the sporadic concentrations of dissolved Pb in excess of the CCC is the copper ore facility upstream and possibly Pb emissions to air from mobile and non-point sources. This location is notable, however, for its very soft water (i.e., 8.8 mg/L as $CaCO_3$) and, as a result, the very low CCC value (i.e., 0.17 µg/L). The measured Pb concentrations that exceed this CCC are relatively low (0.185 to 0.261 µg/L). Whether EPA's equation for relating the CCC to water hardness is valid at this extreme value of water hardness (i.e., the lowest water hardness in the data set used to develop the CCC equation was 20 mg/L as $CaCO_3$ [USEPA 1984]) is unknown.

Exhibit H-16. Station 1127000 in Connecticut

Sampling Site Information

State – Site ID – Land Use	CT - 1127000 – Mixed
Dissolved Pb	22 samples; 14 < QL of 1 µg/L which > CCC; 4 < CCC; 4 > CCC; mean HQ = 1.13; max HQ = 1.54
Watershed, County	CONN, New London
Place Name	Quinebaug River at Jewett City, CT

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	2.08%
Developed	Low Intensity Residential	4.14%
	High Intensity Residential	0.28%
	Commercial/Industrial/Transportation	1.81%
Barren	Bare Rock/Sand/Clay	0.24%
	Quarries/Strip Mines/Gravel Pits	0.11%
	Transitional	0.41%
Forested Upland	Deciduous Forest	51.79%
	Evergreen Forest	3.05%
	Mixed Forest	12.79%
Shrubland	Shrubland	0.04%
Non-natural Woody	Orchards/Vineyards/Other	0.07%
Herbaceous Planted/Cultivated	Pasture/Hay	7.58%
	Row Crops	5.32%
	Urban/Recreational Grasses	2.27%
Wetlands	Woody Wetlands	5.94%
	Emergent Herbaceous Wetlands	2.08%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	4	
Emissions to Air within 20 km	6.11	tons/year
Number of Facilities in 50 km	57	
Emissions to Air within 50 km	6.97	tons/year
Emissions in county of monitor from mobile and non-point sources	0.139	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Jewett City WPCA	New London	STATE	approx same location	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- 43 mg/kg	Measured values recorded were the highest in the last 5 years.
Plainfield Village Stp	Windham	STATE	10 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- 127 mg/kg	Measured values recorded were the highest in the last 5 years.

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
BST Systems	Windham	STATE	11 km		max. quantity- .628 g/day avg. quantity- .299 g/day max conc.- .166mg/L (daily) avg. conc.- .079mg/L (monthly)	max quantity- .095g/day avg. quantity- <.056 g/day	Measured values recorded were the highest in the last 5 years.
Plainfield North Water Pollution Control Facility	Windham	STATE	15 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- 34.5 mg/kg	Measured values recorded were the highest in the last 5 years.
Killingly WPCF Town of	Windham	STATE	25 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- 149 mg/kg	Measured values recorded were the highest in the last 5 years.
Delta Rubber Company	Windham	STATE	25 km	SPECIAL INDUSTRY MACHINERY, NOT ELSEWHERE CLASSIFIED	max. quantity- 32.3 g/day avg. quantity- 10.7 g/day max conc.- .5 mg/L (daily) avg. conc.- .1 mg/L (monthly)	max. quantity- .2 g/day avg. quantity- .2 g/day max conc.- .002 mg/L (daily) avg. conc.- .079mg/L (monthly)	Measured values recorded were the highest in the last 5 years.
Exeter Energy Limited Partnership	Windham	STATE	25 km	ELECTRIC SERVICES	max. conc.- ADDMON avg. conc.- OPTMON	max. conc.- .27mg/L avg. conc.- .1363 mg/L	Measured values recorded were the highest in the last 5 years.
Frito Lay Incorporated	Windham	STATE	between 30 and 50 km		No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.
Lake Road Generating Co L.P.	Windham	STATE	between 30 and 50 km		max. conc.- .5 mg/L (daily) avg. conc.- .1 mg/L (daily)	max. conc.- .052 mg/L avg. conc.- .041 mg/L	Measured values recorded were the highest in the last 5 years.
National Chromium Company Inc	Windham	STATE	between 30 and 50 km		max. conc.- .5 mg/L (daily) avg. conc.- .1 mg/L (daily)	max. conc.- .019 mg/L avg. conc.- .0071 mg/L	Measured values recorded were the highest in the last 5 years.
Putnam Water Pollution Control Facility	Windham	STATE	between 30 and 50 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- 49 mg/kg	Measured values recorded were the highest in the last 5 years.

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Rogers Corporation	Windham	STATE	between 30 and 50 km	FLOOR LAYING AND OTHER FLOOR WORK, NOT ELSEWHERE CLASSIFIED	max. conc.- ADDMON avg. conc.- ADDMON	max. conc.- .001 mg/L avg. conc.- .001 mg/L	Measured values recorded were the highest in the last 5 years.
Thompson WPCF	Windham	STATE	between 30 and 50 km	SEWERAGE SYSTEMS	max. conc.- ADDMON avg. conc.- DELMON	max. conc.- .93 mg/L	Measured values recorded were the highest in the last 5 years.
U.S. Button Corporation	Windham	STATE	between 30 and 50 km		max. quantity- .340 g/day avg. quantity- DELMON max. conc.- .690 mg/L (daily) avg. conc.- DELMON		No measurements presented for Pb levels.
Wheelabrator Putnam Inc	Windham	STATE	between 30 and 50 km		max. conc.- ADDMON avg. conc.- DELMON	max. conc.- .320 mg/L	Measured values recorded were the highest in the last 5 years.

Conclusions: It is possible that one major source of the dissolved Pb at this location is air deposition from the 4 facilities within 20 km discharging 6.11 tons of Pb per year to the air. However, there also are many sewerage systems and industries with permitted discharges of Pb upstream of this sampling location, including one discharge essentially at this location from the Jewett City WPCA.

Exhibit H-17. Station 1124000 in Connecticut

Sampling Site Information

State – Site ID – Land Use	CT - 1124000 - Mixed
Dissolved Pb	23 samples; 9 < QL of 1 µg/L which is > CCC; 3 < CCC; 11 > CCC; mean HQ = 2.53; max HQ = 3.33
Watershed, County	CONN, Windham
Place Name	Quinebaug River at Quinebaug, CT

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	3.86%
Developed	Low Intensity Residential	4.55%
	High Intensity Residential	0.33%
	Commercial/Industrial/Transportation	1.98%
Barren	Bare Rock/Sand/Clay	0.25%
	Quarries/Strip Mines/Gravel Pits	0.09%
	Transitional	0.33%
Forested Upland	Deciduous Forest	41.39%
	Evergreen Forest	5.39%
	Mixed Forest	20.29%
Shrubland	Shrubland	0.07%
Non-natural Woody	Orchards/Vineyards/Other	0.12%
Herbaceous Planted/Cultivated	Pasture/Hay	5.76%
	Row Crops	5.26%
	Urban/Recreational Grasses	1.30%
Wetlands	Woody Wetlands	6.81%
	Emergent Herbaceous Wetlands	2.21%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	8	
Emissions to Air within 20 km	0.0809	tons/year
Number of Facilities in 50 km	161	
Emissions to Air within 50 km	11.3	tons/year
Emissions in county of monitor from mobile and non-point sources	0.0924	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Sturbridge Water Pollution Control Facility	Worcester	EPA	15 km	SEWERAGE SYSTEMS	No info on Pb		This facility resulted in a query for Pb discharges, but no permit info for Pb was found.

Conclusions: Although there are 8 facilities emitting Pb to air within 20 km of this sampling location, the total annual Pb emissions are only 0.081 tons per year; however, considering a 50 km radius, there are 161 facilities emitting a total of 11.3 tons of Pb to the air per year. Other possible sources of Pb nearby appear to be relatively minor (e.g., only one facility with an NPDES permit that might include Pb upstream, relatively low emissions from non-point and mobile sources). This location is notable for its soft water (14.8 mg/L as $CaCO_3$) and low CCC value (0.30 µg/L). The measured Pb concentrations that exceed this CCC are relatively low (1 µg/L or lower).

Exhibit H-18. Station 1119375 in Connecticut

Sampling Site Information

State – Site ID – Land Use	CT - 1119375 – Mixed
Dissolved Pb	20 samples; 13 < QL of 1 µg/L which is > CCC; 2 < CCC; 5 > CCC; mean HQ = 1.68; max HQ = 2.09
Watershed, County	CONN, Tolland
Place Name	WILLIMANTIC R AT MERROW, CT

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	1.79%
Developed	Low Intensity Residential	7.49%
	High Intensity Residential	0.60%
	Commercial/Industrial/Transportation	2.05%
Barren	Bare Rock/Sand/Clay	0.24%
	Quarries/Strip Mines/Gravel Pits	0.07%
	Transitional	0.30%
Forested Upland	Deciduous Forest	47.55%
	Evergreen Forest	2.49%
	Mixed Forest	14.09%
Shrubland	Shrubland	0.05%
Non-natural Woody	Orchards/Vineyards/Other	0.07%
Herbaceous Planted/Cultivated	Pasture/Hay	5.65%
	Row Crops	7.20%
	Urban/Recreational Grasses	2.11%
Wetlands	Woody Wetlands	5.95%
	Emergent Herbaceous Wetlands	2.31%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	3	
Emissions to Air within 20 km	0.68	tons/year
Number of Facilities in 50 km	57	
Emissions to Air within 50 km	13.7	tons/year
Emissions in county of monitor from mobile and non-point sources	0.0139	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
T.A. Operating Corporation	Tolland	STATE	11 km	COURIER SERVICES, EXCEPT BY AIR	max. conc.- ADDMON avg/conc.- DELMON	max. conc.- .0109 mg/L	Measured values recorded were the highest in the last 5 years.
Stafford/WPCF	Tolland	STATE	17 km	SEWERAGE SYSTEMS	max. quantity- .159 kg/day avg. quantity- .07 kg/day	max. quantity- .39 kg/day avg. quantity- .18 kg/day	Measured values recorded were the highest in the last 5 years.

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Tyco Printed Circuit Group LP	Tolland	STATE	18 km		max. conc.- .20 mg/L avg. conc.- .10 mg/L	No apparent Pb discharge	
Tyco Printed Circuit Group Stafford Division	Tolland	STATE	18 km		max. conc.- .70 mg/L avg. conc.- .20 mg/L	max. conc.- .0392 mg/L avg. conc.- .0192 mg/L	Values were summed for two pipes.
Warren Corporation	Tolland	STATE	18 km		max. conc.- .50 mg/L avg. conc.- .10 mg/L	No apparent Pb discharge	

Conclusions: It is possible that one major source of dissolved Pb at this location is air emissions deposition from the 3 facilities within 20 km emitting 0.68 tons of Pb per year to the air. Considering a 50 km radius around the sampling site instead, there are a total of 57 facilities emitting a total of 13.7 tons of Pb per year to the air, which is relatively high. There are also several NPDES permitted discharges upstream of the site.

Exhibit H-19. Station 385240106583600 in Colorado[a]

Sampling Site Information

State – Site ID – Land Use	CO – 385240106583600– Other/Mixed
Dissolved Pb	4 samples; 2 < QL of 1 µg/L which is > CCC; 1 < CCC; 1 > CCC; HQ = 1.09
Watershed, County	UCOL, Gunnison
Place Name	Slate River above Coal Creek near Crested Butte

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	0.12%
	Perennial Ice/Snow	1.49%
Developed	Low Intensity Residential	0.13%
	High Intensity Residential	0.01%
	Commercial/Industrial/Transportation	0.05%
Barren	Bare Rock/Sand/Clay	9.20%
	Transitional	0.02%
Forested Upland	Deciduous Forest	16.66%
	Evergreen Forest	32.66%
	Mixed Forest	1.25%
Shrubland	Shrubland	5.35%
Herbaceous Upland	Grasslands/Herbaceous	31.00%
Herbaceous Planted/Cultivated	Pasture/Hay	1.94%
	Row Crops	0.11%
	Small Grains	0.01%
	Urban/Recreational Grasses	0.00%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	1	
Emissions to Air within 50 km	2.86E-04	tons/year
Emissions in county of monitor from mobile and non-point sources	0.0355	tons/year

[a] There is no permit discharge information for Pb from facilities upstream of this monitor in NPDES.

Conclusions: The aquatic risks at this location appear to be minimal, with only one measurement of dissolved Pb that exceeded the CCC and an HQ of 1.09. There are no obvious sources of Pb to this location, other than the possibly natural sources and mobile and non-point sources in the county.

Exhibit H-20. Station 404847111240501 in Utah

Sampling Site Information

State – Site ID – Land Use	UT – 404847111240501 – Rangeland
Dissolved Pb	2 samples; 1 < CCC; 1 > CCC; HQ = 1.45
Watershed, County	GRSL, Summit
Place Name	Silver Creek at Wanship, UT

Percent Land Use Within 20 km (from NLCD 1992)

Water	Open Water	0.72%
Developed	Low Intensity Residential	0.29%
	Commercial/Industrial/Transportation	0.53%
Barren	Bare Rock/Sand/Clay	0.03%
	Quarries/Strip Mines/Gravel Pits	0.06%
Forested Upland	Deciduous Forest	22.77%
	Evergreen Forest	20.52%
	Mixed Forest	8.37%
Shrubland	Shrubland	32.93%
Non-natural Woody	Orchards/Vineyards/Other	0.00%
Herbaceous Upland	Grasslands/Herbaceous	8.63%
Herbaceous Planted/Cultivated	Pasture/Hay	4.73%
	Small Grains	0.00%
	Urban/Recreational Grasses	0.23%
Wetlands	Woody Wetlands	0.00%
	Emergent Herbaceous Wetlands	0.17%

Nearby Air Pb Emissions (from 2002 NEI)

Number of Facilities in 20 km	0	
Emissions to Air within 20 km	0	tons/year
Number of Facilities in 50 km	27	
Emissions to Air within 50 km	0.358	tons/year
Emissions in **county** of monitor from mobile and non-point sources	0.108	tons/year

Permit Discharge Information for Facilities Upstream of Sampling Site (from NPDES)

Facility Name	County	Permit Issued By	Approx. Distance Upstream	Type of Facility	Pb Permit Limit	Measured Values	Notes
Gear Systems Incorporated	Summit	STATE	13 km	ELECTROPLATING, PLATING, POLISHING, ANODIZING, AND COLORING	max conc. (daily)- 1.38 mg/L avg. conc. (monthly)-.86 mg/L	Pipe 001- <.007mg/L (per day); Pipe 002- Max seen (per day)- .14 mg/L	Limit levels are summed for 2 pipes (each have equal limit levels).

