BASELINE RISK ASSESSMENT

Volume II of III
Appendices A and B

Sunnyside Yard
Queens, New York

January, 1995

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APPENDIX A
Compiled Analytical Data Utilized in the Risk Assessment

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Table A-1:

Concentrations of Volatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		2-Butanone	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	11	U	5	U	5	U	5	U	11	U	11	U
S-17	0 - 2	10/19/90	35		7	U	7	U	7	U	14	U	14	U
S-22	0 - 2	10/17/90	12	U	6	U	6	U	6	U	12	U	12	U
S-30	0 - 2	10/16/90	33		6	U	6	U	6	U	11	U	11	U
S-43	0 - 2	11/5/90	11	U	6	U	6	U	6	U	11	U	11	U
S-62	0 - 2	10/24/90	24		6	U	6	U	6	U	11	U	11	U
S-82	0 - 2	10/16/90	29		6	U	6	U	6	U	11	U	11	U
S-82+	0 - 2	10/16/90	20		6	U	6	U	6	U	11	U	11	U
S-99	0 - 2	1/18/93	11	U	11	U	11	U	11	U	11	U	11	U
S-100	0 - 2	1/18/93	27	UV	11	U	11	U	11	U	11	U	11	U
S-101	0 - 2	1/18/93	19	UV	12	U	12	U	12	U	12	U	12	U
S-102	0 - 2	1/18/93	16	UV	11	U	11	U	11	U	11	U	11	U
FC-21P	0.5 - 2.5	4/5/94	55	UV	5	U	5	U	5	U	10	U	10	U
FC-24P	0.5 - 2.5	4/5/94	51	UV	5	U	5	U	5	U	10	U	10	U
FC-18	1 - 3	4/6/94	39	UV	5	U	5	U	5	U	10	U	10	U
FC-24	1 - 3	4/5/94	57	UV	5	U	5	U	5	U	10	U	10	U
FC-27	1 - 3	4/4/94	18	UV	5	U	5	U	5	U	10	U	10	U
FC-31	1 - 3	4/5/94	32	UV	5	U	5	U	5	U	10	U	10	U
FC-33	1 - 3	4/4/94	31	UV	5	U	5	U	5	U	10	U	10	U
FC-40	1 - 3	4/5/94	13	UV	5	U	5	U	5	U	10	U	10	U
S-90	1 - 3	10/1/90	80		5	U	5	U	5	U	11	U	11	U
MW-58	2 - 3	12/7/93	1600	UV	1600	U	1600	U	1600	U	1600	U	1600	U
S-64	2 - 3	10/18/90	15		6	U	6	U	6	U	12	U	12	U
S-38	2 - 4	11/29/90	12	U	6	U	6	U	6	U	12	U	12	U
S-39	2 - 4	11/29/90	11	U	5	U	5	U	5	U	11	U	11	U
S-47	2 - 4	10/19/90	11	U	5	U	5	U	5	U	11	U	11	U
S-49	2 - 4	10/19/90	20		5	U	5	U	5	U	11	U	11	U
S-80	2 - 4	10/3/90	229		10	U	10	U	10	U	21	U	21	U
S-80+	2 - 4	10/3/90	308		10	U	10	U	10	U	21	U	21	U
S-134	2 - 4	11/8/93	15	UV	12	U	12	U	12	U	12	U	12	UV
S-139	3 - 3.1	12/7/93	12	UV	6	U	6	U	6	U	12	U	12	U
S-135	3 - 3.5	12/7/93	24	UV	6	U	6	U	6	U	12	U	12	UV
MW-54	3 - 5	11/29/93	2600	UV	1600	U	1600	U	1600	U	1600	U	1600	UV
S-129	3 - 5	11/29/93	1500	UV	1500	U	1500	U	1500	U	1500	U	1500	U
S-41A	3.5 - 5.5	11/7/90	293		29	U	29	U	29	U	58	U	58	U
MW-25	4 - 6	11/17/90	18		5	U	5	U	5	U	11	U	11	U
S-33	4 - 6	12/13/90	49		5	U	5	U	5	U	11	U	11	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Acetone		Benzene		Bromodichloromethane		Bromoform		Bromomethane		2-Butanone	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	16		5	U	5	U	5	U	11	U	11	U
S-60	4 - 6	12/12/90	20		5	U	5	U	5	U	10	U	10	U
S-53	5 - 7	11/18/90	38		5	U	5	U	5	U	10	U	10	U
S-61	5 - 7	10/24/90	53		6	U	6	U	6	U	11	U	11	U
FC-36	7 - 9	4/6/94	81	UV	5	U	5	U	5	U	10	U	10	U
S-122	7.5 - 8.5	4/9/94	29	UV	6	U	6	U	6	U	11	U	11	U
S-35	8 - 10	11/30/90	15		6	U	6	U	6	U	11	U	11	U
MW-26	9 - 11	12/5/90	11		5	U	5	U	5	U	10	U	10	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Carbon Disulfide		Carbon Tetrachloride		Chlorobenzene		Chloroethane		2-Chloroethyl vinylether		Chloroform	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	5	U	5	U	5	U	11	U	11	U	5	U
S-17	0 - 2	10/19/90	7	U	7	U	7	U	14	U	14	U	7	U
S-22	0 - 2	10/17/90	7.7		6	U	6	U	12	U	12	U	6	U
S-30	0 - 2	10/16/90	6	U	6	U	6	U	11	U	11	U	6	U
S-43	0 - 2	11/5/90	6	U	6	U	6	U	11	U	11	U	3.8	J
S-62	0 - 2	10/24/90	11		6	U	6	U	11	U	11	U	6	U
S-82	0 - 2	10/16/90	7.1		6	U	6	U	11	U	11	U	6	U
S-82+	0 - 2	10/16/90	4.4	J	6	U	6	U	11	U	11	U	6	U
S-99	0 - 2	1/18/93	11	U	11	U	11	U	11	U	NA		11	U
S-100	0 - 2	1/18/93	11	U	11	U	11	U	11	U	NA		11	U
S-101	0 - 2	1/18/93	12	U	12	U	12	U	12	U	NA		12	U
S-102	0 - 2	1/18/93	11	U	11	U	11	U	11	U	NA		11	U
FC-21P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	10	U	NA		5	U
FC-24P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	10	U	NA		5	U
FC-18	1 - 3	4/6/94	5	U	5	U	5	U	10	U	NA		5	U
FC-24	1 - 3	4/5/94	5	U	5	U	5	U	10	U	NA		5	U
FC-27	1 - 3	4/4/94	5	U	5	U	5	U	10	U	NA		5	U
FC-31	1 - 3	4/5/94	5	U	5	U	5	U	10	U	NA		5	U
FC-33	1 - 3	4/4/94	5	U	5	U	5	U	10	U	NA		5	U
FC-40	1 - 3	4/5/94	5	U	5	U	5	U	10	U	NA		5	U
S-90	1 - 3	10/1/90	5.1	J	5	U	5	U	11	U	11	U	5	U
MW-58	2 - 3	12/7/93	1600	U	1600	U	1600	U	1600	U	NA		1600	U
S-64	2 - 3	10/18/90	6	U	6	U	6	U	12	U	12	U	6	U
S-38	2 - 4	11/29/90	6	U	6	U	6	U	12	U	12	U	6	U
S-39	2 - 4	11/29/90	5	U	5	U	5	U	11	U	11	U	5	U
S-47	2 - 4	10/19/90	5	U	5	U	5	U	11	U	11	U	5	U
S-49	2 - 4	10/19/90	5	U	5	U	5	U	11	U	11	U	5	U
S-80	2 - 4	10/3/90	19		10	U	10	U	21	U	21	U	10	U
S-80+	2 - 4	10/3/90	17		10	U	10	U	21	U	21	U	10	U
S-134	2 - 4	11/8/93	12	U	12	U	12	U	12	U	NA		12	U
S-139	3 - 3.1	12/7/93	6	U	6	U	6	U	12	U	NA		6	U
S-135	3 - 3.5	12/7/93	6	U	6	U	6	U	12	U	NA		6	U
MW-54	3 - 5	11/29/93	1600	U	1600	U	1600	U	1600	U	NA		1600	U
S-129	3 - 5	11/29/93	1500	UJV	1500	U	1500	U	1500	U	NA		1500	U
S-41A	3.5 - 5.5	11/7/90	29	U	29	U	29	U	58	U	58	U	29	U
MW-25	4 - 6	11/17/90	5	U	5	U	5	U	11	U	11	U	5	U
S-33	4 - 6	12/13/90	5	U	5	U	5	U	11	U	11	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Carbon Disulfide		Carbon Tetrachloride		Chlorobenzene		Chloroethane		2-Chloroethyl vinylether		Chloroform	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	5	U	5	U	5	U	11	U	11	U	5	U
S-60	4 - 6	12/12/90	5	U	5	U	5	U	10	U	10	U	5	U
S-53	5 - 7	11/18/90	5	U	5	U	5	U	10	U	10	U	5	U
S-61	5 - 7	10/24/90	10		6	U	6	U	11	U	11	U	6	U
FC-36	7 - 9	4/6/94	5	U	5	U	5	U	10	U	NA		5	U
S-122	7.5 - 8.5	4/9/94	6	U	6	U	6	U	11	U	NA		6	U
S-35	8 - 10	11/30/90	6	U	6	U	6	U	11	U	11	U	6	U
MW-26	9 - 11	12/5/90	5	U	5	U	5	U	10	U	10	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Chloromethane		Dibromochloromethane		1,3-Dichlorobenzene		1,2-Dichlorobenzene		1,4-Dichlorobenzene		1,2-Dichloroethane	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	11	U	5	U	5	U	5	U	5	U	5	U
S-17	0 - 2	10/19/90	14	U	7	U	7	U	7	U	7	U	7	U
S-22	0 - 2	10/17/90	12	U	6	U	6	U	6	U	6	U	6	U
S-30	0 - 2	10/16/90	11	U	6	U	6	U	6	U	6	U	6	U
S-43	0 - 2	11/5/90	11	U	6	U	6	U	6	U	6	U	6	U
S-62	0 - 2	10/24/90	11	U	6	U	6	U	6	U	6	U	6	U
S-82	0 - 2	10/16/90	11	U	6	U	6	U	6	U	6	U	6	U
S-82+	0 - 2	10/16/90	11	U	6	U	6	U	6	U	6	U	6	U
S-99	0 - 2	1/18/93	11	U	11	U	NA		NA		NA		6	U
S-100	0 - 2	1/18/93	11	U	11	U	NA		NA		NA		11	U
S-101	0 - 2	1/18/93	12	U	12	U	NA		NA		NA		11	U
S-102	0 - 2	1/18/93	11	U	11	U	NA		NA		NA		12	U
FC-21P	0.5 - 2.5	4/5/94	10	U	5	U	NA		NA		NA		11	U
FC-24P	0.5 - 2.5	4/5/94	10	U	5	U	NA		NA		NA		5	U
FC-18	1 - 3	4/6/94	10	U	5	U	NA		NA		NA		5	U
FC-24	1 - 3	4/5/94	10	U	5	U	NA		NA		NA		5	U
FC-27	1 - 3	4/4/94	10	U	5	U	NA		NA		NA		5	U
FC-31	1 - 3	4/5/94	10	U	5	U	NA		NA		NA		5	U
FC-33	1 - 3	4/4/94	10	U	5	U	NA		NA		NA		5	U
FC-40	1 - 3	4/5/94	10	U	5	U	NA		NA		NA		5	U
S-90	1 - 3	10/1/90	11	U	5	U	5	U	5	U	5	U	5	U
MW-58	2 - 3	12/7/93	1600	U	1600	U	NA		NA		NA		5	U
S-64	2 - 3	10/18/90	12	U	6	U	6	U	6	U	6	U	1600	U
S-38	2 - 4	11/29/90	12	U	6	U	6	U	6	U	6	U	6	U
S-39	2 - 4	11/29/90	11	U	5	U	5	U	5	U	5	U	6	U
S-47	2 - 4	10/19/90	11	U	5	U	5	U	5	U	5	U	5	U
S-49	2 - 4	10/19/90	11	U	5	U	5	U	5	U	5	U	5	U
S-80	2 - 4	10/3/90	21	U	10	U	10	U	10	U	10	U	5	U
S-80+	2 - 4	10/3/90	21	U	10	U	10	U	10	U	10	U	10	U
S-134	2 - 4	11/8/93	12	U	12	U	NA		NA		NA		10	U
S-139	3 - 3.1	12/7/93	12	U	6	U	NA		NA		NA		12	U
S-135	3 - 3.5	12/7/93	12	U	6	U	NA		NA		NA		6	U
MW-54	3 - 5	11/29/93	1600	U	1600	U	NA		NA		NA		6	U
S-129	3 - 5	11/29/93	1500	U	1500	U	NA		NA		NA		1600	U
S-41A	3.5 - 5.5	11/7/90	58	U	29	U	29	U	29	U	NA		1500	U
MW-25	4 - 6	11/17/90	11	U	5	U	5	U	5	U	29	U	29	U
S-33	4 - 6	12/13/90	11	U	5	U	5	U	5	U	5	U	5	U
											5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Chloromethane		Dibromochloromethane		1,3-Dichlorobenzene		1,2-Dichlorobenzene		1,4-Dichlorobenzene		1,2-Dichloroethane	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	11	U	5	U	5	U	5	U	5	U	5	U
S-60	4 - 6	12/12/90	10	U	5	U	5	U	5	U	5	U	5	U
S-53	5 - 7	11/18/90	10	U	5	U	5	U	5	U	5	U	5	U
S-61	5 - 7	10/24/90	11	U	6	U	6	U	6	U	6	U	6	U
FC-36	7 - 9	4/6/94	10	U	5	U	NA		NA		NA		5	U
S-122	7.5 - 8.5	4/9/94	11	UJV	6	U	NA		NA		NA		6	U
S-35	8 - 10	11/30/90	11	U	6	U	6	U	6	U	6	U	6	U
MW-26	9 - 11	12/5/90	10	U	5	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene (total)		1,2-Dichloropropane		cis-1,3-Dichloropropene		Ethylbenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	5	U	5	U	5	U	5	U	5	U	5	U
S-17	0 - 2	10/19/90	7	U	7	U	7	U	7	U	7	U	7	U
S-22	0 - 2	10/17/90	6	U	6	U	6	U	6	U	6	U	6	U
S-30	0 - 2	10/16/90	6	U	6	U	6	U	6	U	6	U	6	U
S-43	0 - 2	11/5/90	6	U	6	U	6	U	6	U	6	U	6	U
S-62	0 - 2	10/24/90	6	U	6	U	6	U	6	U	6	U	6	U
S-82	0 - 2	10/16/90	6	U	6	U	6	U	6	U	6	U	6	U
S-82+	0 - 2	10/16/90	6	U	6	U	6	U	6	U	6	U	6	U
S-99	0 - 2	1/18/93	11	U	11	U	11	U	11	U	11	U	11	U
S-100	0 - 2	1/18/93	11	U	11	U	11	U	11	U	11	U	11	U