Conclusions: It appears unlikely that air emissions are a major source of Pb at this location; it may be that the Pb discharges from the NPDES-permitted facility 13 km upstream of this site is the source of most of the Pb to this location.

References

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U.S. Environmental Protection Agency (USEPA). (2006) 2002 National Emissions Inventory Data & Documentation, Final Version 1 Release. February. Available at http://www.epa.gov/ttn/chief/net/2002inventory.html

Appendix I

Input Parameter Values Used in the Blood Pb Modeling

This appendix includes a discussion of the Integrated Exposure Uptake Biokinetic Model for Children (hereafter referred to as the IEUBK model) and the International Commission for Radiation Protection (ICRP) model (hereafter referred to as the Leggett model). The IEUBK and Leggett models (USEPA 1994 and Leggett 1993) were used to calculate geometric mean blood Pb concentrations for children living in each of the census blocks or block groups included in the case studies. Detailed tables of the inputs used in the IEUBK and Leggett models are included in this Appendix. Policy-relevant exposure concentration inputs to the models included time-averaged air Pb levels and estimated soil and house dust Pb concentrations. Derivation of exposure concentration estimates were described in Chapter 4 and tabulated in Appendix F. See Chapter 5 for a more detailed discussion of the structure of the IEUBK and Leggett models.

I.1 IEUBK Model

In addition to exposure concentrations and dietary Pb intake/uptake values, the IEUBK model requires a range of input parameter values that characterize the relationships between Pb exposure, intake, and uptake (absorbed dose). These values serve as inputs to equations that calculate Pb absorption from the various exposed media into the blood/extracellular fluid compartment of the model. Exhibit I-1 provides values for all of the parameters that were used in the IEUBK model for the three case studies. The derivation of these values is also discussed in Section 5.1.4.

Exhibit I-1. Input Parameter Values for the IEUBK Model

Parameter	IEUBK Parameter Name	Parameter Value							Basis/Derivation
		IEUBK Default Age Ranges (Years)							
		0.5 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	
Inhalation									
Daily ventilation rate (m3/day)	Ventilation rate	4	5.1	6	6.8	7.8	8.8	10	ICRP (2002), with interpolation for intermediate ages.
Absolute inhalation absorption fraction (unitless)	Lung absorption	0.42 (Primary, secondary smelter), 0.32 (Near Roadway Urban)							Smelter value: USEPA (1989), Appendix A IEUBK value: USEPA (1989), central tendency value from analysis of deposition data.
Indoor air Pb concentration	Indoor air Pb concentration (percentage of outdoor)	100%							Time spent indoors/outdoors is not considered because the input air concentrations are already long-term weighted averages of indoor and outdoor concentrations.
Time spent outdoors	Time spent outdoors (hours/day)	Not used							

Exhibit I-1. Input Parameter Values for the IEUBK Model

Parameter	IEUBK Parameter Name	Parameter Value — IEUBK Default Age Ranges (Years): 0.5 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	Basis/Derivation
Drinking Water Ingestion									
Water consumption (L/day)	Water consumption (L/day)	0.34	0.31	0.31	0.33	0.36	0.39	0.42	Based on value for infants, 1 to 3 yr olds, 1 to10 yr olds (with trend lines used to interpolate intermediate age ranges) (USEPA 2002).
Water Pb concentration (µg/L)	Pb concentration in drinking water (µg/L)	4.61							GM of values reported in studies of United States and Canadian populations (residential water) (Moir et al. 1996, Clayton et al. 1999, as cited in USEPA (2006), Section 3.3 Table 3-10).
Absolute absorption (unitless)	Total percent accessible	50% (Single value used across all age ranges)							Assumed similar to dietary absorption (see "Total percent accessible" under Ingestion-Diet below).
Other drinking water parameters	First-draw, flushed drinking water concentrations	Not used							Water Pb concentration assumed to be representative of children's Pb intake.
Diet									
Dietary Pb intake (µg/day)	Daily Pb intake (µg/day)	3.16	2.6	2.87	2.74	2.61	2.74	2.99	Estimates based on (a) Pb food residue data from U.S. Food and Drug Administration Total Diet Study (USFDA 2001), and (b) food consumption data from NHANES III (CDC 1997).
Absolute absorption (unitless)	Total percent accessible	50%							Alexander et al. (1974) and Ziegler et al. (1978), as cited in USEPA 2006 (Section 4.2.1). These two dietary balance studies suggest that 40-50% of ingested Pb is absorbed by children (2 weeks to 8 years of age).
Other diet parameters	Use alternative dietary values?	No							Daily Pb intake is assumed to include all food groups.

Exhibit I-1. Input Parameter Values for the IEUBK Model

Parameter	IEUBK Parameter Name	Parameter Value: IEUBK Default Age Ranges (Years) 0.5 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	Basis/Derivation
Soil/Indoor Dust Ingestion									
Soil/dust weighting factor (unitless)	Soil/dust ingestion weighting factor (percent soil)	45%							This is the percent of total ingestion that is soil. Value reflects best judgment and consideration (results published by van Wijnen et al. (1990), as cited in (USEPA 1989). The van Wijnen et al. study looked at tracer studies of ingestion rates for rainy days and non –rainy days. It was assumed that rainy days were associated with all soil ingestion and non-rainy days were associated with a combination of soil and dust with the delta representing soil.
Total dust + soil ingestion (mg/day)	Amount of soil/dust ingested daily (mg)	85	135	135	135	100	90	85	USEPA 1989, which was based on multiple studies focusing on children.

Exhibit I-1. Input Parameter Values for the IEUBK Model

<table>
<tr><th rowspan="3">Parameter</th><th rowspan="3">IEUBK Parameter Name</th><th colspan="7">Parameter Value</th><th rowspan="3">Basis/Derivation</th></tr>
<tr><th colspan="7">IEUBK Default Age Ranges (Years)</th></tr>
<tr><th>0.5 to 1</th><th>1 to 2</th><th>2 to 3</th><th>3 to 4</th><th>4 to 5</th><th>5 to 6</th><th>6 to 7</th></tr>
<tr><td colspan="10">Soil/Indoor Dust Ingestion (Continued)</td></tr>
<tr><td>Absolute gastrointestinal absorption (soil and dust) (unitless)</td><td>Total percent accessible</td><td colspan="7">· Primary Pb smelter case study: 0.48 for soil and 0.26 for dust

· Secondary Pb smelter and near roadway: 0.30 for both soil and dust</td><td>· Site specific absorption factors for soil and indoor dust were derived for the primary Pb smelter case study using relative bioavailability (RBA) estimates generated based on swine studies involving soil and dust samples collected in the study area (Casteel et al. 2005). These RBAs were converted to absolute bioavailability factors (i.e., total percent accessible values) by applying the absolute bioavailability factor for the control material (Pb acetate water solution also fed to the animals).

· Secondary Pb smelter and near roadway values: USEPA (1989) reflects evidence that Pb in dust and soil is as accessible as dietary Pb and that dust/soil ingestion may occur away from mealtimes (resulting in enhanced absorption relative to exposure during meal events).</td></tr>
<tr><td>Other soil/dust ingestion parameters</td><td>Multiple source analysis</td><td colspan="7">No</td><td>Soil and house dust concentrations were modeled external to the IEUBK model.</td></tr>
<tr><td colspan="10">Other</td></tr>
<tr><td>Maternal blood Pb (µg/dL)</td><td>Maternal blood Pb concentration at childbirth, µg/dL</td><td colspan="7">1.94</td><td>NHANES IV, national GM for adult women – all nationalities (CDC 2004).</td></tr>
<tr><td rowspan="2">Passive-active uptake parameters</td><td>Fraction passive/total accessible</td><td colspan="7">20</td><td rowspan="2">IEUBK default values were used.</td></tr>
<tr><td>Half saturation level, µg/day</td><td colspan="7">100</td></tr>
</table>

I.2 Leggett Model

The Visual Basic® adaptation of the Leggett model includes a multi-pathway intake and uptake module as described in Section 5.1.3.3. The following policy-relevant exposure concentrations are read from a spreadsheet into the model and serve as the basis for calculating concurrent and lifetime average blood Pb concentrations for each block level or block group:

- BRETH (modeled inhalation exposure concentration);
- SOILPB (soil dust Pb concentration); and
- DUSTPB (house dust Pb concentration).

The Leggett concentration input/output spreadsheet served as the input sheet for the probabilistic blood Pb and IQ model. After concurrent and lifetime average blood Pb concentrations were calculated for each block group, the values were output back into the appropriate rows of the spreadsheet and used in the Monte Carlo simulation to generate blood Pb and IQ distributions.

In addition to exposure concentrations, the Leggett model also accepts essentially the same set of input parameters as those used in the IEUBK model. The intention was to have the Pb uptake (absorbed dose) calculated by the Leggett model for each age group equal to the Pb uptake calculated by the IEUBK model for the same age group, given the same set of exposure concentrations. A section of a Leggett model input parameter spreadsheet is shown in Exhibit I-2. Most of the parameters take the same values as the analogous IEUBK inputs shown in Exhibit I-1. One difference is that the age-specific inputs in the Leggett model are stratified into narrower age ranges than the IEUBK values. In the batch version of the Leggett model, input values are defined for age ranges 0 to 100 days (0.274 years), 100 days to 6 months, and then values are specified every tenth of a year through the age of 5 years, when the stratification reverts to 0.25 years per age group. This stratification was originally intended to provide a smoother transition between age groups with regard to biokinetic parameter values, especially in younger children. However, in the current version of the model, exposure parameters for each age range are set at the identical (or equivalent) values as those used in the IEUBK runs, in order to match absorbed dose estimates as closely as possible, at the expense of some discontinuities in the output blood Pb profiles.

The variables included in the Leggett input parameter spreadsheet that use the same age-specific values as shown in Exhibit I-1 for the IEUBK model are:

- CHAGE (age ranges);
- AFI (dietary absorption fractions);
- H2OAF (gastrointestinal absorption fractions);
- EAT (background dietary Pb intake estimates);
- H20CONC (drinking water concentration);
- RESVOL (age-specific respiratory volumes); and
- AFLUNG (absorption fraction for inhalation exposure).

The variables listed below are included in the Leggett input parameter spreadsheet, but are handled somewhat differently in the IEUBK model:

- SOILING (estimated daily soil ingestion rate);
- DUSTING (estimated daily dust ingestion rate);
- SOILBIO (soil bioavailability);
- DUSTBIO (dust bioavailability);
- SOILAF (gastrointestinal absorption fraction value for soil); and
- DUSTAF (gastrointestinal absorption fraction value for dust).

SOILING and DUSTING are calculated in the input parameter spreadsheet from the corresponding IEUBK inputs relating to total dust + soil ingestion and the soil/dust weighting factor. The Leggett model includes SOILBIO, DUSTBIO, SOILAF, and DUSTAF parameters. In contrast, the IEUBK model characterizes Pb absorption from ingested soil and dust on the basis of one parameter (Total Percent Available). In Exhibit I-2, SOILBIO and DUSTBIO have been set to 1.0 (100 percent) and the SOILAF and DUSTAF have been set to 0.3 (30 percent) to match the IEUBK "Total Percent Available" input value of 30 percent, even though 100 percent bioavailability from soil and dust is unlikely. The SOILAF and DUSTAF values, while they can be varied with age, are held constant at 0.30 across all age groups (the input file extracted in Exhibit I-2 is from the secondary Pb smelter case study). SOILBIO and DUSTBIO values are not treated as age-specific in the batch Leggett model.

The input parameter spreadsheet also includes the same estimated maternal blood Pb concentration as is used in the IEUBK modeling (1.94 µg/dL) and the default maternal-fetal blood Pb ratio specified in the Leggett code. The spreadsheet also includes model inputs related to the use of a non-linear (saturable) model for red blood cell Pb absorption, which is analogous to the saturable uptake model in the IEUBK model. The non-linear blood Pb model parameter values in Exhibit I-2 are the defaults by Leggett (1993).

During this analysis, it was found that the form of the red blood cell model that is specified makes very little difference to the predicted blood Pb profiles, given the relatively low blood Pb intakes predicted for almost all exposed children in the case studies.

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		0	**0.274**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	4	4	4	4	4	4	4
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	3.16	3.16	3.16	3.16	3.16	3.16	3.16
H20CONS	Water consumption (L/day)	0.34	0.34	0.34	0.34	0.34	0.34	0.325
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.04675	0.04675	0.04675	0.04675	0.04675	0.04675	0.04675
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.03825	0.03825	0.03825	0.03825	0.03825	0.03825	0.03825
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		1	1.1	1.2	1.3	1.4	1.5	1.6
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	5.1	5.1	5.1	5.1	5.1	5.1	5.1
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.6	2.6	2.6	2.6	2.6	2.6	2.6
H20CONS	Water consumption (L/day)	0.31	0.31	0.31	0.31	0.31	0.31	0.31
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		1.7	**1.8**	**1.9**	**2**	**2.1**	**2.2**	**2.3**
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	5.1	5.1	5.1	6	6	6	6
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.6	2.6	2.6	2.87	2.87	2.87	2.87
H20CONS	Water consumption (L/day)	0.31	0.31	0.31	0.31	0.31	0.31	0.31
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		2.4	2.5	2.6	2.7	2.8	2.9	3
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	6	6	6	6	6	6	6.8
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.87	2.87	2.87	2.87	2.87	2.87	2.74
H20CONS	Water consumption (L/day)	0.31	0.31	0.31	0.31	0.31	0.32	0.33
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		3.1	3.2	3.3	3.4	3.5	3.6	3.7
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	6.8	6.8	6.8	6.8	6.8	6.8	6.8
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.74	2.74	2.74	2.74	2.74	2.74	2.74
H20CONS	Water consumption (L/day)	0.33	0.33	0.33	0.33	0.33	0.33	0.33
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425	0.07425
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075	0.06075
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		3.8	**3.9**	**4**	**4.1**	**4.2**	**4.3**	**4.4**
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	6.8	6.8	7.8	7.8	7.8	7.8	7.8
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (μg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (μg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (μg/day)	2.74	2.74	2.61	2.61	2.61	2.61	2.61
H20CONS	Water consumption (L/day)	0.33	0.345	0.36	0.36	0.36	0.36	0.36
H20CONC	Pb concentration in drinking water (μg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.07425	0.07425	0.055	0.055	0.055	0.055	0.055
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (μg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.06075	0.06075	0.045	0.045	0.045	0.045	0.045
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (μg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (μg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (μg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		4.5	**4.6**	**4.7**	**4.8**	**4.9**	**5**	**5.25**
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	7.8	7.8	7.8	7.8	7.8	8.8	8.8
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.61	2.61	2.61	2.61	2.61	2.74	2.74
H20CONS	Water consumption (L/day)	0.36	0.36	0.36	0.36	0.375	0.39	0.39
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.055	0.055	0.055	0.055	0.055	0.0495	0.0495
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.045	0.045	0.045	0.045	0.045	0.0405	0.0405
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Exhibit I-2. Example Leggett Model Input Parameters

Parameter	Description	Biokinetic Input Parameters by Age Endpoints (CHAGE) (years)						
		5.5	**5.75**	**6**	**6.25**	**6.5**	**6.75**	**7**
AFI	Ingestion absorption fraction (absolute)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RESVOL	Respiratory volume (m^3/day)	8.8	8.8	10	10	10	10	10
AFLUNG	Inhalation absorption fraction (absolute)	0.42	0.42	0.42	0.42	0.42	0.42	0.42
CHR	Direct intake to bloodstream (µg/day)	0	0	0	0	0	0	0
BRETH	Air concentration (µg/m^3)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
EAT	Pb content in non-water diet (µg/day)	2.74	2.74	2.99	2.99	2.99	2.99	2.99
H20CONS	Water consumption (L/day)	0.39	0.405	0.42	0.42	0.42	0.42	0.42
H20CONC	Pb concentration in drinking water (µg/L)	4.61	4.61	4.61	4.61	4.61	4.61	4.61
H20AF	Absorption fraction for drinking water (abs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DUSTING	Household dust ingestion (g/day)	0.0495	0.0495	0.04675	0.04675	0.04675	0.04675	0.04675
DUSTAF	Dust absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
DUSTPB	Dust Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILING	Soil ingestion (g/day)	0.0405	0.0405	0.03825	0.03825	0.03825	0.03825	0.03825
SOILAF	Soil absorption fraction (relative to soluble)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SOILPB	Soil Pb concentration (µg/g)	0	0	0	0	0	0	0
SOILBIO	Soil bioavailability	1	1	1	1	1	1	1
DUSTBIO	Dust bioavailability	1	1	1	1	1	1	1
IFETAL	Flag to include fetal exposure	1	1	1	1	1	1	1
BLDMOT	Maternal blood Pb (µg/dL)	1.94	1.94	1.94	1.94	1.94	1.94	1.94
BRATIO	Ratio of maternal to fetal blood	0.85	0.85	0.85	0.85	0.85	0.85	0.85
IRBC	Use non-linear RBC model	1	1	1	1	1	1	1
RBCNL	Non-linear RBC model threshold (µg/day)	60	60	60	60	60	60	60
SATRAT	Non-linear RBC model coefficient	350	350	350	350	350	350	350
POWER	Non-linear RBC model power	1.5	1.5	1.5	1.5	1.5	1.5	1.5

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Appendix J

Detailed Human Health Risk Results

Appendix J presents detailed human exposure and heath risk summary data for the three case study locations: the primary Pb smelter, the secondary Pb smelter, and the near roadway urban location. For each of the case study locations, the predicted blood Pb distributions, IQ distributions, and exposure pathway contributions to total Pb uptake are provided for both lifetime average and concurrent blood lead predictions from the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Children (hereafter referred to as the IEUBK model) and the International Commission for Radiation Protection (ICRP) model (hereafter referred to as the Leggett model). Exhibit J-1 and J-2 present summary data for the primary Pb smelter; Exhibit J-3 and J-4 present summary data for the secondary Pb smelter; and Exhibit J-5 presents summary data for the near roadway urban location. These results are discussed in more detail in Section 6.2.

Exhibit J-1. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Primary Pb Smelter Case Study, Current Conditions Scenario

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						Population Above Predicted Blood Pb Level/IQ Change
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	
IEUBK (Concurrent Blood Pb Metric)									
Max	37.2	-7.4	4.0%	7%	86%	2%	98%	2%	0
99.9th	21.9	-6.0	4.0%	7%	86%	2%	98%	2%	4
99.5th	12.4	-4.4	3.4%	6%	87%	4%	96%	4%	19
99th	7.4	-3.0	3.3%	8%	85%	4%	96%	4%	39
95th	3.7	-1.2	0.6%	68%	9%	22%	78%	22%	194
90th	2.9	-0.5	0.5%	54%	11%	34%	66%	34%	388
75th	2.0	- -	0.4%	41%	13%	45%	55%	45%	970
Median	1.3	- -	0.9%	24%	19%	56%	44%	56%	1,940
25th	0.9	- -	0.7%	26%	18%	56%	44%	56%	2,910
1st	0.4	- -	0.4%	30%	15%	54%	46%	54%	3,841
IEUBK (Lifetime-Averaged Blood Pb Metric)									
Max	48.5	-6.3	4.0%	7%	86%	2%	98%	2%	0
99.9th	28.6	-4.7	4.2%	3%	90%	2%	98%	2%	4
99.5th	16.9	-3.1	2.9%	12%	80%	5%	95%	5%	19
99th	10.6	-1.7	2.9%	12%	80%	5%	95%	5%	39
95th	5.3	- -	0.7%	63%	11%	26%	74%	26%	194
90th	4.1	- -	0.7%	59%	11%	29%	71%	29%	388
75th	2.7	- -	0.6%	20%	18%	62%	38%	62%	970
Median	1.8	- -	0.7%	63%	11%	25%	75%	25%	1,940
25th	1.2	- -	0.7%	26%	18%	56%	44%	56%	2,910
1st	0.5	- -	0.4%	30%	15%	54%	46%	54%	3,841

Exhibit J-1. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Primary Pb Smelter Case Study, Current Conditions Scenario

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
Leggett (Concurrent Blood Pb Metric)									
Max	19.2	-5.6	2.9%	12%	80%	5%	95%	5%	0
99.9th	13.9	-4.7	4.0%	7%	86%	2%	98%	2%	4
99.5th	6.7	-2.8	2.9%	12%	80%	5%	95%	5%	19
99th	4.2	-1.5	2.0%	13%	74%	11%	89%	11%	39
95th	2.0	- -	0.9%	24%	19%	56%	44%	56%	194
90th	1.5	- -	0.3%	54%	11%	35%	65%	35%	388
75th	1.0	- -	0.6%	60%	11%	28%	72%	28%	970
Median	0.7	- -	0.3%	31%	14%	55%	45%	55%	1,940
25th	0.5	- -	0.3%	54%	11%	35%	65%	35%	2,910
1st	0.2	- -	0.4%	30%	15%	54%	46%	54%	3,841
Leggett (Lifetime-Averaged Blood Pb Metric)									
Max	31.8	-5.0	2.9%	12%	80%	5%	95%	5%	0
99.9th	22.9	-4.0	4.2%	3%	90%	2%	98%	2%	4
99.5th	11.1	-1.8	2.9%	12%	80%	5%	95%	5%	19
99th	6.8	-0.3	1.1%	32%	50%	17%	83%	17%	39
95th	3.1	- -	0.6%	59%	11%	29%	71%	29%	194
90th	2.3	- -	0.6%	68%	9%	22%	78%	22%	388
75th	1.6	- -	0.7%	59%	11%	29%	71%	29%	970
Median	1.1	- -	0.4%	38%	13%	48%	52%	48%	1,940
25th	0.7	- -	0.9%	24%	19%	56%	44%	56%	2,910
1st	0.3	- -	0.4%	30%	15%	54%	46%	54%	3,841

[a] - - indicates that IQ changes are not estimated below blood Pb cutoff values.

Exhibit J-2. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Primary Pb Smelter Case Study, Attainment Scenario

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
IEUBK (Concurrent Blood Pb Metric)									
Max	33.8	-7.1	3.4%	11%	82%	3%	97%	3%	0
99.9th	18.4	-5.5	3.4%	11%	82%	3%	97%	3%	4
99.5th	11.2	-4.2	3.5%	6%	86%	4%	96%	4%	19
99th	7.9	-3.2	0.5%	81%	6%	13%	87%	13%	39
95th	3.7	-1.2	0.6%	60%	11%	28%	72%	28%	194
90th	2.9	-0.5	0.5%	48%	12%	40%	60%	40%	388
75th	2.0	- -	0.5%	48%	12%	39%	61%	39%	970
Median	1.4	- -	0.7%	59%	11%	29%	71%	29%	1,940
25th	0.9	- -	0.4%	41%	14%	45%	55%	45%	2,910
1st	0.4	- -	0.6%	20%	18%	62%	38%	62%	3,841
IEUBK (Lifetime-Averaged Blood Pb Metric)									
Max	45.6	-6.1	3.4%	11%	82%	3%	97%	3%	0
99.9th	24.9	-4.3	3.6%	5%	88%	4%	96%	4%	4
99.5th	15.5	-2.8	2.9%	12%	80%	5%	95%	5%	19
99th	11.3	-1.9	2.9%	12%	80%	5%	95%	5%	39
95th	5.4	- -	2.2%	15%	74%	9%	91%	9%	194
90th	4.1	- -	0.4%	30%	15%	54%	46%	54%	388
75th	2.8	- -	0.6%	59%	11%	29%	71%	29%	970
Median	1.9	- -	0.5%	31%	16%	52%	48%	52%	1,940
25th	1.2	- -	0.9%	24%	19%	56%	44%	56%	2,910
1st	0.5	- -	0.3%	43%	12%	44%	56%	44%	3,841

Exhibit J-2. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Primary Pb Smelter Case Study, Attainment Scenario

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
Leggett (Concurrent Blood Pb Metric)									
Max	17.0	-5.3	3.4%	6%	87%	4%	96%	4%	0
99.9th	12.7	-4.5	3.6%	5%	88%	4%	96%	4%	4
99.5th	6.4	-2.6	1.3%	77%	12%	10%	90%	10%	19
99th	4.3	-1.6	2.9%	12%	80%	5%	95%	5%	39
95th	2.0	- -	0.7%	63%	11%	25%	75%	25%	194
90th	1.5	- -	0.6%	68%	9%	22%	78%	22%	388
75th	1.0	- -	0.9%	24%	19%	56%	44%	56%	970
Median	0.7	- -	0.9%	26%	19%	54%	46%	54%	1,940
25th	0.5	- -	0.5%	26%	17%	57%	43%	57%	2,910
1st	0.2	- -	0.4%	24%	17%	59%	41%	59%	3,841
Leggett (Lifetime-Averaged Blood Pb Metric)									
Max	28.1	-4.6	3.4%	6%	87%	4%	96%	4%	0
99.9th	20.7	-3.7	3.4%	6%	87%	4%	96%	4%	4
99.5th	10.6	-1.7	1.3%	77%	12%	10%	90%	10%	19
99th	7.1	-0.5	2.9%	12%	80%	5%	95%	5%	39
95th	3.1	- -	0.3%	54%	11%	35%	65%	35%	194
90th	2.3	- -	2.0%	14%	73%	11%	89%	11%	388
75th	1.6	- -	0.4%	41%	14%	45%	55%	45%	970
Median	1.1	- -	0.9%	24%	19%	56%	44%	56%	1,940
25th	0.7	- -	0.6%	20%	18%	62%	38%	62%	2,910
1st	0.3	- -	0.4%	24%	17%	59%	41%	59%	3,841

[a] - - indicates that IQ changes are not estimated below blood Pb cutoff values.

Exhibit J-3. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Secondary Pb Smelter Case Study, MPE (Modeled) Soil Concentrations

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
IEUBK (Concurrent Blood Pb Metric)									
Max	4.7	-1.8	0.3%	8%	23%	69%	24%	76%	0
99.9th	3.7	-1.1	0.8%	9%	27%	63%	30%	70%	2
99.5th	3.0	-0.6	0.8%	9%	27%	63%	30%	70%	8
99th	2.7	-0.3	0.1%	7%	22%	71%	22%	78%	17
95th	1.9	- -	0.8%	9%	27%	63%	30%	70%	84
90th	1.7	- -	0.0%	7%	22%	71%	22%	78%	167
75th	1.2	- -	0.0%	7%	22%	71%	22%	78%	418
Median	0.9	- -	0.4%	8%	24%	68%	26%	74%	836
25th	0.7	- -	0.2%	7%	23%	70%	23%	77%	1,254
1st	0.3	- -	0.2%	8%	23%	69%	24%	76%	1,655
IEUBK (Lifetime-Averaged Blood Pb Metric)									
Max	6.0	- -	0.3%	8%	23%	69%	24%	76%	0
99.9th	4.7	- -	0.0%	7%	22%	71%	22%	78%	2
99.5th	3.9	- -	0.3%	8%	23%	69%	24%	76%	8
99th	3.5	- -	0.5%	9%	25%	66%	27%	73%	17
95th	2.5	- -	0.3%	8%	23%	69%	24%	76%	84
90th	2.1	- -	0.2%	8%	23%	69%	24%	76%	167
75th	1.6	- -	0.2%	8%	23%	69%	24%	76%	418
Median	1.1	- -	0.1%	7%	22%	71%	22%	78%	836
25th	0.8	- -	0.3%	8%	24%	68%	25%	75%	1,254
1st	0.4	- -	0.5%	8%	25%	67%	26%	74%	1,655

Exhibit J-3. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Secondary Pb Smelter Case Study, MPE (Modeled) Soil Concentrations

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
Leggett (Concurrent Blood Pb Metric)									
Max	2.9	-0.5	0.1%	7%	22%	70%	22%	78%	0
99.9th	2.1	- -	0.5%	8%	24%	67%	26%	74%	2
99.5th	1.6	- -	0.8%	9%	27%	63%	30%	70%	8
99th	1.4	- -	0.1%	7%	22%	70%	22%	78%	17
95th	1.0	- -	0.8%	9%	27%	63%	31%	69%	84
90th	0.9	- -	0.4%	8%	24%	68%	25%	75%	167
75th	0.6	- -	0.3%	8%	23%	69%	24%	76%	418
Median	0.5	- -	0.6%	9%	25%	65%	29%	71%	836
25th	0.3	- -	0.5%	8%	25%	67%	26%	74%	1,254
1st	0.2	- -	0.3%	8%	23%	69%	24%	76%	1,655
Leggett (Lifetime-Averaged Blood Pb Metric)									
Max	4.1	- -	0.1%	7%	22%	70%	22%	78%	0
99.9th	3.0	- -	0.0%	7%	22%	71%	22%	78%	2
99.5th	2.3	- -	0.2%	8%	23%	69%	24%	76%	8
99th	1.9	- -	0.4%	8%	24%	67%	26%	74%	17
95th	1.4	- -	0.4%	8%	24%	67%	26%	74%	84
90th	1.2	- -	0.1%	7%	22%	70%	23%	77%	167
75th	0.9	- -	0.3%	8%	23%	69%	24%	76%	418
Median	0.7	- -	0.1%	7%	22%	70%	23%	77%	836
25th	0.5	- -	0.0%	7%	22%	71%	22%	78%	1,254
1st	0.2	- -	0.1%	7%	22%	70%	23%	77%	1,655

[a] - - indicates that IQ changes are not estimated below blood Pb cutoff values.