S-101	0 - 2	1/18/93	12	U	12	U	12	U	12	U	12	U	12	U
S-102	0 - 2	1/18/93	11	U	11	U	11	U	11	U	11	U	11	U
FC-21P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-24P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-18	1 - 3	4/6/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-24	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-27	1 - 3	4/4/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-31	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-33	1 - 3	4/4/94	5	U	5	U	5	U	5	U	5	U	5	U
FC-40	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	5	U
S-90	1 - 3	10/1/90	5	U	5	U	5	U	5	U	5	U	5	U
MW-58	2 - 3	12/7/93	1600	U	1600	UJV	1600	U	1600	U	1600	U	1600	U
S-64	2 - 3	10/18/90	6	U	6	U	6	U	6	U	6	U	6	U
S-38	2 - 4	11/29/90	6	U	6	U	6	U	6	U	6	U	6	U
S-39	2 - 4	11/29/90	5	U	5	U	5	U	5	U	5	U	5	U
S-47	2 - 4	10/19/90	5	U	5	U	5	U	5	U	5	U	5	U
S-49	2 - 4	10/19/90	5	U	5	U	5	U	5	U	5	U	5	U
S-80	2 - 4	10/3/90	10	U	10	U	10	U	10	U	10	U	10	U
S-80+	2 - 4	10/3/90	10	U	10	U	10	U	10	U	10	U	10	U
S-134	2 - 4	11/8/93	12	U	12	U	12	U	12	U	12	U	12	U
S-139	3 - 3.1	12/7/93	6	U	6	U	6	U	6	U	6	U	6	U
S-135	3 - 3.5	12/7/93	6	U	6	U	6	U	6	U	6	U	6	U
MW-54	3 - 5	11/29/93	1600	UJV	1600	U	1600	U	1600	U	1600	U	640	J
S-129	3 - 5	11/29/93	1500	U	1500	U	1500	U	1500	U	1500	U	1500	U
S-41A	3.5 - 5.5	11/7/90	29	U	29	U	29	U	29	U	29	U	67	
MW-25	4 - 6	11/17/90	5	U	5	U	5	U	5	U	5	U	5	U
S-33	4 - 6	12/13/90	5	U	5	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene (total)		1,2-Dichloropropane		cis-1,3-Dichloropropene		Ethylbenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	5	U	5	U	5	U	5	U	5	U	5	U
S-60	4 - 6	12/12/90	5	U	5	U	5	U	5	U	5	U	5	U
S-53	5 - 7	11/18/90	5	U	5	U	5	U	5	U	5	U	5	U
S-61	5 - 7	10/24/90	6	U	6	U	6	U	6	U	6	U	6	U
FC-36	7 - 9	4/6/94	5	U	5	U	5	U	5	U	5	U	5	U
S-122	7.5 - 8.5	4/9/94	6	U	6	U	6	U	6	U	6	U	6	U
S-35	8 - 10	11/30/90	6	U	6	U	6	U	6	U	6	U	6	U
MW-26	9 - 11	12/5/90	5	U	5	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Hexanone		4-Methyl-2-Pentanone		Methylene Chloride		Styrene		1,1,2,2-Tetrachloroethane		Tetrachloroethene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	11	U	11	U	5	U	5	U	5	U	5	U
S-17	0 - 2	10/19/90	14	U	14	U	7	U	7	U	7	U	7	U
S-22	0 - 2	10/17/90	12	U	12	U	32		6	U	6	U	6	U
S-30	0 - 2	10/16/90	11	U	11	U	6	U	6	U	6	U	6	U
S-43	0 - 2	11/5/90	11	U	11	U	6	U	6	U	6	U	6	U
S-62	0 - 2	10/24/90	11	U	11	U	14		6	U	6	U	6	U
S-82	0 - 2	10/16/90	11	U	11	U	26		6	U	6	U	6	U
S-82+	0 - 2	10/16/90	11	U	11	U	21		6	U	6	U	6	U
S-99	0 - 2	1/18/93	11	U	11	U	11	UV	11	U	11	U	11	U
S-100	0 - 2	1/18/93	11	U	11	U	11	UV	11	U	11	U	11	U
S-101	0 - 2	1/18/93	12	U	12	U	12	UV	12	U	12	U	12	U
S-102	0 - 2	1/18/93	11	U	11	U	11	UV	11	U	11	U	11	U
FC-21P	0.5 - 2.5	4/5/94	10	U	10	U	5	UV	5	U	5	U	5	U
FC-24P	0.5 - 2.5	4/5/94	10	U	10	U	7	UV	5	U	5	U	5	U
FC-18	1 - 3	4/6/94	10	U	10	U	3	UV	5	U	5	U	5	U
FC-24	1 - 3	4/5/94	10	U	10	U	5	UV	5	U	5	U	5	U
FC-27	1 - 3	4/4/94	10	U	10	U	5	U	5	U	5	U	5	U
FC-31	1 - 3	4/5/94	10	U	10	U	5	U	5	U	5	U	5	U
FC-33	1 - 3	4/4/94	10	U	10	U	5	U	5	U	5	U	5	U
FC-40	1 - 3	4/5/94	10	U	10	U	5	UV	5	U	5	U	5	U
S-90	1 - 3	10/1/90	11	U	11	U	26		5	U	5	U	5	U
MW-58	2 - 3	12/7/93	1600	U	1600	U	1600	UV	1600	U	1600	U	1600	U
S-64	2 - 3	10/18/90	12	U	12	U	6	U	6	U	6	U	6	U
S-38	2 - 4	11/29/90	12	U	12	U	6	U	6	U	6	U	6	U
S-39	2 - 4	11/29/90	11	U	11	U	5	U	5	U	5	U	5	U
S-47	2 - 4	10/19/90	11	U	11	U	5	U	5	U	5	U	5	U
S-49	2 - 4	10/19/90	11	U	11	U	3.6	J	5	U	5	U	5	U
S-80	2 - 4	10/3/90	21	U	21	U	302		10	U	10	U	10	U
S-80+	2 - 4	10/3/90	21	U	21	U	258		10	U	10	U	10	U
S-134	2 - 4	11/8/93	12	U	12	U	12	UV	12	U	12	U	12	U
S-139	3 - 3.1	12/7/93	12	U	12	U	6	UV	6	U	6	U	6	U
S-135	3 - 3.5	12/7/93	12	U	12	U	6	UV	6	U	6	U	6	U
MW-54	3 - 5	11/29/93	1600	U	1600	U	1600	UV	1600	U	1600	U	1600	U
S-129	3 - 5	11/29/93	1500	U	1500	U	1500	UV	1500	U	1500	U	1500	U
S-41A	3.5 - 5.5	11/7/90	58	U	58	U	29	U	29	U	29	U	29	U
MW-25	4 - 6	11/17/90	11	U	11	U	5	U	3.4	J	5	U	5	U
S-33	4 - 6	12/13/90	11	U	11	U	77		5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Hexanone		4-Methyl-2-Pentanone		Methylene Chloride		Styrene		1,1,2,2-Tetrachloroethane		Tetrachloroethene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	11	U	11	U	5	U	5	U	5	U	5	U
S-60	4 - 6	12/12/90	10	U	10	U	29		5	U	5	U	5	U
S-53	5 - 7	11/18/90	10	U	10	U	4.3	J	5	U	5	U	5	U
S-61	5 - 7	10/24/90	11	U	11	U	14		6	U	6	U	6	U
FC-36	7 - 9	4/6/94	10	U	10	U	5	U	5	U	5	U	5	U
S-122	7.5 - 8.5	4/9/94	11	U	11	U	6	U	6	U	6	U	6	U
S-35	8 - 10	11/30/90	11	U	11	U	6	U	6	U	6	U	6	U
MW-26	9 - 11	12/5/90	10	U	10	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Toluene		Trans-1,3-Dichloropropene		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Trichloroethene		Trichlorofluoromethane	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	5	U	5	U	5	U	5	U	5	U	5	U
S-17	0 - 2	10/19/90	7	U	7	U	7	U	7	U	7	U	7	U
S-22	0 - 2	10/17/90	4.8	J	6	U	6	U	6	U	6	U	6	U
S-30	0 - 2	10/16/90	6	U	6	U	6	U	6	U	6	U	6	U
S-43	0 - 2	11/5/90	6	U	6	U	6	U	6	U	6	U	6	U
S-62	0 - 2	10/24/90	11		6	U	6	U	6	U	6	U	6	U
S-82	0 - 2	10/16/90	4.8	J	6	U	6	U	6	U	6	U	6	U
S-82+	0 - 2	10/16/90	6	U	6	U	6	U	6	U	6	U	6	U
S-99	0 - 2	1/18/93	11	UV	11	U	11	U	11	U	11	U	NA	
S-100	0 - 2	1/18/93	11	UV	11	U	11	U	11	U	11	U	NA	
S-101	0 - 2	1/18/93	12	UV	12	U	12	U	12	U	12	U	NA	
S-102	0 - 2	1/18/93	11	U	11	U	11	U	11	U	11	U	NA	
FC-21P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-24P	0.5 - 2.5	4/5/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-18	1 - 3	4/6/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-24	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-27	1 - 3	4/4/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-31	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-33	1 - 3	4/4/94	5	U	5	U	5	U	5	U	5	U	NA	
FC-40	1 - 3	4/5/94	5	U	5	U	5	U	5	U	5	U	NA	
S-90	1 - 3	10/1/90	13	J	5	U	5	U	5	U	5	U	5	U
MW-58	2 - 3	12/7/93	1600	UV	1600	U	1600	U	1600	U	1600	U	NA	
S-64	2 - 3	10/18/90	6	U	6	U	6	U	6	U	6	U	6	U
S-38	2 - 4	11/29/90	6	U	6	U	6	U	6	U	6	U	6	U
S-39	2 - 4	11/29/90	5	U	5	U	5	U	5	U	5	U	5	U
S-47	2 - 4	10/19/90	5	U	5	U	5	U	5	U	5	U	5	U
S-49	2 - 4	10/19/90	5	U	5	U	5	U	5	U	5	U	5	U
S-80	2 - 4	10/3/90	30	J	10	U	10	U	10	U	10	U	10	U
S-80+	2 - 4	10/3/90	31		10	U	10	U	10	U	10	U	10	U
S-134	2 - 4	11/8/93	12	U	12	U	12	U	12	U	12	U	NA	
S-139	3 - 3.1	12/7/93	6	UV	6	U	6	U	6	U	6	U	NA	
S-135	3 - 3.5	12/7/93	6	U	6	U	6	U	6	U	6	U	NA	
MW-54	3 - 5	11/29/93	1600	UV	1600	U	1600	U	1600	U	1600	U	NA	
S-129	3 - 5	11/29/93	1500	UV	1500	U	1500	U	1500	U	1500	U	NA	
S-41A	3.5 - 5.5	11/7/90	29	U	29	U	29	U	29	U	29	U	29	U
MW-25	4 - 6	11/17/90	5	U	5	U	5	U	5	U	5	U	5	U
S-33	4 - 6	12/13/90	5	U	5	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Toluene		Trans-1,3-Dichloropropene		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Trichloroethene		Trichlorofluoromethane	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	5	U	5	U	5	U	5	U	5	U	5	U
S-60	4 - 6	12/12/90	5	U	5	U	5	U	5	U	5	U	5	U
S-53	5 - 7	11/18/90	5	U	5	U	5	U	5	U	5	U	5	U
S-61	5 - 7	10/24/90	7.6		6	U	6	U	6	U	6	U	6	U
FC-36	7 - 9	4/6/94	5	U	5	U	5	U	5	U	5	U	NA	
S-122	7.5 - 8.5	4/9/94	6	U	6	U	6	U	6	U	6	U	NA	
S-35	8 - 10	11/30/90	6	U	6	U	6	U	6	U	6	U	6	U
MW-26	9 - 11	12/5/90	5	U	5	U	5	U	5	U	5	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Vinyl Acetate		Vinyl Chloride		Xylenes (total)	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	11	U	11	U	5	U
S-17	0 - 2	10/19/90	14	U	14	U	7	U
S-22	0 - 2	10/17/90	12	U	12	U	6	U
S-30	0 - 2	10/16/90	11	U	11	U	6	U
S-43	0 - 2	11/5/90	11	U	11	U	4.4	J
S-62	0 - 2	10/24/90	11	U	11	U	6	U
S-82	0 - 2	10/16/90	11	U	11	U	6	U
S-82+	0 - 2	10/16/90	11	U	11	U	6	U
S-99	0 - 2	1/18/93	NA		11	U	11	U
S-100	0 - 2	1/18/93	NA		11	U	11	U
S-101	0 - 2	1/18/93	NA		12	U	12	U
S-102	0 - 2	1/18/93	NA		11	U	11	U
FC-21P	0.5 - 2.5	4/5/94	10	U	10	U	5	U
FC-24P	0.5 - 2.5	4/5/94	10	U	10	U	5	U
FC-18	1 - 3	4/6/94	10	U	10	U	5	U
FC-24	1 - 3	4/5/94	10	U	10	U	5	U
FC-27	1 - 3	4/4/94	10	U	10	U	5	U
FC-31	1 - 3	4/5/94	10	U	10	U	5	U
FC-33	1 - 3	4/4/94	10	U	10	U	5	U
FC-40	1 - 3	4/5/94	10	U	10	U	5	U
S-90	1 - 3	10/1/90	11	U	11	U	5	U
MW-58	2 - 3	12/7/93	NA		1600	U	1600	U
S-64	2 - 3	10/18/90	12	U	12	U	6	U
S-38	2 - 4	11/29/90	12	U	12	U	6	U
S-39	2 - 4	11/29/90	11	U	11	U	5	U
S-47	2 - 4	10/19/90	11	U	11	U	5	U
S-49	2 - 4	10/19/90	11	U	11	U	5	U
S-80	2 - 4	10/3/90	21	U	21	U	10	U
S-80+	2 - 4	10/3/90	21	U	21	U	10	U
S-134	2 - 4	11/8/93	NA		12	U	12	U
S-139	3 - 3.1	12/7/93	NA		12	U	6	U
S-135	3 - 3.5	12/7/93	NA		12	U	1	J
MW-54	3 - 5	11/29/93	NA		1600	U	1600	U
S-129	3 - 5	11/29/93	NA		1500	U	1500	U
S-41A	3.5 - 5.5	11/7/90	58	U	58	U	137	
MW-25	4 - 6	11/17/90	11	U	11	U	5	U
S-33	4 - 6	12/13/90	11	U	11	U	5	U

Table A-1:

Concentrations of Volatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Vinyl Acetate		Vinyl Chloride		Xylenes (total)	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-37	4 - 6	12/1/90	11	U	11	U	5	U
S-60	4 - 6	12/12/90	10	U	10	U	5	U
S-53	5 - 7	11/18/90	10	U	10	U	5	U
S-61	5 - 7	10/24/90	11	U	11	U	6	U
FC-36	7 - 9	4/6/94	10	U	10	U	5	U
S-122	7.5 - 8.5	4/9/94	NA		11	U	6	U
S-35	8 - 10	11/30/90	11	U	11	U	6	U
MW-26	9 - 11	12/5/90	10	U	10	U	5	U

U - Indicates that the compound was analyzed for but not detected.
V - Qualifier added and/or value altered during validation.
J - Estimated value
B - Detected in laboratory blank.
J - Estimated level.
NA - Not analyzed.
\+ - Indicates Reanalysis.

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Acenaphthene		Acenaphthylene		Anthracene		Benzidine		Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo(b) fluoranthene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	645	U	441		292	J	NA	
S-17	0 - 2	10/19/90	480	U	480	U	480	U	870	U	480	U	480	U	NA	
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	4350	U	2390	U	2390	U	NA	
S-22	0 - 2	10/17/90	400	U	337	J	307	J	730	U	404	JV	699	JV	NA	
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	3660	U	2010	U	2010	U	NA	
S-30	0 - 2	10/16/90	370	U	370	U	370	U	670	U	370	U	370	U	NA	
S-43	0 - 2	11/5/90	3710	U	3710	U	1966	J	6749	U	12600		5760		NA	
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	3330	U	1830	U	1830	U	NA	
FC-21P	0.5 - 2.5	4/5/94	620	J	330	U	850		NA		1900		1700	J	1600	J
FC-24P	0.5 - 2.5	4/5/94	17	J	330	U	29	J	NA		67	J	58	J	63	J
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	3230	UJV	1770	UJV	1770	UJV	NA	
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	NA		9	J	8	J	10	J
FC-24	1 - 3	4/5/94	330	U	330	U	46	J	NA		100	J	93	J	94	J
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	NA		62	J	72	J	130	J
FC-31	1 - 3	4/5/94	330	U	330	U	15	J	NA		64	J	56	J	70	J
FC-33	1 - 3	4/4/94	62	J	330	U	130	J	NA		280	J	230	J	240	J
FC-40	1 - 3	4/5/94	330	U	330	U	8	J	NA		56	J	58	J	69	J
MW-58	2 - 3	12/7/93	7300	U	7300	U	500	J	NA		7300	U	7300	U	860	J
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	7140	U	3930	U	3930	U	NA	
S-38	2 - 4	11/29/90	390	U	390	U	390	U	705	U	390	U	390	U	NA	
S-39	2 - 4	11/29/90	350	U	350	U	350	U	630	U	350	U	350	U	NA	
S-47	2 - 4	10/19/90	355	U	355	U	355	U	645	U	355	U	355	U	NA	
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	6450	U	3550	U	3550	U	NA	
S-49	2 - 4	10/19/90	350	U	350	U	350	U	640	U	350	U	415	JV	NA	
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	640	U	3510	U	3510	U	NA	
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	3130	U	1720	U	1720	U	NA	
S-134	2 - 4	11/8/93	790	UJV	330	JV	210	JV	NA		370	J	460	J	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	NA		330	U	46	J	89	J
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	NA		350	U	350	UJV	350	UJV
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	NA		7600	U	7600	U	7600	U
S-129	3 - 5	11/29/93	410	U	40	J	57	J	NA		410	U	47	J	250	J
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	6980	U	3840	U	3840	U	NA	
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	650	U	360	U	360	U	NA	
S-33	4 - 6	12/13/90	355	U	355	U	355	U	645	U	355	U	355	U	NA	
S-37	4 - 6	12/1/90	350	U	350	U	350	U	640	U	350	U	350	U	NA	
S-60	4 - 6	12/12/90	340	U	340	U	340	U	620	U	340	U	340	U	NA	
S-53	5 - 7	11/18/90	340	U	340	U	340	U	625	U	340	U	340	U	NA	

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Acenaphthene		Acenaphthylene		Anthracene		Benzidine		Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo(b) fluoranthene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	6829	U	3750	U	3750	U	NA	
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	NA		330	U	330	UJ	330	UJ
S-35	9 - 10	11/30/90	380	U	380	U	380	U	690	U	380	U	380	U	NA	
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	625	UR	340	UR	340	UR	NA	
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	625	UR	340	UR	340	UR	NA	
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	6670	U	3670	U	3670	U	NA	
S-99	0 - 2	1/18/93	380	U	16	J	17	J	NA		65	J	88	J	100	J
S-100	0 - 2	1/18/93	74	JV	380	JV	460	JV	NA		1100	JV	1200	JV	1000	JV
S-101	0 - 2	1/18/93	240	JV	2500	JV	3100	JV	NA		3900	JV	5700	JV	3200	JV
S-101+	0 - 2	1/18/93	290	JV	3500	JV	3200	JV	NA		4600	JV	4000	JV	3500	JV
S-102	0 - 2	1/18/93	45	JV	600	JV	370	JV	NA		690	JV	2100	JV	1200	JV
S-102+	0 - 2	1/18/93	380	UJV	710	JV	340	JV	NA		730	JV	2100	JV	760	JV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	NA		22	J	370	U	28	J

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Benzo(k) fluoranthene		Benzo (b+k) fluoranthenes		Benzo (g,h,i) Perylene		Benzoic Acid		Benzyl Alcohol		4-Bromophenyl-phenylether	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	NA		1000		272	J	1720	U	355	U	355	U
S-17	0 - 2	10/19/90	NA		416	J	480	U	2320	U	480	U	480	U
S-17+	0 - 2	10/19/90	NA		2390	U	2390	U	11600	U	2390	U	2390	U
S-22	0 - 2	10/17/90	NA		2427	JV	400	U	1950	U	400	U	400	U
S-22+	0 - 2	10/17/90	NA		5617	JV	2010	U	9760	U	2010	U	2010	U
S-30	0 - 2	10/16/90	NA		370	U	370	U	1780	U	370	U	370	U
S-43	0 - 2	11/5/90	NA		7400		5800		18000	U	3710	U	3710	U
S-82	0 - 2	10/16/90	NA		1233	J	1830	U	8890	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	2000	J	NA		350	J	1600	U	330	U	330	U
FC-24P	0.5 - 2.5	4/5/94	46	J	NA		56	J	1600	U	330	U	330	U
S-90	1 - 3	10/1/90	NA		1770	UJV	1770	UJV	8600	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	NA		330	U	1600	U	330	U	330	U
FC-24	1 - 3	4/5/94	19	J	NA		92	J	1600	U	330	U	330	U
FC-27	1 - 3	4/4/94	75	J	NA		330	U	1600	U	330	U	330	U
FC-31	1 - 3	4/5/94	12	J	NA		28	J	1600	U	330	U	330	U
FC-33	1 - 3	4/4/94	200	J	NA		76	J	1600	U	330	U	330	U
FC-40	1 - 3	4/5/94	13	J	NA		23	J	1600	U	330	U	330	U
MW-58	2 - 3	12/7/93	7300	U	NA		7300	U	35000	U	7300	U	7300	U
S-64	2 - 3	10/18/90	NA		3930	U	3930	U	19000	U	3930	U	3930	U
S-38	2 - 4	11/29/90	NA		390	U	390	U	1880	U	390	U	390	U
S-39	2 - 4	11/29/90	NA		350	U	350	U	1680	U	350	U	350	U
S-47	2 - 4	10/19/90	NA		257	J	355	U	1720	U	355	U	355	U
S-47+	2 - 4	10/19/90	NA		3550	U	3550	U	17200	U	3550	U	3550	U
S-49	2 - 4	10/19/90	NA		350	U	350	U	1700	U	350	U	350	U
S-49+	2 - 4	10/19/90	NA		3510	U	3510	U	17000	U	3510	U	3510	U
S-80	2 - 4	10/3/90	NA		1720	U	1720	U	8330	U	1720	U	1720	U
S-134	2 - 4	11/8/93	820	JV	NA		790	UJV	3800	UJV	790	UJV	790	UJV
S-139	3 - 3.1	12/7/93	330	U	NA		330	U	1600	U	330	U	330	U
S-135	3 - 3.5	12/7/93	350	UJV	NA		350	UJV	17000	U	350	U	350	U
MW-54	3 - 5	11/29/93	7600	U	NA		7600	U	37000	U	7600	U	7600	U
S-129	3 - 5	11/29/93	37	J	NA		43	J	480	J	NA		410	U
S-41A	3.5 - 5.5	11/7/90	NA		3840	U	3840	U	18600	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	NA		360	U	360	U	1740	U	360	U	360	U
S-33	4 - 6	12/13/90	NA		355	U	355	U	1720	U	355	U	355	U
S-37	4 - 6	12/1/90	NA		350	U	350	U	1700	U	350	U	350	U
S-60	4 - 6	12/12/90	NA		340	U	340	U	1650	U	340	U	340	U
S-53	5 - 7	11/18/90	NA		340	U	340	U	1670	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Benzo(k) fluoranthene		Benzo (b+k) fluoranthenes		Benzo (g,h,i) Perylene		Benzoic Acid		Benzyl Alcohol		4-Bromophenyl-phenylether	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	NA		3750	U	3750	U	18200	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	UJ	NA		330	UJ	1600	U	330	U	330	U
S-35	9 - 10	11/30/90	NA		380	U	380	U	1840	U	380	U	380	U
MW-26	9 - 11	12/5/90	NA		340	UR	340	UR	1670	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	NA		340	UR	340	UR	1670	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	NA		3670	U	3670	U	17800	U	3670	U	3670	U
S-99	0 - 2	1/18/93	110	J	NA		80	J	NA		NA		380	U
S-100	0 - 2	1/18/93	940	JV	NA		150	JV	NA		NA		380	UJV
S-101	0 - 2	1/18/93	5100	JV	NA		700	JV	NA		NA		3100	UJV
S-101+	0 - 2	1/18/93	3800	JV	NA		550	JV	NA		NA		3100	UJV
S-102	0 - 2	1/18/93	860	JV	NA		670	JV	NA		NA		380	UJV
S-102+	0 - 2	1/18/93	670	JV	NA		280	JV	NA		NA		380	UJV
S-122	7.5 - 8.5	4/9/94	37	J	NA		370	U	1800	U	370	U	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Butylbenzyl phthalate		4-Chloro-3-Methylphenol		4-Chloroaniline		Bis (2-Chloroethoxy) Methane		Bis (2-Chloroethyl) Ether		Bis (2-Chloroisopropyl) Ether	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	355	U	355	U	355	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	480	U	480	U	480	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	234	J	400	U	400	U	400	U	400	U	400	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	2010	U	2010	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	370	U	370	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	3710	U	3710	U	3710	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	330	U	330	U	330	U
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-27	1 - 3	4/4/94	330	U	44	J	330	U	330	U	330	U	330	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-33	1 - 3	4/4/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	330	U	330	U	330	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	7300	U	7300	U	NA	
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	350	U	350	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	355	U	355	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	1720	U	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	790	UJV	790	UJV	NA	
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	330	U	330	U	NA	
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	U	350	U	NA	
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	7600	U	NA	
S-129	3 - 5	11/29/93	410	U	410	U	410	U	410	U	410	U	NA	
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	360	U	360	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	350	U	350	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Butylbenzyl phthalate		4-Chloro-3-Methylphenol		4-Chloroaniline		Bis (2-Chloroethoxy) Methane		Bis (2-Chloroethyl) Ether		Bis (2-Chloroisopropyl) Ether	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	330	U	330	U	330	U
S-35	9 - 10	11/30/90	380	U	380	U	380	U	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	380	U	380	UJ	380	U	380	U	NA	
S-100	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	NA	
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	3100	UJV	3100	UJV	NA	
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	3100	UJV	3100	UJV	NA	
S-102	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	NA	
S-102+	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	NA	
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	370	U	370	U	NA	