Exhibit J-4. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Secondary Pb Smelter Case Study, Hybrid Soil Concentrations

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
IEUBK (Concurrent Blood Pb Metric)									
Max	6.7	-2.5	0.3%	19%	25%	55%	39%	61%	0
99.9th	4.7	-2.3	0.4%	20%	26%	54%	40%	60%	2
99.5th	3.7	-1.4	0.2%	19%	25%	56%	38%	62%	8
99th	3.3	-1.0	0.3%	20%	25%	54%	40%	60%	17
95th	2.4	-0.3	0.2%	19%	25%	56%	38%	62%	84
90th	2.0	- -	0.1%	18%	24%	58%	36%	64%	167
75th	1.5	- -	0.2%	19%	25%	56%	38%	62%	418
Median	1.1	- -	0.1%	18%	24%	57%	37%	63%	836
25th	0.8	- -	0.2%	19%	25%	56%	39%	61%	1,254
1st	0.4	- -	0.0%	18%	24%	58%	36%	64%	1,655
IEUBK (Lifetime-Averaged Blood Pb Metric)									
Max	9.0	-1.2	0.3%	19%	25%	55%	39%	61%	0
99.9th	6.3	-0.1	0.3%	19%	25%	56%	38%	62%	2
99.5th	4.9	- -	0.3%	20%	25%	54%	40%	60%	8
99th	4.4	- -	0.1%	19%	24%	57%	37%	63%	17
95th	3.2	- -	0.5%	21%	27%	52%	43%	57%	84
90th	2.7	- -	0.1%	18%	24%	57%	37%	63%	167
75th	2.0	- -	0.4%	20%	26%	54%	41%	59%	418
Median	1.5	- -	0.2%	19%	24%	57%	38%	62%	836
25th	1.1	- -	0.4%	19%	26%	55%	40%	60%	1,254
1st	0.5	- -	0.0%	18%	24%	58%	36%	64%	1,655

Exhibit J-4. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Secondary Pb Smelter Case Study, Hybrid Soil Concentrations

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change (Log Linear Model)[a]	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
Leggett (Concurrent Blood Pb Metric)									
Max	3.0	-0.5	0.2%	19%	24%	57%	37%	63%	0
99.9th	2.3	- -	0.2%	19%	24%	57%	38%	62%	2
99.5th	1.9	- -	0.3%	19%	25%	55%	39%	61%	8
99th	1.7	- -	0.4%	20%	26%	53%	42%	58%	17
95th	1.2	- -	0.2%	19%	24%	57%	38%	62%	84
90th	1.0	- -	0.2%	19%	24%	57%	38%	62%	167
75th	0.8	- -	0.2%	19%	25%	56%	38%	62%	418
Median	0.6	- -	0.3%	20%	25%	55%	40%	60%	836
25th	0.4	- -	0.1%	18%	24%	58%	36%	64%	1,254
1st	0.2	- -	0.2%	19%	25%	56%	38%	62%	1,655
Leggett (Lifetime-Averaged Blood Pb Metric)									
Max	4.3	- -	0.2%	19%	24%	57%	37%	63%	0
99.9th	3.3	- -	0.1%	19%	24%	57%	37%	63%	2
99.5th	2.7	- -	0.2%	19%	25%	56%	38%	62%	8
99th	2.5	- -	0.3%	20%	25%	55%	40%	60%	17
95th	1.8	- -	0.3%	20%	25%	55%	40%	60%	84
90th	1.5	- -	0.3%	19%	25%	56%	39%	61%	167
75th	1.1	- -	0.2%	19%	24%	57%	38%	62%	418
Median	0.8	- -	0.2%	19%	25%	55%	39%	61%	836
25th	0.6	- -	0.1%	19%	24%	57%	37%	63%	1,254
1st	0.3	- -	0.3%	20%	25%	55%	40%	60%	1,655

[a] - - indicates that IQ changes are not estimated below blood Pb cutoff values.

Exhibit J-5. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Near Roadway Urban Case Study

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change[a] (Log Linear Model)	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
IEUBK (Concurrent Blood Pb Metric)									
Max	8.1	-3.3	0.1%	52%	29%	20%	80%	20%	0
99.9th	6.5	-2.7	0.2%	30%	26%	44%	56%	44%	0
99.5th	5.0	-2.0	0.2%	30%	26%	44%	56%	44%	2
99th	4.4	-1.6	0.2%	30%	26%	44%	56%	44%	3
95th	3.1	-0.7	0.2%	30%	26%	44%	56%	44%	16
90th	2.6	-0.2	0.2%	30%	26%	44%	56%	44%	32
75th	1.9	- -	0.2%	30%	26%	44%	56%	44%	80
Median	1.4	- -	0.2%	37%	27%	35%	65%	35%	159
25th	1.0	- -	0.2%	37%	27%	35%	65%	35%	239
1st	0.4	- -	0.2%	30%	26%	44%	56%	44%	316
IEUBK (Lifetime-Averaged Blood Pb Metric)									
Max	11.9	-2.0	0.1%	52%	29%	20%	80%	20%	0
99.9th	9.1	-1.2	0.2%	30%	26%	44%	56%	44%	0
99.5th	7.0	-0.4	0.2%	30%	26%	44%	56%	44%	2
99th	6.2	- -	0.2%	30%	26%	44%	56%	44%	3
95th	4.4	- -	0.2%	30%	26%	44%	56%	44%	16
90th	3.6	- -	0.2%	30%	26%	44%	56%	44%	32
75th	2.7	- -	0.2%	30%	26%	44%	56%	44%	80
Median	1.9	- -	0.2%	37%	27%	35%	65%	35%	159
25th	1.4	- -	0.2%	37%	27%	35%	65%	35%	239
1st	0.6	- -	0.2%	30%	26%	44%	56%	44%	316

Exhibit J-5. Summary of Projected Blood Pb Distributions, IQ Distributions, and Exposure Pathway Contributions to Total Pb Uptake for the Near Roadway Urban Case Study

Percentile	Predicted Blood Pb (µg/dL)	Predicted IQ Change[a] (Log Linear Model)	Pathway Contribution						
			Air	Soil	House Dust	Diet	Total Policy-Relevant Sources	Total Policy-Relevant Background Exposures	Population Above Predicted Blood Pb Level/IQ Change
Leggett (Concurrent Blood Pb Metric)									
Max	6.7	-2.8	0.2%	37%	27%	35%	65%	35%	0
99.9th	4.2	- -	0.2%	30%	26%	44%	56%	44%	0
99.5th	3.2	- -	0.2%	30%	26%	44%	56%	44%	2
99th	2.7	- -	0.2%	37%	27%	35%	65%	35%	3
95th	1.9	- -	0.2%	30%	26%	44%	56%	44%	16
90th	1.6	- -	0.2%	30%	26%	44%	56%	44%	32
75th	1.2	- -	0.2%	30%	26%	44%	56%	44%	80
Median	0.8	- -	0.2%	30%	26%	44%	56%	44%	159
25th	0.6	- -	0.2%	30%	26%	44%	56%	44%	239
1st	0.3	- -	0.2%	30%	26%	44%	56%	44%	316
Leggett (Lifetime-Averaged Blood Pb Metric)									
Max	9.5	-1.4	0.2%	37%	27%	35%	65%	35%	0
99.9th	6.9	-0.4	0.1%	52%	29%	20%	80%	20%	0
99.5th	4.9	- -	0.2%	30%	26%	44%	56%	44%	2
99th	4.1	- -	0.2%	30%	26%	44%	56%	44%	3
95th	2.9	- -	0.2%	30%	26%	44%	56%	44%	16
90th	2.4	- -	0.2%	37%	27%	35%	65%	35%	32
75th	1.7	- -	0.2%	30%	26%	44%	56%	44%	80
Median	1.2	- -	0.2%	37%	27%	35%	65%	35%	159
25th	0.9	- -	0.2%	30%	26%	44%	56%	44%	239
1st	0.4	- -	0.2%	30%	26%	44%	56%	44%	316

[a] - - indicates that IQ changes are not estimated below blood Pb cutoff values.

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Appendix K

Adaptation of the Lanphear et al. (1998) Model for Estimating Blood Pb Levels in the Pilot Phase Assessment

Appendix K includes a discussion of the Lanphear et al. (1998) "empirical" blood Pb model, which was included in the sensitivity analysis, in addition to the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Children (hereafter referred to as the IEUBK model) and the International Commission for Radiation Protection (ICRP) model (hereafter referred to as the Leggett model), to compare the resultant blood Pb distributions and IQ change estimates.

Lanphear et al. (1998) reported the results of an analysis of the relationship between residential soil Pb levels, house dust Pb concentrations, Pb paint hazards, and blood Pb levels in 12 cohorts of urban children in the United States. The study controlled for socioeconomic and family variables, and exposure to Pb in drinking water. A major result of this study was a model that predicted blood Pb concentrations as a function of dust Pb loading (the amount of Pb per unit area of flooring) and residential soil Pb concentrations. As discussed in Section 6.1, it is important to note that the Lanphear et al. model estimates blood Pb concentrations for 16 month old children, so the results from this model cannot be directly compared to the lifetime average and concurrent blood lead predictions from the IEUBK and Leggett models.

Two technical issues needed to be addressed before the Lanphear et al. model could be used to estimate blood Pb levels in the pilot phase human exposure and health risk assessments. First, the Lanphear et al. model's input is dust Pb loading rather than house dust Pb concentration, therefore a model needed to be developed to describe the relationship between the estimates of house dust Pb loading in the Lanphear et al. model and the house dust concentration estimates generated in the primary Pb smelter case study. Second, a method had to be developed to apply the Lanphear et al. model to the specific combinations of house dust and soil Pb exposures in each of the case study block-groups and block-levels. This appendix explains how these two technical issues were addressed.

K.1. Development of a House Dust Pb Concentration- Dust Pb Loading Regression Model

The first technical issue that had to be addressed in this analysis was developing a model to relate house dust Pb concentration to house dust Pb loading. In order to address this issue, the relationship between dust Pb loading and house dust Pb concentration was investigated using a data set developed as part of HUD's 1997 National Survey. The data set was used because it appeared to be the largest, most nationally representative source of both dust Pb loading (from wipe samples) and house dust Pb concentration data taken simultaneously from the same households. To the extent that these data do not reflect the dust Pb loading-house dust Pb concentration relationship in the primary Pb smelter case study, the blood Pb estimates will be biased.

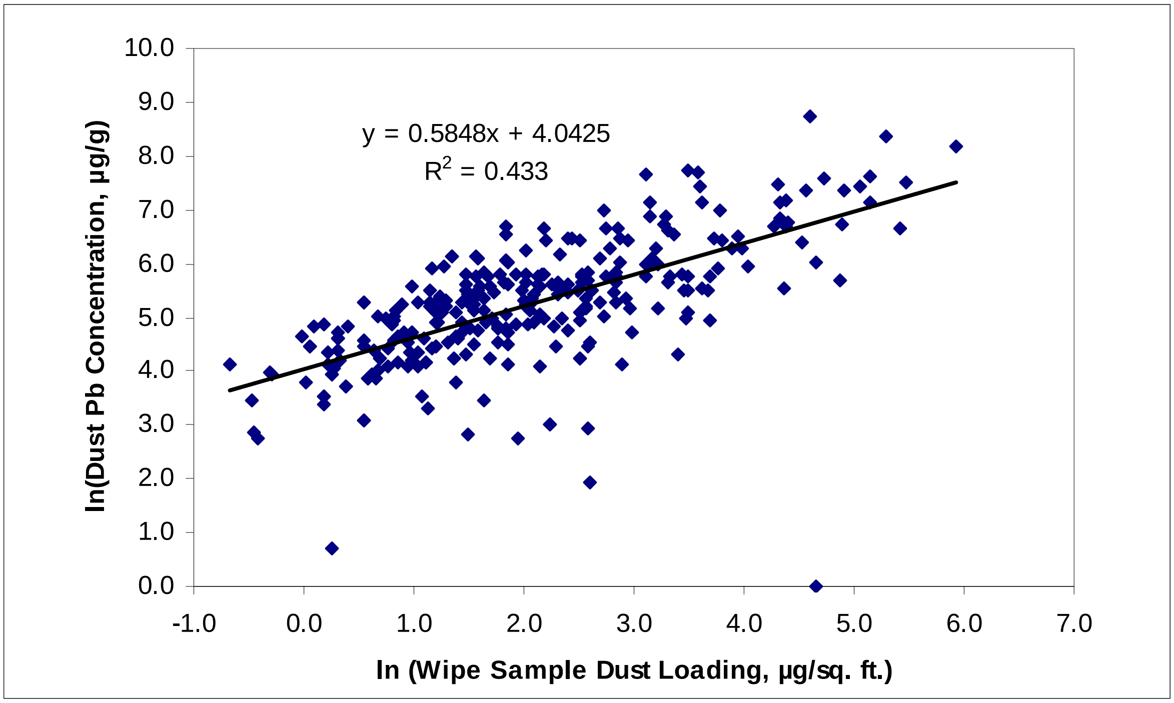
The data set developed as part of HUD's 1997 National Survey consisted of 307 dust Pb loading and house dust Pb concentration measurements taken from 284 households (USEPA 1998, Appendix C). The data was stratified into four vintage ranges from pre-1940 to post-1979. Then the data from all four ranges were pooled for the analysis. Log-log regression provided the best fit and regression diagnostics for the data. Two dust Pb concentration data points, one with a value more than 10-fold below the next lowest value, and one with a value more than 10-fold above the next highest value, were excluded from the analysis. The house dust Pb concentration model derived in this manner was as follows (also, see Exhibit K-1):

$$LnDustPb = 4.0425 + 0.5848 \times LnDustPbLoading$$

where:

LnDustPb	= log-transformed house dust Pb concentration (µg/g)
LnDustPbLoading	= log-transformed dust Pb loading (wipe samples)(µg/ft^2)
adjusted R^2	= adjusted variance, set to 0.433

Exhibit K-1. Regression Analysis of HUD National Survey House Dust Pb Concentration Data and Dust Pb Loading Data



K.2. Estimation of Equivalent House Dust Pb Concentrations and a Bivariate Blood Pb Model

The second technical issue that had to be addressed in this analysis was developing a method to apply the Lanphear et al. model to the specific combinations of house dust and soil Pb exposures in each of the case study block-groups and block-levels. In order to address this issue, the regression analysis was used to convert selected dust Pb loading values from the Lanphear et al. (1998) analysis to estimates of house dust Pb concentrations. Exhibit K-2 is a reproduction of Table 4 in Lanphear et al. (1998), with a column added for estimated house dust Pb concentrations. Table 4 in Lanphear et al. (1998) contains covariate-adjusted estimates of blood Pb for 16 month old children associated with specified combinations of dust Pb loading and soil Pb concentrations. In Exhibit K-2, covariate-adjusted estimates of blood Pb for 16 month old children are also specified for house dust Pb concentrations.