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Chloronaphthalene		2-Chlorophenol		4-Chlorophenyl-phenylether		Chrysene		Di-n-Butylphthalate		Di-n-Octyl Phthalate	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	538		198	J	355	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	342	J	462	J	480	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	400	U	400	U	400	U	913	JV	898	JV	400	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	2010	U	2010	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	555		370	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	10100		3710	U	3710	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	1900		330	U	15	J
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	74	J	330	U	22	J
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	11	J	26	J	330	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	U	120	J	8	J	24	J
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	79	J	330	U	330	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	U	110	J	8	J	16	J
FC-33	1 - 3	4/4/94	330	U	330	U	330	U	340	J	7	J	42	J
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	64	J	28	J	100	J
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	650	J	7300	U	7300	U
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	350	U	350	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	263	J	355	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	875	BJ	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	630	J	120	J	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	56	J	18	J	330	U
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	U	350	U	350	UJV
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	7600	U	7600	U
S-129	3 - 5	11/29/93	410	U	410	U	410	U	81	J	30	J	410	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	360	U	360	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	350	U	350	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Chloronaphthalene		2-Chlorophenol		4-Chlorophenyl-phenylether		Chrysene		Di-n-Butylphthalate		Di-n-Octyl Phthalate	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	330	U	25	J	330	UJ
S-35	9 - 10	11/30/90	380	U	380	U	380	U	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	380	U	380	U	110	J	380	UV	380	U
S-100	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	4900	JV	3100	UJV	3100	UJV
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	6500	JV	3100	UJV	3100	UJV
S-102	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	1500	JV	380	UJV	380	UJV
S-102+	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	1100	JV	380	UJV	380	UJV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	40	J	15	J	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Dibenzo (a,h) Anthracene		Dibenzofuran		1,2-Dichlorobenzene		1,3-Dichlorobenzene		1,4-Dichlorobenzene		3,3'-Dichlorobenzidine	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	355	U	355	U	710	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	480	U	480	U	960	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	2390	U	4780	U
S-22	0 - 2	10/17/90	400	U	400	U	400	U	400	U	400	U	805	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	2010	U	4020	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	370	U	730	U
S-43	0 - 2	11/5/90	2090	J	3710	U	3710	U	3710	U	3710	U	7420	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	3670	U
FC-21P	0.5 - 2.5	4/5/94	150	J	400	J	330	U	330	U	330	U	660	U
FC-24P	0.5 - 2.5	4/5/94	10	J	13	J	330	U	330	U	330	U	660	U
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	3550	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	330	U	330	U	660	U
FC-24	1 - 3	4/5/94	17	J	17	J	330	U	330	U	330	U	660	U
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	330	U	330	U	660	U
FC-31	1 - 3	4/5/94	11	J	7	J	330	U	330	U	330	U	660	U
FC-33	1 - 3	4/4/94	19	J	53	J	330	U	330	U	330	U	660	U
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	330	U	330	U	660	U
MW-58	2 - 3	12/7/93	7300	U	760	J	7300	U	7300	U	7300	U	7300	U
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	7860	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	780	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	350	U	695	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	355	U	710	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	7100	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	350	U	700	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	7020	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	1720	U	3440	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	790	UJV	790	UJV	1600	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	330	U	330	U	330	U
S-135	3 - 3.5	12/7/93	350	UJV	17	J	350	U	350	U	350	U	350	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	7600	U	7600	U
S-129	3 - 5	11/29/93	410	U	58	J	410	U	410	U	410	U	410	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	7670	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	360	U	720	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	710	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	350	U	700	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	680	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	340	U	690	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4-Dichlorophenol		Diethylphthalate		Dimethyl Phthalate		2,4-Dimethylphenol		4,6-Dinitro-2-Methylphenol		2,4-Dinitrophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	355	U	1720	U	1720	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	480	U	2320	U	2320	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	11600	U	11600	U
S-22	0 - 2	10/17/90	400	U	400	U	400	U	400	U	1950	U	1950	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	9760	U	9760	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	1780	U	1780	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	3710	U	18000	U	18000	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	8890	U	8890	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	330	U	1600	U	1600	U
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	8600	UJV	8600	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-33	1 - 3	4/4/94	330	U	330	U	330	U	330	U	1600	U	1600	U
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	330	U	1600	U	1600	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	7300	U	35000	U	35000	U
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	19000	U	19000	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	1880	U	1880	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	1680	U	1680	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	1720	U	1720	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	17200	U	17200	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	1700	U	1700	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	17000	U	17000	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	8330	U	8330	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	790	UJV	3800	UJV	3800	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	330	U	1600	U	1600	U
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	U	1700	U	1700	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	37000	U	37000	U
S-129	3 - 5	11/29/93	410	U	410	U	410	U	410	U	2000	U	2000	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	18600	U	18600	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	1740	U	1740	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	1720	U	1720	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	1700	U	1700	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	1650	U	1650	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	1670	U	1670	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4-Dichlorophenol		Diethylphthalate		Dimethyl Phthalate		2,4-Dimethylphenol		4,6-Dinitro-2-Methylphenol		2,4-Dinitrophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	18200	U	18200	U
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	330	U	1600	U	1600	U
S-35	9 - 10	11/30/90	380	U	380	U	380	U	380	U	1840	U	1840	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	1670	UR	1670	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	1670	UR	1670	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	17800	U	17800	U
S-99	0 - 2	1/18/93	380	U	380	UV	380	U	380	U	910	U	910	U
S-100	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	910	UJV	910	UJV
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	41	JV	7400	UJV	7400	UJV
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	3100	UJV	7400	UJV	7400	UJV
S-102	0 - 2	1/18/93	380	UJV	380	UV	380	UJV	380	UJV	910	UJV	910	UJV
S-102+	0 - 2	1/18/93	380	UJV	380	UV	380	UJV	15	JV	910	UJV	910	UJV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	370	U	1800	U	1800	UJV

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4-Dinitrotoluene		2,6-Dinitrotoluene		Bis (2-Ethylhexyl) Phthalate		Fluoranthene		Fluorene		Hexachlorobenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	404	B	716		355	U	355	U
S-17	0 - 2	10/19/90	480	U	480	U	810	JV	628	JV	480	U	480	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	1340	J	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	400	U	400	U	1048	JV	1878	JV	400	U	400	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	1500	BJ	2585	JV	2010	U	2010	U
S-30	0 - 2	10/16/90	370	U	370	U	407		370	U	370	U	370	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	19700		3710	U	3710	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	UV	330	U	510	J	330	U
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	UV	180	J	18	J	330	U
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	UV	14	J	330	U	330	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	UV	280	J	22	J	330	U
FC-27	1 - 3	4/4/94	330	U	330	U	330	UV	92	J	330	U	330	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	UV	150	J	9	J	330	U
FC-33	1 - 3	4/4/94	330	U	330	U	330	UV	820		70	J	330	U
FC-40	1 - 3	4/5/94	330	U	330	U	22	UV	96	J	330	U	330	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	1500	J	1400	J	7300	U
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	350	U	350	U	197	BJ	350	U	350	U	350	U
S-47	2 - 4	10/19/90	355	U	355	U	284	J	394	JV	355	U	355	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	350	U	350	U	485	JV	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	1720	U	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	500	J	790	UJV	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	UV	93	J	330	U	330	U
S-135	3 - 3.5	12/7/93	350	U	350	U	350	UV	350	U	31	J	350	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	UV	7600	U	2600	J	7600	U
S-129	3 - 5	11/29/93	410	U	410	U	410	UV	140	J	410	U	410	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	360	U	360	U	680	B	360	U	360	U	360	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	350	U	350	U	217	BJ	350	U	350	U	350	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	340	U	340	U	461	B	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4-Dinitrotoluene		2,6-Dinitrotoluene		Bis (2-Ethylhexyl) Phthalate		Fluoranthene		Fluorene		Hexachlorobenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	U	330	U	130	UV	6	J	330	U	330	U
S-35	9 - 10	11/30/90	380	U	380	U	203	BJ	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	306	BJR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	829	BR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	380	U	380	UV	100	J	380	U	380	U
S-100	0 - 2	1/18/93	380	UJV	380	UJV	1600	UJV	1700	JV	110	JV	380	UJV
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	1900	UJV	7000	JV	460	JV	3100	UJV
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	2400	UJV	6800	JV	600	JV	3100	UJV
S-102	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	260	JV	380	UJV	380	UJV
S-102+	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	220	JV	380	UJV	380	UJV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	UV	48	J	370	U	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Hexachlorobutadiene		Hexachlorocyclopentadiene		Hexachloroethane		Indeno (1,2,3-cd) pyrene		Isophorone		2-Methylnaphthalene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	227	J	355	U	355	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	480	U	480	U	480	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	400	U	400	U	400	U	400	U	400	U	400	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	2010	U	2010	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	370	U	370	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	4640		3710	U	3710	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	580	J	330	U	120	J
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	55	J	330	U	330	U
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	U	87	J	330	U	330	U
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	330	U	330	U	330	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	U	30	J	330	U	8	J
FC-33	1 - 3	4/4/94	330	U	330	U	330	U	78	J	330	U	22	J
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	27	J	330	U	330	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	7300	U	7300	U	45000	
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	350	U	350	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	355	U	355	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	1720	U	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	550	J	790	UJV	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	330	U	330	U	18	J
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	UJV	350	U	350	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	7600	U	21000	
S-129	3 - 5	11/29/93	410	U	410	U	410	U	63	J	410	U	410	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	360	U	360	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	350	U	350	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Hexachlorobutadiene		Hexachlorocyclopentadiene		Hexachloroethane		Indeno (1,2,3-cd) pyrene		Isophorone		2-Methylnaphthalene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	330	UJ	330	U	330	U
S-35	9 - 10	11/30/90	380	U	380	U	380	U	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	380	U	380	U	110	J	380	U	11	J
S-100	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	280	JV	380	UJV	81	JV
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	920	JV	3100	UJV	430	JV
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	1200	JV	3100	UJV	440	JV
S-102	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	770	JV	380	UJV	190	JV
S-102+	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	670	JV	380	UJV	230	JV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	370	U	370	U	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4-Methylphenol		2-Methylphenol		N-Nitroso-Di-n-Propylamine		N-Nitrosodimethylamine		N-Nitrosodiphenylamine (1)		Naphthalene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	355	U	355	U	355	U	355	U	355	U	355	U
S-17	0 - 2	10/19/90	480	U	480	U	480	U	480	U	480	U	480	U
S-17+	0 - 2	10/19/90	2390	U	2390	U	2390	U	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	400	U	400	U	400	U	400	U	400	U	400	U
S-22+	0 - 2	10/17/90	2010	U	2010	U	2010	U	2010	U	2010	U	2010	U
S-30	0 - 2	10/16/90	370	U	370	U	370	U	370	U	370	U	370	U
S-43	0 - 2	11/5/90	3710	U	3710	U	3710	U	3710	U	3710	UV	3710	U
S-82	0 - 2	10/16/90	1830	U	1830	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	NA		330	U	530	J
FC-24P	0.5 - 2.5	4/5/94	330	U	330	U	330	U	NA		330	U	14	J
S-90	1 - 3	10/1/90	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	330	U	330	U	330	U	NA		330	U	330	U
FC-24	1 - 3	4/5/94	330	U	330	U	330	U	NA		330	U	19	J
FC-27	1 - 3	4/4/94	330	U	330	U	330	U	NA		330	U	330	U
FC-31	1 - 3	4/5/94	330	U	330	U	330	U	NA		330	U	14	J
FC-33	1 - 3	4/4/94	330	U	330	U	330	U	NA		330	U	65	J
FC-40	1 - 3	4/5/94	330	U	330	U	330	U	NA		330	U	330	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	7300	U	7300	U	3700	U	20000	
S-64	2 - 3	10/18/90	3930	U	3930	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	390	U	390	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	350	U	350	U	350	U	350	U	350	U	350	U
S-47	2 - 4	10/19/90	355	U	355	U	355	U	355	U	355	U	355	U
S-47+	2 - 4	10/19/90	3550	U	3550	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	350	U	350	U	350	U	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	3510	U	3510	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	1720	U	1720	U	1720	U	1720	U	1720	U	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	790	UJV	790	UJV	790	UJV	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	330	U	330	U	330	U	33	J
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	U	350	U	350	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	7600	U	7600	U	7600	U	6600	J
S-129	3 - 5	11/29/93	410	U	410	U	410	U	410	U	410	U	410	U
S-41A	3.5 - 5.5	11/7/90	3840	U	3840	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	360	U	360	U	360	U	360	U	360	U	360	U
S-33	4 - 6	12/13/90	355	U	355	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	350	U	350	U	350	U	350	U	350	U	350	U
S-60	4 - 6	12/12/90	340	U	340	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	340	U	340	U	340	U	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4-Methylphenol		2-Methylphenol		N-Nitroso-Di-n-Propylamine		N-Nitrosodimethylamine		N-Nitrosodiphenylamine (1)		Naphthalene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	3750	U	3750	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	330	U	330	U	330	U	NA		330	U	330	U
S-35	9 - 10	11/30/90	380	U	380	U	380	U	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	340	UR	340	UR	340	UR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	3670	U	3670	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	380	U	380	U	380	U	380	U	9	J
S-100	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	85	JV
S-101	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	3100	UJV	3100	UJV	700	JV
S-101+	0 - 2	1/18/93	3100	UJV	3100	UJV	3100	UJV	3100	UJV	3100	UJV	660	JV
S-102	0 - 2	1/18/93	380	UJV	380	UJV	380	UJV	380	UJV	380	UJV	260	JV
S-102+	0 - 2	1/18/93	28	JV	380	UJV	380	UJV	380	UJV	380	UJV	280	JV
S-122	7.5 - 8.5	4/9/94	370	U	370	U	370	U	370	U	370	U	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Nitroaniline		4-Nitroaniline		3-Nitroaniline		Nitrobenzene		4-Nitrophenol		2-Nitrophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	1720	U	1720	U	1720	U	355	U	1720	U	355	U
S-17	0 - 2	10/19/90	2320	U	2320	U	2320	U	480	U	2320	U	480	U
S-17+	0 - 2	10/19/90	11600	U	11600	U	11600	U	2390	U	11600	U	2390	U
S-22	0 - 2	10/17/90	1950	U	1950	U	1950	U	400	U	1950	U	400	U
S-22+	0 - 2	10/17/90	9760	U	9760	U	9760	U	2010	U	9760	U	2010	U
S-30	0 - 2	10/16/90	1780	U	1780	U	1780	U	370	U	1780	U	370	U
S-43	0 - 2	11/5/90	18000	U	18000	U	18000	U	3710	U	18000	U	3710	U
S-82	0 - 2	10/16/90	8890	U	8890	U	8890	U	1830	U	8890	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-24P	0.5 - 2.5	4/5/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
S-90	1 - 3	10/1/90	8600	UJV	8600	UJV	8600	UJV	1770	UJV	8600	UJV	1770	UJV
FC-18	1 - 3	4/6/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-24	1 - 3	4/5/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-27	1 - 3	4/4/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-31	1 - 3	4/5/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-33	1 - 3	4/4/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
FC-40	1 - 3	4/5/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
MW-58	2 - 3	12/7/93	35000	U	35000	U	35000	UJV	7300	U	35000	U	7300	U
S-64	2 - 3	10/18/90	19000	U	19000	U	19000	U	3930	U	19000	U	3930	U
S-38	2 - 4	11/29/90	1880	U	1880	U	1880	U	390	U	1880	U	390	U
S-39	2 - 4	11/29/90	1680	U	1680	U	1680	U	350	U	1680	U	350	U
S-47	2 - 4	10/19/90	1720	U	1720	U	1720	U	355	U	1720	U	355	U
S-47+	2 - 4	10/19/90	17200	U	17200	U	17200	U	3550	U	17200	U	3550	U
S-49	2 - 4	10/19/90	1700	U	1700	U	1700	U	350	U	1700	U	350	U
S-49+	2 - 4	10/19/90	17000	U	17000	U	17000	U	3510	U	17000	U	3510	U
S-80	2 - 4	10/3/90	8330	U	8330	U	8330	U	1720	U	8330	U	1720	U
S-134	2 - 4	11/8/93	3800	UJV	3800	UJV	3800	UJV	790	UJV	3800	UJV	790	UJV
S-139	3 - 3.1	12/7/93	1600	U	1600	U	1600	UJV	330	U	1600	U	330	U
S-135	3 - 3.5	12/7/93	1700	U	1700	U	1700	UJV	350	U	1700	U	350	U
MW-54	3 - 5	11/29/93	37000	U	37000	U	37000	UJV	7600	U	37000	U	7600	U
S-129	3 - 5	11/29/93	2000	U	2000	U	2000	U	410	U	2000	U	410	U
S-41A	3.5 - 5.5	11/7/90	18600	U	18600	U	18600	U	3840	U	18600	U	3840	U
MW-25	4 - 6	11/17/90	1740	U	1740	U	1740	U	360	U	1740	U	360	U
S-33	4 - 6	12/13/90	1720	U	1720	U	1720	U	355	U	1720	U	355	U
S-37	4 - 6	12/1/90	1700	U	1700	U	1700	U	350	U	1700	U	350	U
S-60	4 - 6	12/12/90	1650	U	1650	U	1650	U	340	U	1650	U	340	U
S-53	5 - 7	11/18/90	1670	U	1670	U	1670	U	340	U	1670	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2-Nitroaniline		4-Nitroaniline		3-Nitroaniline		Nitrobenzene		4-Nitrophenol		2-Nitrophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	18200	U	18200	U	18200	U	3750	U	18200	U	3750	U
FC-36	8 - 9	4/6/94	1600	U	1600	U	1600	U	330	U	1600	U	330	U
S-35	9 - 10	11/30/90	1840	U	1840	U	1840	U	380	U	1840	U	380	U
MW-26	9 - 11	12/5/90	1670	UR	1670	UR	1670	UR	340	UR	1670	UR	340	UR
MW-26+	9 - 11	12/5/90	1670	UR	1670	UR	1670	UR	340	UR	1670	UR	340	UR
S-62	0 - 2	10/24/90	17800	U	17800	U	17800	U	3670	U	17800	U	3670	U
S-99	0 - 2	1/18/93	910	U	910	U	910	UJ	380	U	910	U	380	U
S-100	0 - 2	1/18/93	910	UJV	910	UJV	910	UJV	380	UJV	910	UJV	380	UJV
S-101	0 - 2	1/18/93	7400	UJV	7400	UJV	7400	UJV	3100	UJV	7400	UJV	3100	UJV
S-101+	0 - 2	1/18/93	7400	UJV	7400	UJV	7400	UJV	3100	UJV	7400	UJV	3100	UJV
S-102	0 - 2	1/18/93	910	UJV	910	UJV	910	UJV	380	UJV	910	UJV	380	UJV
S-102+	0 - 2	1/18/93	910	UJV	910	UJV	910	UJV	380	UJV	910	UJV	380	UJV
S-122	7.5 - 8.5	4/9/94	1800	U	1800	U	1800	U	370	U	1800	U	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds ($\mu g/kg$) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,2'-oxybis(1-Chloropropane)		Pentachlorophenol		Phenanthrene		Phenol		Pyrene		1,2,4-Trichlorobenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	NA		1720	U	234	J	355	U	523		355	U
S-17	0 - 2	10/19/90	NA		2320	U	480	U	480	U	329	J	480	U
S-17+	0 - 2	10/19/90	NA		11600	U	2390	U	2390	U	2390	U	2390	U
S-22	0 - 2	10/17/90	NA		1950	U	406	JV	400	U	1011	JV	400	U
S-22+	0 - 2	10/17/90	NA		9760	U	2010	U	2010	U	1270	J	2010	U
S-30	0 - 2	10/16/90	NA		1780	U	370	U	370	U	370	U	370	U
S-43	0 - 2	11/5/90	NA		18000	U	11900		3710	U	16500		3710	U
S-82	0 - 2	10/16/90	NA		8890	U	1830	U	1830	U	1830	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	NA		1600	U	3400		330	U	330	U	330	U
FC-24P	0.5 - 2.5	4/5/94	NA		1600	U	160	J	330	U	130	J	330	U
S-90	1 - 3	10/1/90	NA		8600	UJV	1770	UJV	1770	UJV	1770	UJV	1770	UJV
FC-18	1 - 3	4/6/94	NA		1600	U	10	J	330	U	17	J	330	U
FC-24	1 - 3	4/5/94	NA		1600	U	240	J	330	U	220	J	330	U
FC-27	1 - 3	4/4/94	NA		1600	U	44	J	330	U	90	J	330	U
FC-31	1 - 3	4/5/94	NA		1600	U	110	J	330	U	140	J	330	U
FC-33	1 - 3	4/4/94	NA		1600	U	690		330	U	590		330	U
FC-40	1 - 3	4/5/94	NA		1600	U	36	J	330	U	92	J	330	U
MW-58	2 - 3	12/7/93	7300	U	7300	U	1500	J	7300	U	1200	J	7300	U
S-64	2 - 3	10/18/90	NA		19000	U	3930	U	3930	U	3930	U	3930	U
S-38	2 - 4	11/29/90	NA		1880	U	390	U	390	U	390	U	390	U
S-39	2 - 4	11/29/90	NA		1680	U	350	U	350	U	350	U	350	U
S-47	2 - 4	10/19/90	NA		1720	U	271	J	355	U	296	J	355	U
S-47+	2 - 4	10/19/90	NA		17200	U	3550	U	3550	U	3550	U	3550	U
S-49	2 - 4	10/19/90	NA		1700	U	350	U	350	U	350	U	350	U
S-49+	2 - 4	10/19/90	NA		17000	U	3510	U	3510	U	3510	U	3510	U
S-80	2 - 4	10/3/90	NA		8330	U	1720	U	1720	U	1720	U	1720	U
S-134	2 - 4	11/8/93	790	UJV	790	UJV	920	JV	790	UJV	2100	JV	790	UJV
S-139	3 - 3.1	12/7/93	330	U	330	U	58	J	330	U	100	J	330	U
S-135	3 - 3.5	12/7/93	350	U	350	U	350	U	350	U	350	U	350	U
MW-54	3 - 5	11/29/93	7600	U	7600	U	4200	J	7600	U	660	J	7600	U
S-129	3 - 5	11/29/93	410	U	410	U	140	J	410	U	130	J	410	U
S-41A	3.5 - 5.5	11/7/90	NA		18600	U	3840	U	3840	U	3840	U	3840	U
MW-25	4 - 6	11/17/90	NA		1740	U	360	U	360	U	360	U	360	U
S-33	4 - 6	12/13/90	NA		1720	U	355	U	355	U	355	U	355	U
S-37	4 - 6	12/1/90	NA		1700	U	350	U	350	U	350	U	350	U
S-60	4 - 6	12/12/90	NA		1650	U	340	U	340	U	340	U	340	U
S-53	5 - 7	11/18/90	NA		1670	U	340	U	340	U	340	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,2'-oxybis(1-Chloropropane)		Pentachlorophenol		Phenanthrene		Phenol		Pyrene		1,2,4-Trichlorobenzene	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	NA		18200	U	3750	U	3750	U	3750	U	3750	U
FC-36	8 - 9	4/6/94	NA		1600	U	11	J	330	U	6	J	330	U
S-35	9 - 10	11/30/90	NA		1840	U	380	U	380	U	380	U	380	U
MW-26	9 - 11	12/5/90	NA		1670	UR	340	UR	340	UR	340	UR	340	UR
MW-26+	9 - 11	12/5/90	NA		1670	UR	340	UR	340	UR	340	UR	340	UR
S-62	0 - 2	10/24/90	NA		17800	U	3670	U	3670	U	3670	U	3670	U
S-99	0 - 2	1/18/93	380	U	910	U	45	J	380	U	77	J	380	U
S-100	0 - 2	1/18/93	380	UJV	910	UJV	1000	JV	380	UJV	380	UJV	380	UJV
S-101	0 - 2	1/18/93	3100	UJV	7400	UJV	3100	JV	3100	UJV	6900	JV	3100	UJV
S-101+	0 - 2	1/18/93	3100	UJV	7400	UJV	3600	JV	3100	UJV	7800	JV	3100	UJV
S-102	0 - 2	1/18/93	380	UJV	910	UJV	680	JV	380	UJV	380	UJV	380	UJV
S-102+	0 - 2	1/18/93	380	UJV	910	UJV	630	JV	380	UJV	710	JV	380	UJV
S-122	7.5 - 8.5	4/9/94	370	U	1800	U	15	J	370	U	39	J	370	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4,5-Trichlorophenol		2,4,6-Trichlorophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-34	0 - 2	11/29/90	1720	U	355	U
S-17	0 - 2	10/19/90	2320	U	480	U
S-17+	0 - 2	10/19/90	11600	U	2390	U
S-22	0 - 2	10/17/90	1950	U	400	U
S-22+	0 - 2	10/17/90	9760	U	2010	U
S-30	0 - 2	10/16/90	1780	U	370	U
S-43	0 - 2	11/5/90	18000	U	3710	U
S-82	0 - 2	10/16/90	8890	U	1830	U
FC-21P	0.5 - 2.5	4/5/94	1600	U	330	U
FC-24P	0.5 - 2.5	4/5/94	1600	U	330	U
S-90	1 - 3	10/1/90	8600	UJV	1770	UJV
FC-18	1 - 3	4/6/94	1600	U	330	U
FC-24	1 - 3	4/5/94	1600	U	330	U
FC-27	1 - 3	4/4/94	1600	U	330	U
FC-31	1 - 3	4/5/94	1600	U	330	U
FC-33	1 - 3	4/4/94	1600	U	330	U
FC-40	1 - 3	4/5/94	1600	U	330	U
MW-58	2 - 3	12/7/93	35000	U	7300	U
S-64	2 - 3	10/18/90	19000	U	3930	U
S-38	2 - 4	11/29/90	1880	U	390	U
S-39	2 - 4	11/29/90	1680	U	350	U
S-47	2 - 4	10/19/90	1720	U	355	U
S-47+	2 - 4	10/19/90	17200	U	3550	U
S-49	2 - 4	10/19/90	1700	U	350	U
S-49+	2 - 4	10/19/90	17000	U	3510	U
S-80	2 - 4	10/3/90	8330	U	1720	U
S-134	2 - 4	11/8/93	3800	UJV	790	UJV
S-139	3 - 3.1	12/7/93	1600	U	330	U
S-135	3 - 3.5	12/7/93	1700	U	350	U
MW-54	3 - 5	11/29/93	37000	U	7600	U
S-129	3 - 5	11/29/93	2000	U	410	U
S-41A	3.5 - 5.5	11/7/90	18600	U	3840	U
MW-25	4 - 6	11/17/90	1740	U	360	U
S-33	4 - 6	12/13/90	1720	U	355	U
S-37	4 - 6	12/1/90	1700	U	350	U
S-60	4 - 6	12/12/90	1650	U	340	U
S-53	5 - 7	11/18/90	1670	U	340	U