In order to estimate blood Pb values for individual census blocks, Exhibit K-2 was used to derive a bivariate model for predicting blood Pb as a continuous function of soil and house dust Pb concentrations. The REGRESS module from Mathematica® version 5.2 was used to fit a nonlinear model to the natural log of soil and house dust Pb concentrations, as follows (Wolfram Research Inc. 2005):

$$BloodPb = -9.1138 + 2.03554 \times LnDustPb + 0.66657 \times LnSoilPb$$

where:

BloodPb	= concentration of Pb in blood (mg/kg)
LnDustPb	= log-transformed house dust Pb concentration (µg/g)
LnSoilPb	= log-transformed soil dust Pb concentration (µg/g)

All the coefficients were significant at $p < 10^{-6}$ and the F-Ratio for the fit model was 960.3 ($p = < 10^{-6}$). To test the model, the fitted coefficients were used to reproduce the estimated blood Pb values in Exhibit K-2. The resulting blood Pb values matched those in the table within an average of 0.4 percent. The maximum difference between any of the values in Exhibit K-2 and those in Lanphear et al.'s Table 4 was 1.6 percent.

Exhibit K-2. Predicted Blood Pb Levels Associated with Combinations of Dust Pb Loading, House Dust Pb Concentrations, and Soil Dust Pb Concentrations (Adapted from Lanphear et al. 1998, Table 4)

Dust Pb Loading (µg/ft^2)	Estimated Equivalent House Dust Pb Conc. (mg/kg)	Soil Dust Pb Concentration (mg/kg)							
		10	72	100	500	1000	1500	2000	4000
1	57	2.3	2.8	2.9	3.5	3.8	4	4.1	4.4
5	146	3.2	4	4.1	4.9	5.3	5.5	5.7	6.1
10	219	3.7	4.6	4.7	5.6	6.1	6.3	6.5	7.1
15	278	4	5	5.1	6.1	6.6	6.9	7.1	7.7
20	328	4.2	5.3	5.4	6.5	7	7.3	7.6	8.1
25	374	4.4	5.5	5.7	6.8	7.3	7.7	7.9	8.5
40	493	4.9	6.1	6.3	7.5	8.1	8.4	8.7	9.4
55	593	5.2	6.5	6.7	8	8.6	9	9.3	10
70	683	5.5	6.8	7	8.4	9.1	9.5	9.8	10.5
100	842	5.9	7.3	7.6	9	9.7	10.2	10.5	11.3

Note that for equivalent house dust Pb concentrations outside of the range of the model (i.e., > 845 µg/g), the same degree of model fit cannot be expected. However, only 17 block-groups/block-levels in the primary Pb smelter case study, with less than two percent of the exposed child population, have predicted house dust Pb concentrations above this value.

References

Lanphear, B.P., Matte, T.D., Rogers, J., Clickner, R.P., Dietz, B., Bornschein, R.L., Succop, P., Mahaffey, K.R., Dixon, S., Galke, W., Rabinowitz, M., Farfel, M., Rohde, C., Schwartz, J., Ashley, P., Jacobs, D.E. (1998) The Contribution of Lead-Contaminated House Dust and Residential Soil to Children's Blood Lead Levels: A Pooled Analysis of 12 Epidemiologic Studies. *Environmental Research* 79:51-68.

U.S. Environmental Protection Agency (USEPA). (1998) Risk Analysis to Support Standards for Lead in Paint, Dust, and Soil. Office of Pollution Prevention and Toxics. EPA 747-R-97-006.

Wolfram Research, Inc. (2005) Mathematica, Version 5.2. Champaign, IL.

Appendix L

Development of Pb Soil Screening Values

The purpose of this appendix is to document the development of soil benchmarks to use in screening soil Pb concentrations for risks of adverse effects on birds or mammals for the Pb NAAQS review (see Section L.1). Development of these soil screening values (SSVs) was based in part on the methodology developed by EPA for estimating Ecological Soil Screening Levels (Eco-SSLs) for use in the Superfund program. As background, therefore, a brief overview of the Eco-SSL methodology and the derivation of the Pb Eco-SSLs for birds and mammals is presented in Section L.2. An evaluation of the potential utility of the Pb Eco-SSLs for the Pb NAAQS review is presented in Section L.3. Section L.4 presents the SSVs for birds and mammals specifically derived for the Pb NAAQS review.

L.1 Purpose

The purpose of this appendix is to document the development of soil screening values (SSVs) for use in the ecological risk assessment conducted for the Pb NAAQS review. In general, screening-level ecological benchmarks are concentrations of a chemical in an environmental medium below which it is very unlikely that adverse ecological effects might occur. At exposure concentrations above the screening-level benchmark, further evaluation may be needed to determine the likelihood of adverse ecological effects. To conserve resources, that evaluation may be conducted iteratively, with information gleaned at one stage informing the next stage in the assessment (USEPA 1998a).

Pre-screens or initial screening-level assessments generally include many conservative assumptions to ensure that risks are not overlooked. For example, in the Superfund program, a screening-level risk assessment for wildlife generally assumes 100 percent bioavailability of a contaminant in food, soil, and water, and a diet consisting of 100 percent of the diet item that is most contaminated (USEPA 1998b). If the initial screening assessment cannot conclude that risks are negligible for one or more chemicals, further analysis may or may not be needed depending on the risk management decision that is under advisement. Depending on the EPA program office and its needs, further analysis will be conducted iteratively or the next phase will be full-scale baseline human exposure and health risk assessments.

This appendix documents the development of SSVs to screen for risks of Pb in soils to birds and mammals in an ecological risk assessment for the Pb NAAQS review. EPA's Superfund program has developed Ecological Soil Screening Levels (Eco-SSLs) for use in screening-level assessments for Superfund sites. The methodology for developing Eco-SSLs has undergone extensive review and consensus building between representatives of the Agency, academia, and industry, and therefore represents an excellent starting point for consideration in developing SSVs for the Pb NAAQS Review.

First, it was considered whether the Eco-SSLs for Superfund sites might be appropriate for use in the context of the Pb NAAQS review. The lowest Eco-SSL for Pb, which is the avian Eco-SSL of 11 mg/kg, was compared to background concentrations of Pb in soils across the United States. That review indicated that between 70 and 85 percent of background soil concentrations (i.e., samples taken in areas far from anthropogenic sources in the United States) might exceed the Eco-SSL (see Section L.3). In the absence of documented impacts of Pb to birds nationwide, it was concluded that the avian Eco-SSL is more conservative than necessary for the Pb NAAQS review. However, the Eco-SSL methodology for back-calculating soil concentrations from toxicity reference values (TRVs) for birds and mammals is appropriate, and the TRVs developed for the Eco-SSLs are based on extensive literature reviews and data quality assessments. Therefore, EPA's OAPQS decided to use as much of the Eco-SSL approach as was appropriate in developing SSVs for the Pb NAAQS review.

While available data indicate that perhaps only 6 percent of background soil Pb concentrations exceed the Eco-SSL for mammals (Section L.3), any methods or assumptions used to develop an avian Pb SSV for the Pb NAAQS review would also apply to the development of a mammalian Pb SSV to allow comparable risk screening assessments for birds and mammals.

An overview of the Superfund Eco-SSLs and how they are derived (for birds and mammals in particular) is provided in the following section.

L.2 Superfund Eco-SSLs

L.2.1 Overview of Eco-SSLs

EPA's Superfund program has been developing Eco-SSLs since the late 1990s, with peer review of the methodology by EPA's Science Advisory Board in 1999 and an external peer review workshop open to the public in 2000. The *Guidance for Developing Ecological Soil Screening Levels* was published in 2003 and revised in 2005 (USEPA 2005a). Eco-SSLs for Pb were published in 2005 (USEPA 2005b). Eco-SSLs are developed for four groups of organisms: plants, soil invertebrates, birds, and mammals. For birds and mammals, Eco-SSLs are based on the lowest Eco-SSL for each of three different species in each group. The three species have been selected to reflect those most exposed through their diets and incidental soil ingestion rates (e.g., soil ingested when foraging on the ground for seeds or invertebrates). The Eco-SSLs for birds and mammals are expressed as soil concentrations and are back-calculated from a hazard quotient (HQ) of 1.0 (i.e., the soil concentration for which the estimated exposure equals a toxicity reference value for the group). Exposures to birds and mammals via inhalation or dermal absorption from soils were not evaluated because they are expected to be negligible compared to the risk from oral exposures.

Eco-SSLs for plants and soil invertebrates are considered applicable to soils with a pH between 4.0 and 8.5 when the organic matter content is less than or equal to 10 percent. Eco-SSLs are not expected to apply to wetland soils that are regularly flooded or areas amended with sewage sludge (because of high organic content) (USEPA 2005a). In general, because of the generally higher organic content of wetland sediments compared to terrestrial (upland) soils, bioavailability of metals in wetlands is expected to be less than in uplands. EPA did not report soil conditions for which the avian and mammalian Eco-SSLs are applicable; presumably they are applicable to similar soil conditions as described here.

A generic limitation of the Eco-SSL methodology is that soil microbial processes are not included; however, the data were considered to be insufficient and interpretation of results too uncertain for establishing risk-based thresholds for these ecosystem functions. In addition, amphibians, which are particularly important in wetland ecosystems, were not included due to data limitations. Of the four Eco-SSLs for Pb, the values for birds (11 mg/kg) and for mammals (56 mg/kg) are the lowest; therefore, the derivation of these values is described in detail in the next section.

L.2.2 Derivation of Eco-SSLs for Birds and Mammals

The first step in the derivation of Eco-SSLs for birds and mammals is identifying an appropriate TRV for each class of animals. The TRV for birds is based on avian toxicity data, and the TRV for mammals is based on mammalian toxicity data. The TRV represents the dose (expressed in mg of chemical per kg body weight [wet weight] per day) associated with the highest no-observed-adverse-effect level (NOAEL) in the data set of adequate toxicity studies. For each chemical, an extensive literature search was conducted to identify toxicity studies, which then were reviewed for applicability and quality.

In general, growth and reproduction are the most sensitive endpoints for wildlife toxicity that are likely to impact population stability. The relationships between more sensitive biochemical or physiological endpoints and the likelihood of population-level effects generally are unclear. Therefore, only studies with growth, reproduction, or survivorship as endpoints were used to derive a TRV for the Eco-SSLs. For example, to develop a TRV for birds, the geometric mean of the NOAEL values for growth and reproduction from adequate toxicity studies are calculated. That value then is compared with bounded lowest-observed-adverse-effect-levels (LOAELs) from adequate toxicity studies.[1] If the geometric mean NOAEL is higher than the lowest bounded LOAEL, then the TRV is set to the highest bounded NOAEL that is lower than the lowest bounded LOAEL. This approach is reasonable and not overly conservative for a screening-level assessment (i.e., there is a small probability that exposure at the TRV would cause adverse effects in a given species; and even for a sensitive species, only a small proportion of the population might be affected).

To calculate an Eco-SSL for birds, the potential exposures of three bird species are evaluated: an herbivore (mourning dove), a ground insectivore (American woodcock), and a carnivore (red-tailed hawk). The first two species were selected as representative of ground-feeders that may be exposed through incidental ingestion of soils while foraging as well as through ingestion of contaminants taken up by plants and soil invertebrates in their diet. The third species was included to evaluate chemicals that might bioaccumulate through a terrestrial food chain. An Eco-SSL is calculated for each species, and the lowest one becomes the avian Eco-SSL.

Exhibit L-1 provides the parameter values used by EPA to calculate the avian Eco-SSLs for Pb. The same procedure is used for all chemicals. The Pb-specific input parameter values in Exhibit L-1 are the TRV for Pb and the results of the equations used to estimate the concentration of Pb in different diet items (i.e., biota type *i*). The same food and soil ingestion rates are used for all chemicals. The resulting Eco-SSLs are provided in the final column.

[1] When there is a statistically significant adverse effect observed at the lowest dose included in a toxicity experiment, the LOAEL is said to be "unbounded" (i.e., a lower, bounding, NOAEL is missing). When the highest dose tested does not produce a statistically significant adverse effect, the NOAEL is unbounded. Bounded NOAEL and LOAEL values are only available from studies that identify both a NOEL and a LOAEL.