Table A-2:

Concentrations of Semivolatile Organic Compounds (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			2,4,5-Trichlorophenol		2,4,6-Trichlorophenol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-61	5 - 7	10/24/90	18200	U	3750	U
FC-36	8 - 9	4/6/94	1600	U	330	U
S-35	9 - 10	11/30/90	1840	U	380	U
MW-26	9 - 11	12/5/90	1670	UR	340	UR
MW-26+	9 - 11	12/5/90	1670	UR	340	UR
S-62	0 - 2	10/24/90	17800	U	3670	U
S-99	0 - 2	1/18/93	910	U	380	U
S-100	0 - 2	1/18/93	910	UJV	380	UJV
S-101	0 - 2	1/18/93	7400	UJV	3100	UJV
S-101+	0 - 2	1/18/93	7400	UJV	3100	UJV
S-102	0 - 2	1/18/93	910	UJV	380	UJV
S-102+	0 - 2	1/18/93	910	UJV	380	UJV
S-122	7.5 - 8.5	4/9/94	1800	U	370	U

U - Indicates that the compound was analyzed for but not detected.

B - Detected in laboratory blank.

J - Estimated concentration.

V - Qualifier added and/or value altered during validation.

R - Declared unusable during data validation.

+ - Indicates reanalysis.

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CMW-20	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CMW-22	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CMW-30	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CMW-31	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CMW-31DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CMW-34	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-01	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-01 DL	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-10	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-16	0 - 2	12/16/93	NA		NA		NA		NA		NA		NA		NA	
CS-22	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-03	3 - 5	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-41A	3.5 - 5.5	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
CS-47	2 - 4	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-49	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-49DL	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-05	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-50	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-50 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-51	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-51 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-53	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-53 DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-59	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	
CS-06	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-61	5 - 7	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-64	2 - 3	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-67	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-06 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-75	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
CS-75DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
CS-76 DL	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-76a	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-77	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	
CS-82	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-83	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-83 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
FC-17	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-18	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-19	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-19P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-20	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-20P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-21	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-21P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-22	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-22P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-23	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-23P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-24	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-24P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-25	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-26	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-27	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-28	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-29	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-30	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-31	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-31P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-32	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-32	5 - 7	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-32P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-33	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-33P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-34	1 - 3	4/4/*94	NA		NA		NA		NA		NA		NA		NA	
FC-34P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-35	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-36	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-36	7 - 9	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-37	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-38	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
FC-38P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-39	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-40	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
MW-13	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA		NA	
MW-16	0 - 2	11/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-16	10 - 12	11/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-17	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
MW-19	0 - 2	12/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-20	0 - 2	12/11/90	NA		NA		NA		NA		NA		NA		NA	
MW-21	0 - 2	12/6/90	NA		NA		NA		NA		NA		NA		NA	
MW-22	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA		NA	
MW-25	4 - 6	11/17/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
MW-26	9 - 11	12/5/90	8	U	8	U	8	U	8	U	8	U	8	U	8	U
MW-30	0 - 2	11/30/90	NA		NA		NA		NA		NA		NA		NA	
MW-31	0 - 2	11/8/90	NA		NA		NA		NA		NA		NA		NA	
MW-34	0 - 2	11/29/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
MW-54	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA		NA	
MW-58	2 - 3	12/7/93	NA		NA		NA		NA		NA		NA		NA	
PD-45	3 - 4	4/7/93	NA		NA		NA		NA		NA		NA		NA	
PD-47	6.5 - 7	4/7/93	NA		NA		NA		NA		NA		NA		NA	
S-01	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-01	2 - 3	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-10	0 - 2	10/16/90	NA		NA		NA		NA		NA		NA		NA	
S-100	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-100 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-101	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-101 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-102	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-103	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
S-103 DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
S-104	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-104 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-105	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-105 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-106	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-106 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-107	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-107 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-108	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-108 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-111	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-111 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-112	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-112 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-113	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-114	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-114 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-115	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-115 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-122	7.5 - 8.5	4/9/94	NA		NA		NA		NA		NA		NA		NA	
S-129	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA		NA	
S-134	2 - 4	11/8/93	NA		NA		NA		NA		NA		NA		NA	
S-135	3 - 3.5	12/7/93	NA		NA		NA		NA		NA		NA		NA	
S-139	3 - 3.1	12/7/93	NA		NA		NA		NA		NA		NA		NA	
S-16	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA		NA	
S-17	0 - 2	10/19/90	12	U	12	U	12	U	12	U	12	U	12	U	12	U
S-02	0 - 2	10/24/90	NA		NA		NA		NA		NA		NA		NA	
S-22	0 - 2	10/17/90	10	U	10	U	10	U	10	U	10	U	10	U	10	U
S-26	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA		NA	
S-03	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-03	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-30	0 - 2	10/16/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-31	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-32	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA		NA	
S-33	4 - 6	12/13/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-34	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA		NA	
S-35	8 - 10	11/30/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-36	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA		NA	
S-37	4 - 6	12/1/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-38	2 - 4	11/29/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-39	2 - 4	11/29/90	8	U	8	U	8	U	8	U	8	U	8	U	8	U
S-04	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-41A	3.5 - 5.5	11/7/90	95	U	95	U	95	U	95	U	95	U	95	U	95	U
S-43	0 - 2	11/5/90	90	U	90	U	90	U	90	U	90	U	90	U	90	U
S-47	2 - 4	10/19/90	85	U	85	U	85	U	85	U	85	U	85	U	85	U
S-49	2 - 4	10/19/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-05	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-50	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-51	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-52	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-53	0 - 2	11/18/90	NA		NA		NA		NA		NA		NA		NA	
S-53	3.5 - 6	11/18/90	NA		NA		NA		NA		NA		NA		NA	
S-53	5 - 7	11/18/90	8	U	8	U	8	U	8	U	8	U	8	U	8	U
S-59	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-06	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA		NA	
S-60	4 - 6	12/12/90	8	U	8	U	8	U	8	U	8	U	8	U	8	U
S-61	5 - 7	10/24/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-62	0 - 2	10/24/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-63	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-64	2 - 3	10/18/90	10	U	10	U	10	U	10	U	10	U	10	U	10	U
S-66	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-67	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA		NA	
S-68	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA		NA	
S-07	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-74	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-75	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-76	0 - 0.7	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-77	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-78	0 - 2	11/26/90	NA		NA		NA		NA		NA		NA		NA	
S-78	8 - 9	12/12/90	NA		NA		NA		NA		NA		NA		NA	
S-08	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-80	2 - 4	10/3/90	8	U	8	U	8	U	8	U	8	U	8	U	8	U
S-82	0 - 2	10/16/90	9	U	9	U	9	U	9	U	9	U	9	U	9	U
S-83	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-84	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-09	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-09	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-90	1 - 3	10/1/90	9	U	9	U	9	U	9	U	485		9	U	9	U

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor epoxide	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-94	2 - 3	10/18/90	NA		NA		NA		NA		NA		NA		NA	
S-99	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
T-21A	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21B	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21C	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21D	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21E	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
SB-05	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-33	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-35	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-34	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	1 - 2	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-04	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-15	4 - 5	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-30	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-18	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-45	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-64	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-71	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-57	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-67	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-16	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-12	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-68	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-61	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CMW-20	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CMW-22	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CMW-30	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CMW-31	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CMW-31DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CMW-34	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-01	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-01 DL	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-10	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-16	0 - 2	12/16/93	NA		NA		NA		NA		NA		NA		NA	
CS-22	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-03	3 - 5	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-41A	3.5 - 5.5	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
CS-47	2 - 4	12/15/93	NA		NA		NA		NA		NA		NA		NA	
CS-49	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-49DL	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-05	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-50	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-50 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-51	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-51 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
CS-53	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-53 DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-59	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	
CS-06	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-61	5 - 7	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-64	2 - 3	2/1/93	NA		NA		NA		NA		NA		NA		NA	
CS-67	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA		NA	
CS-06 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-75	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
CS-75DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
CS-76 DL	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-76a	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA		NA	
CS-77	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	
CS-82	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-83	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
CS-83 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
FC-17	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-18	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-19	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-19P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-20	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-20P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-21	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-21P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-22	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-22P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-23	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-23P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-24	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-24P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-25	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-26	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-27	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-28	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-29	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-30	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-31	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-31P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-32	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-32	5 - 7	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-32P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-33	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-33P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-34	1 - 3	4/4/*94	NA		NA		NA		NA		NA		NA		NA	
FC-34P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA		NA	
FC-35	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-36	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-36	7 - 9	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-37	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-38	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
FC-38P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA		NA	
FC-39	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA		NA	
FC-40	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA		NA	
MW-13	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA		NA	
MW-16	0 - 2	11/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-16	10 - 12	11/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-17	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
MW-19	0 - 2	12/7/90	NA		NA		NA		NA		NA		NA		NA	
MW-20	0 - 2	12/11/90	NA		NA		NA		NA		NA		NA		NA	
MW-21	0 - 2	12/6/90	NA		NA		NA		NA		NA		NA		NA	
MW-22	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA		NA	
MW-25	4 - 6	11/17/90	9	U	17	U	17	UIV	17	U	17	U	17	U	17	U
MW-26	9 - 11	12/5/90	8	U	17	U	17	U	17	U	17	U	17	U	17	U
MW-30	0 - 2	11/30/90	NA		NA		NA		NA		NA		NA		NA	
MW-31	0 - 2	11/8/90	NA		NA		NA		NA		NA		NA		NA	
MW-34	0 - 2	11/29/90	9	U	17	U	17	UIV	17	U	17	U	17	U	17	U
MW-54	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA		NA	
MW-58	2 - 3	12/7/93	NA		NA		NA		NA		NA		NA		NA	
PD-45	3 - 4	4/7/93	NA		NA		NA		NA		NA		NA		NA	
PD-47	6.5 - 7	4/7/93	NA		NA		NA		NA		NA		NA		NA	
S-01	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-01	2 - 3	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-10	0 - 2	10/16/90	NA		NA		NA		NA		NA		NA		NA	
S-100	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-100 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-101	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-101 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-102	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
S-103	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
S-103 DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA		NA	
S-104	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-104 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-105	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-105 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-106	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-106 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-107	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-107 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-108	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-108 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA		NA	
S-111	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-111 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-112	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-112 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-113	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-114	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-114 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-115	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-115 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA		NA	
S-122	7.5 - 8.5	4/9/94	NA		NA		NA		NA		NA		NA		NA	
S-129	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA		NA	
S-134	2 - 4	11/8/93	NA		NA		NA		NA		NA		NA		NA	
S-135	3 - 3.5	12/7/93	NA		NA		NA		NA		NA		NA		NA	
S-139	3 - 3.1	12/7/93	NA		NA		NA		NA		NA		NA		NA	
S-16	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA		NA	
S-17	0 - 2	10/19/90	12	U	23	U	23	UIV	23	U	23	U	23	U	23	U
S-02	0 - 2	10/24/90	NA		NA		NA		NA		NA		NA		NA	
S-22	0 - 2	10/17/90	10	U	20	U	20	UIV	20	U	20	U	20	U	20	U
S-26	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA		NA	
S-03	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-03	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-30	0 - 2	10/16/90	9	U	18	U	18	U	18	U	18	U	18	U	18	U
S-31	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-32	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA		NA	
S-33	4 - 6	12/13/90	9	U	17	U	17	U	17	U	17	U	17	U	17	U
S-34	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA		NA	
S-35	8 - 10	11/30/90	9	U	18	U	18	U	18	U	18	U	18	U	NA	
S-36	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA		18	U
S-37	4 - 6	12/1/90	9	U	17	U	17	U	17	U	17	U	NA		NA	
S-38	2 - 4	11/29/90	9	U	19	UIV	19	U	19	U	17	U	17	U	17	U
S-39	2 - 4	11/29/90	8	U	17	U	17	U	17	U	19	U	19	U	19	UIV
S-04	0 - 2	10/10/90	NA		NA		NA		NA		17	U	17	U	17	U
											NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-41A	3.5 - 5.5	11/7/90	95	U	190	U	190	U	190	U	190	U	190	U	190	U
S-43	0 - 2	11/5/90	90	U	180	U	180	U	180	U	180	U	180	U	180	U
S-47	2 - 4	10/19/90	85	U	170	U	170	UIV	170	U	170	U	170	U	170	UIV
S-49	2 - 4	10/19/90	9	U	17	U	17	UIV	17	U	17	U	17	U	17	UIV
S-05	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-50	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-51	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-52	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA		NA	
S-53	0 - 2	11/18/90	NA		NA		NA		NA		NA		NA		NA	
S-53	3.5 - 6	11/18/90	NA		NA		NA		NA		NA		NA		NA	
S-53	5 - 7	11/18/90	8	U	17	U	17	UIV	17	U	17	U	17	U	17	U
S-59	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-06	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA		NA	
S-60	4 - 6	12/12/90	8	U	16	U	16	U	16	U	16	U	16	U	16	U
S-61	5 - 7	10/24/90	9	U	18	U	18	U	18	U	18	U	18	U	18	U
S-62	0 - 2	10/24/90	9	U	18	U	18	U	18	U	18	U	18	U	18	U
S-63	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-64	2 - 3	10/18/90	10	U	19	U	19	UIV	19	U	19	U	19	U	19	U
S-66	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-67	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA		NA	
S-68	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA		NA	
S-07	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-74	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-75	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-76	0 - 0.7	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-77	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA		NA	
S-78	0 - 2	11/26/90	NA		NA		NA		NA		NA		NA		NA	
S-78	8 - 9	12/12/90	NA		NA		NA		NA		NA		NA		NA	
S-08	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA		NA	
S-80	2 - 4	10/3/90	8	U	17	U	17	U	17	U	17	U	17	U	17	U
S-82	0 - 2	10/16/90	9	U	18	U	18	U	18	UIV	18	U	18	U	18	U
S-83	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-84	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA		NA	
S-09	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-09	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA		NA	
S-90	1 - 3	10/1/90	9	U	1521		17	UIV	1422		17	U	17	U	17	U