Exhibit L-1. Parameter Values used in the Calculation of Avian Eco-SSLs for Pb (USEPA 2005b)[a]

Surrogate Receptor Group	TRV for Pb (mg Pb/kg bw/day)	Food Ingestion Rate (FIR) (kg food dw/ kg bw/day)	Soil Ingestion as a Proportion of Diet (P_{soil})	Concentration of Pb in Biota Type *i* (B*i*; mg Pb/kg dw biota) [b]	Eco-SSL (mg Pb/kg dw soil)
Herbivore (dove)	1.63	0.190	0.139	$\ln(B_i) = 0.561 \times \ln(Soil_i) - 1.328$; where *i* = plants	46
Ground insectivore (woodcock)	1.63	0.214	0.164	$\ln(B_i) = 0.807 \times \ln(Soil_i) - 0.218$; where *i* = earthworms	11
Carnivore (hawk)	1.63	0.0353	0.057	$\ln(B_i) = 0.4422 \times \ln(Soil_i) + 0.0761$; where *i* = mammals	510

[a] TRV = toxicity reference value; bw = body weight; dw = dry weight; mg = milligram; kg = kilogram
[b] B_i = concentration in biota type (i), which represents 100 percent of the diet for the receptor in these cases

To calculate the Eco-SSL, the HQ in the following equation is set equal to 1.0 and the equation is solved for $Soil_j$, which becomes the Eco-SSL:

$$HQ = FIR \times (Soil_j \times P_{soil} + B_i) / TRV$$

where:

- HQ = hazard quotient, set equal to 1.0
- FIR = food ingestion rate (kg food dry weight per kg wildlife body weight per day)
- $Soil_j$ = concentration of the chemical in soil (mg chemical/kg soil dry weight)
- P_{soil} = soil ingestion rate expressed as a proportion of the dry weight diet (unitless)
- B_i = concentration of chemical in the i^{th} type of biota consumed by the wildlife (mg chemical per kg biota dry weight)
- TRV = toxicity reference value (mg chemical per kg body weight per day)

To calculate an Eco-SSL for mammals, the potential exposures of three mammalian species are evaluated: an herbivore (vole), a ground insectivore (shrew), and a carnivore (weasel). The same diets are assumed for these species as for the three groups of birds (i.e., 100 percent of the diet consists of the single food type) (see Exhibit L-2). The Pb-specific parameter values are the TRV value for mammals and the results of the equations used to estimate the concentration of Pb in the diet items, which are the same used for the diets of the three corresponding bird species. The higher TRV for mammals than for birds is the reason for the generally higher Eco-SSLs for mammals than for birds. There also are differences in food and soil ingestion rates between birds and mammals.

Exhibit L-2. Parameter Values used in Calculation of the Mammalian Eco-SSLs for Pb (USEPA 2005b)[a]

Surrogate Receptor Group	TRV for Pb (mg Pb/kg bw/day)	Food Ingestion Rate (FIR) (kg food dw/kg bw/day)	Soil Ingestion as a Proportion of Diet (P_{soil})	Concentration of Pb in Biota Type *i* (B*i*; mg Pb/kg dw biota) [b]	Eco-SSL (mg Pb/kg dw soil)
Herbivore (vole)	4.70	0.0875	0.032	$\ln(B_i) = 0.561 \times \ln(Soil_i) - 1.328$; where *i* = plants	1,200
Ground insectivore (shrew)	4.70	0.209	0.030	$\ln(B_i) = 0.807 \times \ln(Soil_i) - 0.218$; where *i* = earthworms	56
Carnivore (weasel)	4.70	0.130	0.043	$\ln(B_i) = 0.4422 \times \ln(Soil_i) + 0.0761$; where *i* = mammals	460

[a] bw = body weight; dw = dry weight
[b] B_i = concentration in biota type (i), which represents 100% of the diet for the receptor

L.3 Utility of the Pb Eco-SSLs for the Nationwide Pb NAAQS Review

An initial evaluation of the potential utility of the Pb Eco-SSLs for the Pb NAAQS review was conducted by comparing them to measured background levels of Pb in soils nationwide. The most comprehensive and systematic reporting of background Pb concentrations in soils of the United States to date was conducted by the U.S. Geological Survey (USGS) and reported by Shacklette and Boerngen (1984). A reanalysis of those data recently has been published by Gustavsson et al. (2001) who reprocessed the data from 1,323 sites in the conterminous United States to generate maps of the distribution of 7 major and 15 trace elements across the country. The data collection procedures and sampling locations were selected by Shacklette and Boerngen (1984) with the goal of defining "background" concentrations. Many samples were collected incidental to other ongoing studies; however, the same general sampling methods were applied in all locations and all samples were analyzed at the USGS laboratory in Denver, Colorado. Data for sampling sites where pollution and other anthropogenic effects may have influenced the concentrations were excluded.

Gustavsson et al. (2001) reported that most samples were collected at least 100 meters (m) from a road and at sites that had natural surficial materials supporting plant growth; however, Shacklette and Boerngen (1984) reported that many samples were within 100 m of a road, although none were near urban areas or highly traveled roads. In some areas, only agricultural fields could be sampled. Sampling locations were selected to be spaced at intervals of approximately 80 kilometers (km), and all samples were taken from a depth of 20 centimeters (cm) to avoid the plow zone in agricultural areas and surface contamination. Where soils were shallower, the soil immediately above the bedrock was sampled. The 10 ppm (mg/kg) detection limit for Pb was the same throughout the period of data collection, and analyses of 185 of 1,319 (14 percent) samples did not detect Pb.

Exhibit L-3 shows the percentage of samples below and above the detection limit as read from a figure in Shacklette and Boerngen's analysis (1984). Eighty-six percent of soil samples had Pb concentrations greater than the detection limit of 10 ppm, which is very close to the avian Eco-SSL of 11 mg/kg. At a minimum, at least 70 percent of background soil concentrations exceeded the avian Eco-SSL of 11 mg/kg (i.e., 70 percent of soil samples had Pb concentrations greater than or equal to 15 ppm). Approximately 6 percent of soil samples had Pb concentrations greater than 56 mg/kg, which is the mammalian Eco-SSL. It is important to note that the soil samples in this USGS data set were collected between 1961 and 1975, and may or may not be representative of current ambient soil Pb concentrations in areas away from anthropogenic influences.

In the absence of documented impacts of Pb to wildlife nationwide, the results of this comparison suggest that the avian Eco-SSL is more conservative than necessary for purposes of the Pb NAAQS review.

Exhibit L-3. Distribution of Soil Pb Concentrations across the Conterminous United States (Shacklette and Boerngen 1984)

Pb Concentration in Soil (ppm dry weight)	Percentage of 1,319 Samples	Cumulative Percentage
<10	14%	14%
10 to 15	16%	30%
15 to 20	30%	60%
20 to 30	20%	80%
30 to 50	14%	94%
59 to 300	6%	100%
300 to 700	<0.5%	100%

L.4 Development of SSVs for Use in the Pb NAAQS Review

This section describes the evaluation of data underlying the Pb Eco-SSL for birds for applicability to the Pb NAAQS review (Section L.4.1) and how SSVs were developed for the Pb NAAQS review using the basic Eco-SSL methodology (Section L.4.2).

L.4.1 Evaluation of Eco-SSL Equation Parameter Values for Applicability to the Pb NAAQS Review

The avian Eco-SSL for Pb of 11 mg/kg is driven by the woodcock; the next highest avian Eco-SSL is the value of 46 mg/kg for the mourning dove. The woodcock Eco-SSL is based on an assumed diet of 100 percent earthworms, a soil ingestion rate of 16.4 percent of its daily diet (dry-weight basis), and a food ingestion rate of 21.4 percent of its body weight daily. To ensure that most individuals in an exposed population would be protected, EPA attempts to estimate upper 90th percentile values for both the soil and food ingestion rates for use in the Eco-SSL equation.

To estimate the concentration of Pb in earthworms living in soils, EPA used the analysis by Sample et al. (1998) of earthworm Pb uptake factors (UFs). Finding that UFs changed with changing soil concentrations, Sample et al. (1998) developed a non-linear empirical regression model to relate Pb concentrations in earthworms to Pb concentrations in soils. Although Sample et al. (1998) also specified an upper 90th percentile UF based on the Pb earthworm/soil database, for the Pb Eco-SSLs, EPA chose to use the regression model of Pb uptake by earthworms which provides a central tendency estimate similar to a mean value.

The subsections below provide an examination of the assumptions used to derive each of the three exposure parameter values for woodcock (i.e., food ingestion rate, soil ingestion fraction, and prediction of Pb in earthworms) and a comment on the toxicity reference value for birds.

L.4.1.1 Food Ingestion Rate

EPA estimated typical and high-end food ingestion rates for woodcock based on two studies reporting its food ingestion rates: Sheldon (1967) and Stickel et al. (1965) (USEPA 2005c). Ingestion rates reported on a wet-weight (ww) basis (i.e., kg [food ww]/kg [woodcock body weight (bw)]/day) were converted to units of dry-weight (dw) (i.e., kg dw/kg bw/day) using dietary water content (if reported) or assumed water content for dietary items as provided in EPA's *Wildlife Exposure Factors Handbook* (USEPA 1993). The two woodcock food ingestion rate studies are described and evaluated below. Note that the units for the food ingestion rate of kg/kg bw/day are equivalent to g/g bw/day, which are the units used below:

- Stickel et al. (1965) reported a mean wet-weight food ingestion rate of 0.77 g ww/g bw/day and a maximum value of 1.43 g ww/g bw/day for 23 captive woodcock (males and females included) fed a diet of heptachlor-treated earthworms (in Louisiana during the winter). Assuming that earthworms are 84 percent water, EPA estimated mean and maximum dry-weight food ingestion rates for these woodcock as 0.123 and 0.229 g dw/g bw/day, respectively, and used the maximum value to approximate a 90th percentile (USEPA 2005c). For purposes of the Pb NAAQS review, it is noted that a maximum value for 23 birds is likely to exceed both the 90th and 95th percentile values. Therefore, 0.229 g dw/g bw/day is likely to be a slight overestimate of a true 90th percentile value for the population.

- Stickel et al. (1965) also reported mean and maximum wet-weight food ingestion rates for 11 woodcock fed uncontaminated worms (the control group) of 0.73 and 1.27 g ww/g bw/day, respectively. The investigators noted that the food ingestion rates for the treated and control groups were not significantly different from each other. Assuming 84 percent water for the earthworms, the mean and maximum dry-weight food ingestion rates for the control woodcock would be 0.117 and 0.203 g dw/g bw/day, respectively. These food ingestion rates were not used in estimating the woodcock food ingestion rate for the Eco-SSL. Because it is unclear whether heptachlor might affect woodcock feeding rates, these rates might be more appropriate than the rates based the heptachlor-exposed birds. A maximum food ingestion rate for 11 birds also is likely to be closer to a true population 90th percentile than is a maximum value for 23 birds.

- Sheldon (1967) measured food intake of an unspecified number of woodcock of both sexes in captivity in Massachusetts during the summer. Sheldon reported the intake rate to average 150 g of earthworms daily, noting that 150 g approximated the summer weight of the birds. That implies a wet-weight food ingestion rate of 1.0 g ww/g bw/day. Assuming 84 percent moisture content of the worms, EPA estimated a mean food ingestion rate of 1.6 g dw/g bw/day. To calculate a 90^{th} percentile values when both means and standard deviations (SDs) are reported, EPA used the following formula:

$$90^{th} \text{ percentile} = \text{mean} + 1.282 \text{ SD}$$

  Where a SD was not available, as in this case, EPA added 25 percent, which resulted in a dry-weight food ingestion rate of 0.200 g dw/g bw/day. This approach is based on the observation that a typical coefficient of variation (CV) for food intake is approximately 15 to 20 percent for birds and mammals (Nagy 2004).

  For purposes of the Pb NAAQS review, however, the data reported by Sheldon (1967) were considered inadequate for estimating a food ingestion rate for woodcock because the sample size, SD, and range of food ingestion rates were not reported, and the birds might not have been weighed.

To ensure that the Eco-SSL for each surrogate species would protect the majority of individuals in a population, EPA uses the point estimates of high-end exposures (USEPA 2005a). For the woodcock, the food ingestion rate of 0.214 is the arithmetic mean of the two estimated high-end values noted above (i.e., the average of 0.229 and 0.200 g dw/g bw/day).

The food ingestion rate of 0.214 g dw/g bw/day is reasonable, although it also would be reasonable to use the data from woodcock fed uncontaminated earthworms in Stickel et al. (1965) and to exclude the values from Sheldon (1967). In that case, the high-end food ingestion rate would be 0.20 g dw/g bw/day. Use of upper-end estimates for all exposure parameters at the same time can significantly overestimate total exposure. If a mean value were to be used for this exposure parameter, a value of 0.73 g ww/g bw/day is recommended (mean value for woodcock fed uncontaminated worms from Stickel et al., 1965), which equals 0.12 g dw/g bw/day.

L.4.1.2 Soil Ingestion Rate

Soil intake is calculated as the total food ingestion rate (*FIR*) multiplied by soil ingestion fraction (or proportion) on a dry-weight basis:

$$Soil\ intake\ (g/day) = FIR \times P_{soil}$$

To estimate the soil ingestion fraction (P_{soil}), EPA (2005c) used the following model developed by Beyer et al. (1994):

$$P_{soil} = [b - y + (a \times y)] / [(a \times y) - c + b]$$

where:

P_{soil} = proportion of soil in diet (g soil/g dry mass diet)
a = digestibility of food (g absorbed/g dry mass ingested)
b = concentration of acid-insoluble ash in food (g/g dry mass)
c = concentration of acid-insoluble ash in soil (g/g dry mass)
y = concentration of acid-insoluble ash in feces (g/g dry mass)

For the development of Eco-SSLs, EPA wanted to ensure that the value for P_{soil} would be protective of the majority of all individuals in a population of the surrogate species. EPA therefore developed a probabilistic analysis for P_{soil} in which a probability distribution function (PDF) was assigned to each of the variables in the equation (i.e., to *a, b, c,* and *y*) and used in a Monte Carlo simulation to estimate the 90th percentile of P_{soil}. For the woodcock, the following distributions were assumed:

- Digestibility of food (mean = 0.72; SD = 0.051; normally distributed);
- Concentration of acid-insoluble ash in food (min = 0; max = 0.02; uniformly distributed);
- Concentration of acid-insoluble ash in soil (min = 0.9; max = 1.0; uniformly distributed); and
- Concentration of acid-insoluble ash in feces (mean = 0.22; SD = 0.146; normally distributed).

The mean and SD for the digestibility value, *a*, were taken from the *Wildlife Exposure Factors Handbook* (Table 4-3 in USEPA 1993). The values for *b* and *c* were assumed, based on information in Beyer et al. (1994). The mean and SD values for the concentration of acid-insoluble ash in the feces, *y*, were the mean and SD values reported by Beyer et al. (1994) for the seven samples analyzed. EPA examined the results of the Monte Carlo analysis assuming certain parameters were correlated, and found no differences from the results of an analysis without correlated parameters. EPA therefore used the uncorrelated Monte Carlo analyses to estimate soil ingestion fractions. The mean soil ingestion fraction was 0.075, and the upper 90th percentile estimate of the soil ingestion fraction for the woodcock was 0.164 (Table 3 in USEPA 2005c). The latter value was used to calculate the woodcock Eco-SSL.

The mean soil ingestion fraction reported by Beyer, et al. (1994) for the woodcock was 0.104 or 10.4 percent of its dry weight diet. Beyer et al. (1994) assumed a digestibility of 55 percent for the woodcock diet based on data that indicated that the metabolizable energy coefficient for woodcock feeding on earthworms is 59 percent (Vander Haegen 1992) and the information that digestibilities calculated from dry matter tend to be slightly lower than those calculated from calories. If Beyer et al. (1994) had assumed a digestibility of 72 percent instead, as did EPA, then they would have estimated a soil ingestion fraction of 0.058.

Note that based on data presented in EPA's *Wildlife Exposure Factors Handbook* (USEPA 1993), a digestibility of 72 percent is more reasonable than a value of 55 percent for earthworms consumed by woodcock. Thus, it was concluded that a mean soil ingestion fraction for woodcock estimated using the data reported by Beyer et al. (1994) should be 0.058.

The upper 90th percentile soil ingestion fraction of 0.164 estimated by EPA (2005c) from the Monte Carlo simulation is almost three times higher than the mean value of 0.058 that Beyer et al. (1994) would have calculated using the same digestibility assumption. Given EPA's assumption of normality for parameters *a* and *y*, it appears that there must have been some other additional differences between the assumptions used by Beyer et al. (1994) to estimate a mean soil ingestion fraction and the assumptions used in the EPA Monte Carlo analysis. Otherwise, using the 25 percent approach (Nagy 2004) noted above for a normally distributed parameter, one would expect the 90th percentile soil ingestion fraction to be closer to 0.073 (i.e., mean of 0.058 + 25% of 0.058) than 0.164.

Beyer et al. (1994) appear to have used a value of 0.9 for *c*, the concentration acid-insoluble ash in soil, and 0.02 for *b*, the concentration of acid-insoluble ash in the diet, with a very limited discussion of the data supporting those assumptions. To be conservative for purposes of screening-level assessments for Superfund sites, EPA used 0.9 as a minimum value for *c* and 0.02 as a maximum value for *b* (USEPA 2005c). A more appropriate approach for the Pb NAAQS review is to assume a distribution centered on 0.9 for *c* and 0.02 for *b*.

In conclusion, the soil ingestion fraction of 0.164, or 16.4 percent of the dry-weight diet, used in estimating the woodcock Eco-SSL is likely to be higher than the 90th percentile value that might have been calculated if Beyer et al.'s (1994) values of *c* and *b* were used as central tendency values in EPA's Monte Carlo analysis. Evidence includes that assuming a digestibility of 72 percent, the mean soil ingestion fraction estimated from the data presented in Beyer et al. (1994) would be 0.058, or 5.8 percent of the dry-weight diet, and a 90th percentile might have been closer to 0.073 (see above). Therefore, it was concluded that a soil ingestion fraction of 0.073 (see above) to 0.116 (i.e., 0.058 x 2 to be conservative) would be appropriate for the Pb NAAQS review.

L.4.1.3 Diet Composition

The assumed diet of 100 percent earthworms for the Eco-SSL follows EPA guidance for Superfund screening-level assessments (USEPA 1998b). For the Pb NAAQS review, a more nationally representative diet composition is appropriate. In seven studies of woodcock diets in North America summarized in EPA's *Wildlife Exposure Factors Handbook* (USEPA 1993), the proportion of earthworms in the diet ranged from 30 to 99 percent (i.e., values of 30, 67.8, 71, 83.4, 87, 87.4, and 99+). The remainder of the diet consisted of other soil invertebrates such as lepidopteran, dipteran, and coleopteran larvae. The average value is 75 percent earthworms in the diet, and the 90th percentile is 92 percent.

For the Pb NAAQS review, the average value of 75 percent or a high-end value of 90 percent were recommended for the fractions of the woodcock diet to be comprised of earthworms. The remainder of the diet would be 25 or 10 percent soil arthropods, respectively.

L.4.1.4 Earthworm Accumulation of Pb from Soils

To estimate the accumulation of Pb by earthworms from soils, EPA used the Sample et al. (1998) analysis. For that analysis, Sample et al. (1998) used most of the available earthworm Pb accumulation studies to generate a model data set (119 observations); the remainder (126 observations) was used as a "validation" data set to test the accuracy and predictive utility of the UFs and regression models. Earthworm-to-soil uptake factors (UFs) were calculated for Pb and were found to have a non-linear relationship with soil Pb concentrations. Sample et al. found that a simple regression model of natural-log-transformed concentrations in soil and earthworms did provide a significant fit to the data ($p < 0.001$). Sample et al. (1998) also developed multiple regression models incorporating information on soil pH and soil calcium (Ca), both of which can affect the tendency of Pb to partition to water.

The multiple regression models found that inclusion of soil pH contributed significantly to model fit for Pb. Soil Ca also contributed significantly to model fit for Pb. However, an attempt to evaluate the contribution of both Ca and pH to model fit resulted in a small sample size that did not show a significant contribution of both parameters at the same time. However, for a screening level risk assessment for which soil Ca, and even soil pH, might not have been measured, a simple regression model that does not include pH or Ca is more useful.

During validation, Sample et al. (1998) found no significant differences in the simple regression equations for the "model" and "validation" data sets. Both data sets therefore were combined to develop a final regression model for the *combined* data set of 245 observations (Table 12 in Sample et al. 1998), which is what EPA used in the Eco-SSL derivation:

$$\ln(B_i) = 0.807 \times \ln(Soil_i) - 0.218$$

Note that although the correlation coefficient, R^2, for this model based on 245 data points was only moderate (i.e., 0.58), the probability that the correlation was due to chance alone was less than 1/10th of a percent (i.e., $p < 0.0001$). The Standard Error (SE) of the estimate of the slope, 0.807, was ± 0.044. The SE of the estimate of the intercept, -0.218, was ± 0.245.

Sample et al. (1998) also provided the upper 90th percentile UF based on the distribution of the UFs in the Pb earthworm/soil database for use as a high-end value if needed. For the Eco-SSLs for Pb, EPA chose not to use the upper 90th percentile UF, and instead used the point estimates provided by the regression model (i.e., a central tendency estimate similar to a mean value).

For the Pb NAAQS review, the point estimates provided by the regression model are used to estimate Pb concentrations in earthworms based on Pb concentrations in soils. This regression provides a central-tendency estimate.

L.4.1.5 Arthropod Accumulation of Pb from Soils

In the past year, Sample and colleagues have developed models to predict Pb uptake by soil arthropods:[2]

$$\ln(B_i) = 0.70 \times \ln(Soil_i) - 1.63$$

The data are from 24 studies, including 10 North American locations: British Columbia, Delaware, Illinois, Maryland, Missouri, Montana, Oklahoma, Pennsylvania, Tennessee, Virginia, and Wyoming. Sixty-eight percent of all observations were for Pb, zinc, copper, and cadmium. The soil arthropods include spiders, centipedes, millipedes, isopods, coleopterans (e.g., beetles), hymenopterans (e.g., wasps), orthopterans (e.g., grasshoppers), and lepidopterans (e.g., moths). For Pb, both insects and the non-insect arthropods appeared to have similar Pb uptake rates, and therefore all data were combined to estimate a single regression equation for soil arthropods (above). The correlation coefficient, R^2, for this regression based on 197 data points is 0.55, with a significance level of $p < 0.0001$.

The arthropod model for Pb uptake from soil predicts lower concentrations in the arthropods than in earthworms at the same soil concentrations. Exhibit L-4 shows the differences over a range of soil concentrations. At a soil concentration near EPA's Eco-SSL for woodcock, 11 mg/kg, the concentration of Pb in soil arthropods is less than 20 percent of the concentration of Pb in earthworms.

Exhibit L-4. Estimated Arthropod Pb Concentrations as a Percentage of Estimated Earthworm Pb Concentrations (mg/kg dry weight) for Same Soil Concentrations

Soil [Pb]	Earthworm [Pb]	Soil Arthropod [Pb]	Arth./ Earthworm [Pb] (%)
1	0.80	0.20	25.0
10	5.2	0.98	18.9
50	19	3.0	15.8
100	33	4.9	14.9
1,000	210	25	11.8
10,000	1360	123	9.05

From this information, it was concluded that for the analyses proposed for this Pb NAAQS review, a nationally representative SSV for the woodcock would be based on two diet components, earthworm and soil arthropods, and the regression model for Pb uptake from soils for arthropods should be used to predict Pb concentrations in that portion of the diet.

[2] Unpublished data and models by Brad Sample and Christine Arenal from CH2M Hill, Sacramento, California; PowerPoint presentation summarizing results provided to EPA by Brad Sample on June 29, 2006.

L.4.1.6 Bioavailability of Pb in Soil and in Diet

For the Eco-SSL methodology, EPA stated that it was assumed that Pb was 100 percent absorbed from the diet or from soil, and therefore the assimilation efficiencies in the original equation (Equation 4-1 of USEPA 2005a) are set equal to 1.0 and removed from the equation. This follows EPA's guidance for Superfund screening-level ecological risk assessments (USEPA 1998b). However, studies of bioavailability of Pb from the diet or from soils always indicate bioavailability factors of less than 100 percent. Therefore, for purposes of the Pb NAAQS review, the bioavailability of Pb was examined.

The first consideration is how the Eco-SSL TRV for Pb was obtained (i.e., whether was it based on a Pb concentration as administered in food or water or an estimated absorbed dose). For the TRV for Pb for birds, the NOAEL is expressed as Pb administered in an experimental diet rather than an absorbed dose. If Pb in the experimental diet and Pb in natural diets and soils are equally bioavailable, then no correction is needed for relative bioavailability (or relative assimilation efficiency). However, Pb often is mixed into experimental animal diets (e.g., an artificial pelleted dry diet) in a form (e.g., Pb acetate) that may be more bioavailable than the Pb in a natural diet or in soils. Therefore, it may be appropriate to assign a lower relative assimilation efficiency (AE) for Pb in the natural diet and in soils than in the experimental diet upon which the TRV is based.

A literature search was conducted of bioavailability and AEs for birds and mammals for Pb from the diet, soils, and water using 20 DIALOG databases: Toxfile, Environmental Sciences, Biosis Previews, CSA Life Sciences Abstracts, Enviroline, Pollution Abstracts, National Technical Information Services (NTIS), BioEngineering Abstracts, Environmental Engineering Abstracts, AGRICOLA, CAB Abstracts, AGRIS, Pascal, WasteInfo, Wilson Appl. Sci & Tech Abs, Biol. & Agric. Index, Water Resources Abstracts, Zoological Record Online, ELSEVIER BIOBASE, and Aquatic Science & Fisheries Abstracts. None of the references identified discussed the absolute bioavailability or AE for Pb acetate or other forms of Pb typically added to experimental pelleted diets for birds or mammals or the absolute bioavailability of Pb in any natural media. These analyses, therefore, depend on evidence of relative rather than absolute AE. The results of the search were limited to less than 500 titles for purposes of this risk screening assessment; therefore, it is possible that some references were missed.

For purposes of the human exposure and health risk assessments, EPA has assumed that the absolute bioavailability of Pb in water and diet is 50 percent and in soils ingested by children is 30 percent (USEPA 1994). That means that the relative bioavailability of Pb in soils compared with diet and water is 60 percent (i.e., 0.30 divided by 0.50) for children (USEPA 1994). Studies supporting equal AEs for Pb from food and water often use Pb acetate, or other highly soluble forms of Pb (e.g., Pb chloride) mixed with food and water (e.g., Mahaffey et al. 1980).

The Agency for Toxic Substances and Disease Registry (ATSDR) has summarized available data indicating that water-soluble Pb (e.g., from Pb acetate or Pb chloride) is 40 to 50 percent absorbed following ingestion by infants and children, whereas adults absorb only 3 to 10 percent of Pb (if not fasting). Similar differences in absorption of Pb with age are observed in monkeys and rats (ATSDR 2005).

There are data to indicate that Pb ingested with food is absorbed less well than Pb ingested in water and that Pb ingested in soils is less well absorbed than Pb in food. For example, James et al. (1985) found absorption of a tracer dose of Pb acetate in water to be approximately 63 percent when ingested by fasted subjects but only 3 percent when the dose was administered with a meal. Overall, fed-to-fasted ratios of Pb absorption for adult humans ranged from 0.04 to 0.20 in four studies reviewed by ATSDR (2005), indicating that absorption of water-soluble Pb when accompanied by food is generally 4 to 20 percent of Pb absorbed when administered in water when a subject has no food in the gastrointestinal tract. A comparison of Pb absorbed from soil from the Bunker Hill Superfund site by adult humans indicated 26 and 2.5 percent absorption by fasted adults and those ingesting the soil with a meal, respectively (Maddaloni et al. 2005). Note that the amount absorbed from soil by fasted adults (i.e., 26 percent) was approximately half that absorbed with food by fasted adults (i.e., 63 percent).

Few references identified discussed the relative AE of Pb added to pelleted diets of experimental animals and Pb in natural diets or soils. One study did quantify the relative oral bioavailability of Pb in soil collected from a former smelter site in Utah compared with the bioavailability of Pb acetate mixed in a purified pelleted diet fed to rats (Schoof et al. 1995). They found a relative AE of 41 percent (Pb in smelter soil compared to Pb acetate added to the diet). None of the identified references quantified the relative AE of Pb acetate added to pelleted diets of experimental animals to the AE of Pb in natural diets.

Ruby et al. (1999) published a review of gastrointestinal bioavailability studies suitable for use in human exposure and health risk assessments that included a large database. The bioavailabilities of Pb in a variety of soils were expressed as a proportion of the bioavailability of soluble Pb in drinking water. Pb contaminated soils from a variety of sources (e.g., residential areas, and areas near tailings, mills, slags, and smelters) were added to the diet of swine and weanling rats. Nineteen studies with swine resulted in a mean relative bioavailability of 0.50 (SD of 0.28; range of 0.01 to 0.90)[3]. These results indicate that Pb in soils from the environment (not laboratory soils mixed with Pb acetate or another form of Pb) are, on average, half as well assimilated by swine as Pb in water. Nine studies with weanling rats resulted in a mean relative bioavailability of 0.21 (SD of 0.13; range of 0.093 to 0.41)[3]. Assuming 100 percent assimilation of Pb from water by rats, this indicates that only 20 percent of Pb in soils is, on average, assimilated by rats.

Overall, the studies discussed above suggest that the oral bioavailability of Pb in soils or food for mammals is between 3 and 50 percent of its oral bioavailability when added as soluble Pb acetate to food or water. Therefore, the conclusion was reached that the AE of Pb from natural diets or from soils is no more than 50 percent of the AE of Pb in the experimental pellet diets to which Pb acetate is added. When the TRV is based on experiments conducted with Pb acetate added to a dry pellet experimental diet, an AE value of 0.50 is assumed for the screening-level assessment for the Pb NAAQS review.