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-94	2 - 3	10/18/90	NA		NA		NA		NA		NA		NA		NA	
S-99	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
T-21A	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21B	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21C	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21D	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
T-21E	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA		NA	
SB-05	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-33	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-35	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-34	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	1 - 2	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-04	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-15	4 - 5	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-30	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-48	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-18	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-45	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-64	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-71	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-57	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-67	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-16	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-12	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-68	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	
SB-61	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CMW-20	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA	
CMW-22	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA	
CMW-30	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA	
CMW-31	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA	
CMW-31DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA	
CMW-34	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA	
CS-01	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA	
CS-01 DL	0 - 2	1/26/93	NA		NA		NA		NA		NA		NA	
CS-10	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA	
CS-16	0 - 2	12/16/93	NA		NA		NA		NA		NA		NA	
CS-22	0 - 2	12/15/93	NA		NA		NA		NA		NA		NA	
CS-03	3 - 5	11/8/93	NA		NA		NA		NA		NA		NA	
CS-41A	3.5 - 5.5	12/15/93	NA		NA		NA		NA		NA		NA	
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
CS-47	2 - 4	12/15/93	NA		NA		NA		NA		NA		NA	
CS-49	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA	
CS-49DL	2 - 4	2/1/93	NA		NA		NA		NA		NA		NA	
CS-05	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA	
CS-50	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
CS-50 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
CS-51	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
CS-51 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
CS-53	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA	
CS-53 DL	0 - 2	2/1/93	NA		NA		NA		NA		NA		NA	
CS-59	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA	
CS-06	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
CS-61	5 - 7	11/8/93	NA		NA		NA		NA		NA		NA	
CS-64	2 - 3	2/1/93	NA		NA		NA		NA		NA		NA	
CS-67	0 - 2	11/8/93	NA		NA		NA		NA		NA		NA	
CS-06 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
CS-75	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA	
CS-75DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA	
CS-76 DL	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA	
CS-76a	0 - 0.5	1/26/93	NA		NA		NA		NA		NA		NA	
CS-77	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA	
CS-82	0 - 2	11/9/93	NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-83	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
CS-83 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
FC-17	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-18	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-19	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-19P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA	
FC-20	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-20P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA	
FC-21	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
FC-21P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA	
FC-22	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
FC-22P	0.5 - 2.5	4/6/94	NA		NA		NA		NA		NA		NA	
FC-23	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
FC-23P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA	
FC-24	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
FC-24P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA	
FC-25	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-26	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-27	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-28	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-29	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-30	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-31	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
FC-31P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA	
FC-32	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-32	5 - 7	4/4/94	NA		NA		NA		NA		NA		NA	
FC-32P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA	
FC-33	1 - 3	4/4/94	NA		NA		NA		NA		NA		NA	
FC-33P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA	
FC-34	1 - 3	4/4/*94	NA		NA		NA		NA		NA		NA	
FC-34P	0.5 - 2.5	4/4/94	NA		NA		NA		NA		NA		NA	
FC-35	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-36	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-36	7 - 9	4/6/94	NA		NA		NA		NA		NA		NA	
FC-37	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-38	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
FC-38P	0.5 - 2.5	4/5/94	NA		NA		NA		NA		NA		NA	
FC-39	1 - 3	4/6/94	NA		NA		NA		NA		NA		NA	
FC-40	1 - 3	4/5/94	NA		NA		NA		NA		NA		NA	
MW-13	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA	
MW-16	0 - 2	11/7/90	NA		NA		NA		NA		NA		NA	
MW-16	10 - 12	11/7/90	NA		NA		NA		NA		NA		NA	
MW-17	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA	
MW-19	0 - 2	12/7/90	NA		NA		NA		NA		NA		NA	
MW-20	0 - 2	12/11/90	NA		NA		NA		NA		NA		NA	
MW-21	0 - 2	12/6/90	NA		NA		NA		NA		NA		NA	
MW-22	0 - 2	10/20/90	NA		NA		NA		NA		NA		NA	
MW-25	4 - 6	11/17/90	17	UIV	17	U	85	U	9	U	9	U	175	U
MW-26	9 - 11	12/5/90	17	U	17	U	85	U	8	U	8	U	170	U
MW-30	0 - 2	11/30/90	NA		NA		NA		NA		NA		NA	
MW-31	0 - 2	11/8/90	NA		NA		NA		NA		NA		NA	
MW-34	0 - 2	11/29/90	17	UIV	17	U	85	U	9	U	9	U	170	U
MW-54	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA	
MW-58	2 - 3	12/7/93	NA		NA		NA		NA		NA		NA	
PD-45	3 - 4	4/7/93	NA		NA		NA		NA		NA		NA	
PD-47	6.5 - 7	4/7/93	NA		NA		NA		NA		NA		NA	
S-01	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA	
S-01	2 - 3	10/26/90	NA		NA		NA		NA		NA		NA	
S-10	0 - 2	10/16/90	NA		NA		NA		NA		NA		NA	
S-100	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
S-100 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
S-101	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
S-101 DL	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
S-102	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
S-103	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA	
S-103 DL	0 - 2	1/19/93	NA		NA		NA		NA		NA		NA	
S-104	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-104 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-105	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-105 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-106	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-106 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-107	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-107 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-108	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-108 DL	0 - 2	1/25/93	NA		NA		NA		NA		NA		NA	
S-111	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-111 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-112	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-112 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-113	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-114	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-114 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-115	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-115 DL	0 - 2	1/20/93	NA		NA		NA		NA		NA		NA	
S-122	7.5 - 8.5	4/9/94	NA		NA		NA		NA		NA		NA	
S-129	3 - 5	11/29/93	NA		NA		NA		NA		NA		NA	
S-134	2 - 4	11/8/93	NA		NA		NA		NA		NA		NA	
S-135	3 - 3.5	12/7/93	NA		NA		NA		NA		NA		NA	
S-139	3 - 3.1	12/7/93	NA		NA		NA		NA		NA		NA	
S-16	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA	
S-17	0 - 2	10/19/90	23	UIV	23	U	115	U	12	U	12	U	230	U
S-02	0 - 2	10/24/90	NA		NA		NA		NA		NA		NA	
S-22	0 - 2	10/17/90	20	UIV	20	U	100	U	10	U	10	U	200	U
S-26	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA	
S-03	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA	
S-03	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA	
S-30	0 - 2	10/16/90	18	U	18	U	90	U	9	U	9	U	180	U
S-31	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA	
S-32	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA	
S-33	4 - 6	12/13/90	17	U	17	U	85	U	9	U	9	U	170	U
S-34	0 - 2	11/17/90	NA		NA		NA		NA		NA		NA	
S-35	8 - 10	11/30/90	18	U	18	U	90	U	9	U	9	U	185	U
S-36	0 - 2	12/1/90	NA		NA		NA		NA		NA		NA	
S-37	4 - 6	12/1/90	17	U	17	U	85	U	9	U	9	U	170	U
S-38	2 - 4	11/29/90	19	U	19	U	95	U	9	U	9	U	190	U
S-39	2 - 4	11/29/90	17	U	17	U	85	U	8	U	8	U	170	U
S-04	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-41A	3.5 - 5.5	11/7/90	190	U	190	U	930	U	95	U	95	U	1860	U
S-43	0 - 2	11/5/90	180	U	180	U	900	U	90	U	90	U	1800	U
S-47	2 - 4	10/19/90	170	U	170	U	860	U	85	U	85	U	1720	U
S-49	2 - 4	10/19/90	17	U	17	U	85	U	9	U	9	U	170	U
S-05	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA	
S-50	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA	
S-51	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA	
S-52	0 - 2	11/10/90	NA		NA		NA		NA		NA		NA	
S-53	0 - 2	11/18/90	NA		NA		NA		NA		NA		NA	
S-53	3.5 - 6	11/18/90	NA		NA		NA		NA		NA		NA	
S-53	5 - 7	11/18/90	17	UIV	17	U	85	U	8	U	8	U	165	U
S-59	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA	
S-06	0 - 2	11/11/90	NA		NA		NA		NA		NA		NA	
S-60	4 - 6	12/12/90	16	U	16	U	80	U	8	U	8	U	165	U
S-61	5 - 7	10/24/90	18	U	18	U	90	U	9	U	9	U	180	U
S-62	0 - 2	10/24/90	18	U	18	U	90	U	9	U	9	U	180	U
S-63	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA	
S-64	2 - 3	10/18/90	19	UIV	19	U	95	U	10	U	10	U	190	U
S-66	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA	
S-67	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA	
S-68	0 - 2	10/27/90	NA		NA		NA		NA		NA		NA	
S-07	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA	
S-74	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA	
S-75	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA	
S-76	0 - 0.7	10/25/90	NA		NA		NA		NA		NA		NA	
S-77	0 - 2	10/8/90	NA		NA		NA		NA		NA		NA	
S-78	0 - 2	11/26/90	NA		NA		NA		NA		NA		NA	
S-78	8 - 9	12/12/90	NA		NA		NA		NA		NA		NA	
S-08	0 - 2	10/25/90	NA		NA		NA		NA		NA		NA	
S-80	2 - 4	10/3/90	17	U	17	U	85	U	8	U	8	U	170	U
S-82	0 - 2	10/16/90	18	U	18	UIV	90	U	9	U	9	U	180	U
S-83	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA	
S-84	0 - 2	10/17/90	NA		NA		NA		NA		NA		NA	
S-09	0 - 2	10/10/90	NA		NA		NA		NA		NA		NA	
S-09	3 - 5	10/10/90	NA		NA		NA		NA		NA		NA	
S-90	1 - 3	10/1/90	17	UIV	17	U	85	U	9	U	9	U	170	U