[3] Mean and SD values calculated by ICF from Table 1 of Ruby et al. 1999.

L.4.1.7 Toxicity Reference Value (TRV)

For birds, the geometric mean NOAEL for adequate Pb toxicity studies of growth and reproduction across species was calculated as 10.9 mg/kg bw/day. That value is higher than the lowest bounded LOAEL for one study. Therefore, the highest bounded NOAEL that was lower than the lowest bounded LOAEL was used to set the TRV for Pb for birds of 1.63 mg/kg bw/day in the development of the Eco-SSL for Pb. This value is not overly conservative because 2 of 10 reproductive LOAEL values were lower than 1.63 mg/kg bw/day (those two were unbounded, meaning a NOAEL had not been identified).

There are uncertainties associated with having only 10 reproductive toxicity studies for birds for Pb. Nonetheless, the TRV should be protective because it is based on a NOAEL value, and populations of birds may well be able to sustain some loss of reproductive success at the individual level without consequences on population size.

L.4.2 Calculation of SSVs for Pb for Use in the Pb NAAQS Review

Based on the evaluation of individual parameter values discussed above, a Pb SSV for woodcock was estimated using the parameter values identified for the Pb NAAQS review in Section L.4.1. The basic equation for estimating the Eco-SSL for a bird or mammal as described in Section L.2.2 is:

$$1.0 = FIR \times [(Soil_j \times P_{soil}) + B_i] \,/\, TRV$$

Therefore, the equation for Pb is:

$$TRV = FIR \times [(Soil_j \times P_{soil}) + \exp(0.807 \times \ln(Soil_j) - 0.218)]$$

The preceding equation assumes 100 percent earthworms in the diet and equal bioavailability of Pb in the experimental diet used to develop the TRV, in the natural diet, and in soils. To estimate the Eco-SSL, one solves for $Soil_j$.

To develop a Pb SSV for woodcock for use in the Pb NAAQS review, soil arthropods were included as part of the diet, and 50 percent was used as the relative AE or bioavailability of Pb in the natural diet or soil. In this case, the equation is:

$$TRV = FIR \times AE \times [(Soil_j \times P_{soil}) + (F_{earthworms} \times B_{earthworms}) + (F_{soil\_arthropods} \times B_{soil\_arthropods})]$$

where:

AE	= relative assimilation efficiency for Pb in natural diets and soils compared with Pb added to a laboratory diet
$F_{earthworms}$	= fraction of the diet consisting of earthworms
$B_{earthworms}$	= concentration of Pb in the earthworms (mg/kg dry weight)
$F_{soil\_arthropods}$	= fraction of the diet consisting of soil arthropods
$B_{soil\_arthropods}$	= concentration of Pb in the arthropods (mg/kg dry weight)

The equation for Pb then becomes:

$$TRV = FIR \times AE \times [(Soil_j \times P_{soil}) + (F_{earthworms} \times (\exp(0.807 \times \ln(Soil_j) - 0.218))) + (F_{soil\_arthropods} \times (\exp(0.70 \times \ln(Soil_j) - 1.63)))\ ]$$

The preceding equation is solved for $Soil_j$ to find the SSV.

Exhibit L-5 shows the results of using the parameter values developed for the Pb NAAQS review in the equation to estimate an SSV for woodcock exposed to Pb-contaminated soils.

For comparison with the Eco-SSL, the first row shows parameter values used to derive the Eco-SSL for woodcock. The second row indicates that by using values calculated for the Pb NAAQS review for AE and for the 90th percentile values for the food ingestion rate (FIR), soil ingestion fraction, and the fraction of the diet that is earthworms, the SSV is 34 mg/kg. If one uses the average value for the fraction of the diet that is earthworms instead, the SSV for woodcock is 38 mg/kg. Finally, if one uses the average value for all parameters, the SSV for woodcock is 83 mg/kg.

Exhibit L-5. Development of the Woodcock SSV for Pb[a]

Estimate	AE	TRV for Pb (mg Pb/kg bw/day)	Food Ingestion Rate (FIR) (kg food dw/kg bw/day)	Soil Ingestion as a Proportion of Diet (P_{soil})	Fraction of Diet Earth-worms	Fraction of Diet Soil Arthropods	SSV (mg Pb/kg dw soil)
EPA Eco-SSL (USEPA 2005a)	100%	1.63	0.214	0.164	100%	0%	11
90th percentile for all parameters; AE = 0.50[b]	50%	1.63	0.20	0.114	90%	10%	34
90th percentile for FIR and soil ingestion; mean fraction diet; AE = 0.50[c]	50%	1.63	0.20	0.114	75%	25%	**38**
Mean value for all parameters; AE = 0.50[d]	50%	1.63	0.12	0.058	75%	25%	**83**

[a] Abbreviations: AE = relative assimilation efficiency for Pb in natural diet and soils compared with AE of water soluble Pb added to the experimental diet used to derive the toxicity reference value (TRV); bw = body weight; dw = dry weight
[b] Uses 90th percentile values for FIR and soil ingestion rate with 90th percentile proportion of the diet equal to earthworms.
[c] Uses 90th percentile values for FIR and soil ingestion rate with mean proportion of the diet equal to earthworms.
[d] Uses average value for FIR, soil ingestion rate, and proportion of the diet comprised of earthworms.
Note: All estimates use central tendency estimate of concentration of Pb in earthworms and soil arthropods.

When estimating a benchmark to use when screening for ecological risks, it is most appropriate to use 90th percentile values for no more than two parameters in the same exposure equation. Therefore, 38 mg/kg was identified as the most appropriate estimate of an SSV for birds for the screening-level ecological risk assessment in the Pb NAAQS review. This value is based on a conservative estimate of the relative bioavailability of Pb in soil and natural diets compared with water soluble Pb added to an experimental pellet diet. A recent site-specific determination found that a soil concentration of 490 mg/kg[4] is protective of birds that consume soil invertebrates at that location. These findings in a site-specific study suggest that the values of 38 mg/kg or even 83 mg/kg might still be overly conservative. However, for purposes of the Pb NAAQS review, a value of 38 mg/kg is appropriate as a “no-effect” level for the initial screening-level ecological risk assessment. A value of 83 mg/kg might be suitable for use as a “possible-effect level” for a risk screening assessment. Where that value is exceeded, a more refined ecological risk assessment would be required to define the possible magnitude of ecological risks if that information is needed for a risk management decision.

To develop a mammalian SSV for the Pb NAAQS review, a simple calculation is to apply an AE of 50 percent to the mammalian Eco-SSL. That would result in an SSV based on the shrew of 112 mg Pb/kg soil dry weight. The value of 112 mg/kg is likely to be more conservative than necessary because the proportion of earthworms in the diet of shrews is less than 100 percent (data available in USEPA 1993).

[4] Brad Sample, personal communication, June 29, 2006, with Margaret McVey; data not yet available for peer review.

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Appendix M

Sediment Screening Levels

Appendix M summarizes sediment ecotoxicity screening values for the protection of aquatic communities that comply with EPA guidance for use in screening-level ecological risk assessments. Sediment screening values have been developed for the protection of benthic aquatic community—none of which are based on wildlife ingestion of sediments—and include EPA regional screening values, National Oceanic and Atmospheric Administration (NOAA) marine values, Canadian freshwater values, United States "consensus" freshwater values, and EPA's national-level equilibrium partitioning approach to deriving sediment quality criteria for freshwaters.

Many of the sediment screening values include more than one effect level for potential use. This fact reflects in part the difficulty in assessing a "single point" criterion across all sediment conditions that might protect 95 percent of the aquatic species, as has been EPA's tradition for deriving Ambient Water Quality Criteria (AWQC) for aquatic organisms exposed to chemicals in the water column. Overall, various definitions of effect levels have been used: no effect, threshold for effect, low effect/low risk of effect, may have an effect, probable adverse effect, and severe effect. Some criteria present two effect levels and others present three effect levels. The two-effect-level benchmarks generally have a no-effect or low-risk-of-effect level and a probable- or severe-effect level. The three-effect-level benchmarks have a no- or low-effect level, a possible- or threshold-effect level, and a probable-adverse-effect level.

The sediment screening values are expressed as total Pb in sediments on a dry weight basis, with no adjustment for differing sediment conditions, with the exception of EPA's equilibrium partitioning approach. The latter essentially provides equations to estimate the dissolved concentration of Pb in sediment pore waters for comparison with the chronic AWQC based on several sediment characteristics. Because EPA's equilibrium partitioning approach requires data on acid volatile sulfide (AVS), total organic carbon (TOC), and fraction organic carbon (FOC) (USEPA 2005), it cannot be used in this screening assessment because these data have not been identified for the waterbodies of interest in the primary Pb smelter case study. Note that these characteristics are not included in national water quality databases and historically have rarely been measured at any location.

Two of the available screening ecotoxicity criteria for freshwater sediments, the Canadian Sediment Quality Guidelines and the consensus-based values, were evaluated for use in the surface water and sediment screening assessment. These two criteria are described in this appendix to highlight different approaches to identifying specific benchmark effect levels and to describe the approach selected for this pilot phase analysis (See Sections M.1 and M.2).

M.1 Canadian Sediment Quality Guidelines

U.S. EPA Region 6 uses the Canadian Sediment Quality Guidelines, threshold-effect levels (TELs) (Smith et al. 1996). The value for Pb is 35 mg/kg dry sediment. The Canadian values are adopted from an approach used by NOAA with some modifications for freshwaters and an expansion of the database to incorporate freshwater sediment toxicity data. The sediment concentrations for the effects data set and the no-effects data set were arranged in ascending order of chemical concentrations, and TELs and probable-effects levels (PELs) were derived for those chemicals having at least 20 data entries in both data sets (from Appendix A of TNRCC 2001).

The TEL was calculated to be the geometric mean of (1) the 15th percentile concentration of the effects data set and (2) the 50th percentile concentration of the no-effects data set. The TEL was intended to estimate the concentration for a given chemical below which adverse biological affects only rarely occurred. The PEL was calculated to be the geometric mean of (1) the 50th percentile concentration of the effects data set and (2) the 85th percentile of the no-effects data set. The PEL was intended to represent the concentration for a given chemical above which adverse biological affects frequently occurred. Smith et al. (1996) evaluated the reliability of the Canadian guidelines, and compared them with other guidelines. With the exception of the TEL for total DDT, the reliability of the TELs appeared to be high based on the lack of observed adverse effects at concentrations below the TELs. Overall, the authors concluded that the TELs and PELs were comparable to other sediment quality assessment approaches, and that the TELs could be used with a high degree of confidence to indicate chemical concentrations below which adverse biological effects would not be expected to occur.

M.2 Consensus Approach

Both EPA Regions 4 and 5 use sediment toxicity benchmarks derived by a consensus approach as described by MacDonald et al. (2000). The consensus approach has been adopted by the State of Florida in its *Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters, Technical Report* (MacDonald et al. 2003). This report resulted from a cooperative Freshwater Sediment Quality Assessment Initiative that began in 2000 and that included the Florida Department of Environmental Protection (FDEP), EPA, and the U.S. Geological Survey (USGS), with participants from the U.S. Fish and Wildlife Service (USFWS), NOAA, consultants, academics, county governments, and water management districts. The Initiative includes three elements, one of which is the establishment of numerical, sediment quality assessment guidelines (SQAGs) for assessing the potential for adverse biological effects associated with exposure to contaminated sediments. The effects-based SQAGs for the benthic community are intended to identify two levels of contaminants in sediments: (1) concentrations that are unlikely to cause adverse effects, or threshold effect concentrations (TECs), and (2) concentrations that are likely to cause adverse effects on sediment-dwelling organisms, or probable effect concentrations (PECs).

Based on an evaluation of eight distinct approaches for developing “sediment quality guidelines” (SQGs) (i.e., sediment quality criteria, standards, or objectives, depending on the agency), the

Initiative working group recommended the consensus-based approach. The eight approaches reviewed were:

- Screening level concentration approach;
- Effects range approach;
- Effects level approach;
- Apparent effects threshold approach;
- Equilibrium partitioning approach;
- Logistic regression modeling approach;
- Consensus approach; and
- Tissue residue approach.

The report also describes the four basic types of information that are commonly used to assess contaminated sediments: whole-sediment and pore-water chemistry data; whole-sediment toxicity data; benthic invertebrate community structure data; and bioaccumulation data.

The consensus-based TECs are calculated by determining the geometric mean of the SQGs available for that chemical. Likewise, consensus-based PECs are calculated by determining the geometric mean of the PEC-type values. The geometric mean, rather than the arithmetic mean, is used because it provides an estimate of central tendency that is not unduly affected by outliers and because the SQGs might not be normally distributed. Consensus-based TECs or PECs are calculated only if three or more published SQGs are available for a chemical substance or group of substances (MacDonald et al. 2000).

The consensus-based TEC for Pb of 35.8 mg/kg dry weight (Table 4.4 in MacDonald et al. 2003, from MacDonald et al. 2000) was calculated as the geometric mean of the following values:

- Lowest-observed effect level (LEL) of 31 mg/kg from Persaud et al. (1993);
- Threshold effect level (TEL) of 35 mg/kg from Smith et al. (1996);
- Effects range-low (ER-L) value of 35 mg/kg from Long and Morgan (1991);
- Threshold-effect level for the amphipod *Hyalella azteca* in 28-day tests (TEL-HA28) of 37 mg/kg (USEPA 1996); and
- Minimal effect threshold (MET) of 42 mg/kg from Environment Canada (EC) and Ministere de l'Environnement du Quebec (MENVIQ) (1992).

The consensus-based PEC for Pb of 128 mg/kg dry weight (Table 4.5 in MacDonald et al. 2003, from MacDonald et al. 2000) was calculated as the geometric mean of the following values:

- Severe effect level (SEL) of 250 mg/kg (Persaud et al. 1993);
- Probable effect level (PEL) of 91.3 mg/kg (Smith et al. 1996);
- Effects range-median (ER-M) value of 110 mg/kg (Long and Morgan 1991);
- Probable effect level for *Hyalella azteca in* 28-day tests (PEL-HA28) of 82 mg/kg (USEPA 1996); and
- Toxic effect threshold (TET) of 170 mg/kg from (EC and MENVIQ 1992).

The working group considered the consensus-based TEC and PEC values to be appropriate for the United States as a whole, and some analyses were conducted to determine whether they were suitable for Florida sediments. Based on those analyses, the working group concluded that they were appropriate (MacDonald et al. 2003).

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