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			4,4'-DDT		Endrin ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-94	2 - 3	10/18/90	NA		NA		NA		NA		NA		NA	
S-99	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA	
T-21A	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA	
T-21B	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA	
T-21C	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA	
T-21D	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA	
T-21E	0 - 0.5	3/2/92	NA		NA		NA		NA		NA		NA	
SB-05	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-33	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-35	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-34	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-48	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA	
SB-48	1 - 2	8 / 94	NA		NA		NA		NA		NA		NA	
SB-04	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-15	4 - 5	8 / 94	NA		NA		NA		NA		NA		NA	
SB-30	2 - 3	8 / 94	NA		NA		NA		NA		NA		NA	
SB-48	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-18	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-45	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-64	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-71	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-57	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-67	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-16	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA	
SB-12	6 - 7	8 / 94	NA		NA		NA		NA		NA		NA	
SB-68	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	
SB-61	0 - 1	8 / 94	NA		NA		NA		NA		NA		NA	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CMW-20	0 - 2	11/8/93	200	U	200	U	200	U	200	U	200	U	190	J	360	J
CMW-22	0 - 2	11/8/93	200	U	200	U	200	U	200	U	200	U	400	J	1,100	
CMW-30	0 - 2	12/15/93	190	U	190	U	190	U	190	U	190	U	300	J	310	J
CMW-31	0 - 2	2/1/93	400	U	810	U	400	U	400	U	400	U	400	U	8,400	BC
CMW-31DL	0 - 2	2/1/93	4,000	U	8,200	U	4,000	U	4,000	U	4,000	U	4,000	U	10,000	D
CMW-34	0 - 2	12/15/93	180	U	180	U	180	U	180	U	180	U	3.5	J	360	U
CS-01	0 - 2	1/26/93	390	U	790	U	390	U	390	U	700	P	390	U	7,400	P
CS-01 DL	0 - 2	1/26/93	3,900	U	7,900	U	3,900	U	3,900	U	3,900	U	3,900	U	8,600	PD
CS-10	0 - 2	11/8/93	180	U	180	U	180	U	180	U	180	U	360	U	370	
CS-16	0 - 2	12/16/93	210	U	210	U	210	U	210	U	210	U	790		1600	
CS-22	0 - 2	12/15/93	170	U	170	U	170	U	170	U	170	U	7.3	J	16	J
CS-03	3 - 5	11/8/93	210	U	210	U	210	U	210	U	210	U	850		1,400	
CS-41A	3.5 - 5.5	12/15/93	170	U	170	U	170	U	170	U	170	U	320	U	42	J
CS-43	0 - 2	1/18/93	400	U	820	U	400	U	400	U	400	U	400	U	1400	P
CS-47	2 - 4	12/15/93	8,600	U	8,600	U	8,600	U	8,600	U	8,600	U	29,000		20,000	
CS-49	2 - 4	2/1/93	380	U	760	U	380	U	380	U	380	U	380	U	14,000	BCP
CS-49DL	2 - 4	2/1/93	3,800	U	7,600	U	3,800	U	3,800	U	3,800	U	3,800	U	17,000	PD
CS-05	0 - 2	11/8/93	190	U	190	U	190	U	190	U	190	U	440		1,700	
CS-50	0 - 2	1/20/93	38	U	77	U	38	U	38	U	38	U	38	U	250	P
CS-50 DL	0 - 2	1/20/93	380	U	770	U	380	U	380	U	380	U	380	U	270	JPD
CS-51	0 - 2	1/20/93	38	U	77	U	38	U	38	U	38	U	38	U	1100	P
CS-51 DL	0 - 2	1/20/93	380	U	770	U	380	U	380	U	380	U	380	U	1,100	JPD
CS-53	0 - 2	2/1/93	3,800	U	7,600	U	3,800	U	3,800	U	3,800	U	3,800	U	150,000	BCP
CS-53 DL	0 - 2	2/1/93	38,000	U	76,000	U	38,000	U	38,000	U	38,000	U	38,000	U	88,000	PD
CS-59	0 - 2	11/9/93	170	U	170	U	170	U	170	U	170	U	35	J	200	J
CS-06	0 - 2	1/25/93	4,000	U	8,000	U	4,000	U	4,000	U	4,000	U	4,000	U	44,000	PC
CS-61	5 - 7	11/8/93	200	UJ	200	UJ	200	UJ	200	UJ	200	UJ	400	U	97	J
CS-64	2 - 3	2/1/93	400	U	820	U	400	U	400	U	400	U	400	U	1,500	J
CS-67	0 - 2	11/8/93	190	U	190	U	190	U	190	U	190	U	380	U	430	
CS-06 DL	0 - 2	1/25/93	40,000	U	81,000	U	40,000	U	40,000	U	40,000	U	40,000	U	62,000	PD
CS-75	0 - 2	1/19/93	370	U	740	U	370	U	370	U	370	U	370	U	3,600	CP
CS-75DL	0 - 2	1/19/93	3,700	U	7,400	U	3,700	U	3,700	U	3,700	U	3,700	U	6,900	PD
CS-76 DL	0 - 0.5	1/26/93	38,000	U	76,000	U	38,000	U	38,000	U	38,000	U	38,000	U	73,000	D
CS-76a	0 - 0.5	1/26/93	3,800	U	7,600	U	3,800	U	3,800	U	2,900	JP	3,800	U	36,000	
CS-77	0 - 2	11/9/93	180	U	180	U	180	U	180	U	180	U	370		550	
CS-82	0 - 2	11/9/93	920	U	920	U	920	U	920	U	920	U	4,100		4,600	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-83	0 - 2	1/25/93	360	U	730	U	360	U	360	U	360	U	360	U	3,100	PC
CS-83 DL	0 - 2	1/25/93	3,600	U	7,300	U	3,600	U	3,600	U	3,600	U	3,600	U	4,400	D
FC-17	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-18	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-19	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-19P	0.5 - 2.5	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-20	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-20P	0.5 - 2.5	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-21	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-21P	0.5 - 2.5	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-22	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-22P	0.5 - 2.5	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-23	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-23P	0.5 - 2.5	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-24	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-24P	0.5 - 2.5	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-25	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-26	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	24	J
FC-27	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	38	
FC-28	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	42	
FC-29	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-30	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-31	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-31P	0.5 - 2.5	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-32	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-32	5 - 7	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-32P	0.5 - 2.5	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-33	1 - 3	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-33P	0.5 - 2.5	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-34	1 - 3	4/4/*94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-34P	0.5 - 2.5	4/4/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-35	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-36	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-36	7 - 9	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-37	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-38	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
FC-38P	0.5 - 2.5	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-39	1 - 3	4/6/94	33	U	67	U	33	U	33	U	33	U	33	U	33	U
FC-40	1 - 3	4/5/94	33	U	67	U	33	U	33	U	33	U	33	U	56	
MW-13	0 - 2	10/20/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-16	0 - 2	11/7/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-16	10 - 12	11/7/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-17	0 - 2	10/26/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-19	0 - 2	12/7/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-20	0 - 2	12/11/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-21	0 - 2	12/6/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-22	0 - 2	10/20/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-25	4 - 6	11/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-26	9 - 11	12/5/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-30	0 - 2	11/30/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-31	0 - 2	11/8/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-34	0 - 2	11/29/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-54	3 - 5	11/29/93	180	UJV	180	UJV	180	UJV	180	UJV	140	J	320	UJV	33	J
MW-58	2 - 3	12/7/93	88	U	88	U	88	U	88	U	100		340	JV	290	JV
PD-45	3 - 4	4/7/93	88	U	88	U	88	U	88	U	88	U	176	U	14	J
PD-47	6.5 - 7	4/7/93	88	U	88	U	88	U	140		88	U	390		270	
S-01	0 - 2	10/26/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-01	2 - 3	10/26/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-10	0 - 2	10/16/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-100	0 - 2	1/18/93	380	U	760	U	380	U	380	U	380	U	380	U	5400	P
S-100 DL	0 - 2	1/18/93	3,800	U	7,600	U	3,800	U	3,800	U	3,800	U	3,800	U	4,100	PD
S-101	0 - 2	1/18/93	3,800	U	7,800	U	3,800	U	3,800	U	3,800	U	3,800	U	58,000	P
S-101 DL	0 - 2	1/18/93	38,000	U	78,000	U	38,000	U	38,000	U	38,000	U	38,000	U	71,000	PD
S-102	0 - 2	1/18/93	380	U	760	U	380	U	380	U	380	U	380	U	1,400	PV
S-103	0 - 2	1/19/93	3,600	U	7,400	U	3,600	U	3,600	U	3,600	U	3,600	U	40,000	P
S-103 DL	0 - 2	1/19/93	36,000	U	74,000	U	36,000	U	36,000	U	36,000	U	36,000	U	65,000	PD
S-104	0 - 2	1/25/93	37,000	U	74,000	U	37,000	U	37,000	U	37,000	U	37,000	U	820,000	P
S-104 DL	0 - 2	1/25/93	370,000	U	740,000	U	370,000	U	370,000	U	370,000	U	370,000	U	860,000	PD
S-105	0 - 2	1/25/93	390,000	U	790,000	U	390,000	U	390,000	U	390,000	U	390,000	U	13,000,000	P
S-105 DL	0 - 2	1/25/93	3,900,000	U	7,900,000	U	3,900,000	U	3,900,000	U	3,900,000	U	3,900,000	U	15,000,000	PD
S-106	0 - 2	1/25/93	380,000	U	760,000	U	380,000	U	380,000	U	380,000	U	380,000	U	16,000,000	
S-106 DL	0 - 2	1/25/93	3,800,000	U	7,600,000	U	3,800,000	U	3,800,000	U	3,800,000	U	3,800,000	U	20,000,000	D

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-107	0 - 2	1/25/93	3,900	U	8,000	U	3,900	U	3,900	U	3,900	U	3,900	U	51,000	P
S-107 DL	0 - 2	1/25/93	39,000	U	80,000	U	39,000	U	39,000	U	39,000	U	39,000	U	63,000	PD
S-108	0 - 2	1/25/93	380	U	780	U	380	U	380	U	380	U	380	U	5,900	P
S-108 DL	0 - 2	1/25/93	3,800	U	7,800	U	3,800	U	3,800	U	3,800	U	3,800	U	5,600	PD
S-111	0 - 2	1/20/93	39	U	79	U	39	U	39	U	39	U	39	U	1,300	
S-111 DL	0 - 2	1/20/93	390	U	790	U	390	U	390	U	390	U	390	U	1,500	PD
S-112	0 - 2	1/20/93	38	U	78	U	38	U	38	U	38	U	38	U	1,600	P
S-112 DL	0 - 2	1/20/93	380	U	780	U	380	U	380	U	380	U	380	U	1,700	PD
S-113	0 - 2	1/20/93	380	U	760	U	380	U	380	U	380	U	380	U	3,100	JV
S-114	0 - 2	1/20/93	3,600	U	7,200	U	3,600	U	3,600	U	3,600	U	3,600	U	120,000	P
S-114 DL	0 - 2	1/20/93	35,000	U	72,000	U	35,000	U	35,000	U	35,000	U	35,000	U	90,000	PD
S-115	0 - 2	1/20/93	38	U	76	U	38	U	38	U	38	U	38	U	480	P
S-115 DL	0 - 2	1/20/93	380	U	760	U	380	U	380	U	380	U	380	U	590	PD
S-122	7.5 - 8.5	4/9/94	91	U	91	U	91	U	91	U	91	U	180	U	37	J
S-129	3 - 5	11/29/93	200	UJV	200	UJV	200	UJV	200	UJV	200	UJV	400	UJV	190	J
S-134	2 - 4	11/8/93	100	U	100	U	100	U	100	U	100	U	110	J	390	
S-135	3 - 3.5	12/7/93	170	U	170	U	170	U	170	U	170	U	12	J	340	U
S-139	3 - 3.1	12/7/93	160	U	160	U	160	U	160	U	160	U	320	U	140	J
S-16	0 - 2	11/11/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-17	0 - 2	10/19/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-02	0 - 2	10/24/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-22	0 - 2	10/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-26	0 - 2	11/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-03	0 - 2	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-03	3 - 5	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-30	0 - 2	10/16/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-31	0 - 2	10/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-32	0 - 2	12/1/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-33	4 - 6	12/13/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-34	0 - 2	11/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-35	8 - 10	11/30/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-36	0 - 2	12/1/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-37	4 - 6	12/1/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-38	2 - 4	11/29/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-39	2 - 4	11/29/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-04	0 - 2	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-41A	3.5 - 5.5	11/7/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-43	0 - 2	11/5/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-47	2 - 4	10/19/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-49	2 - 4	10/19/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-05	0 - 2	10/26/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-50	0 - 2	11/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-51	0 - 2	11/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-52	0 - 2	11/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-53	0 - 2	11/18/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-53	3.5 - 6	11/18/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-53	5 - 7	11/18/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-59	0 - 2	10/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-06	0 - 2	11/11/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-60	4 - 6	12/12/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-61	5 - 7	10/24/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-62	0 - 2	10/24/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-63	0 - 2	10/25/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-64	2 - 3	10/18/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-66	3 - 5	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-67	0 - 2	10/27/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-68	0 - 2	10/27/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-07	0 - 2	10/25/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-74	0 - 2	10/8/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-75	0 - 2	10/8/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-76	0 - 0.7	10/25/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-77	0 - 2	10/8/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-78	0 - 2	11/26/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-78	8 - 9	12/12/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-08	0 - 2	10/25/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-80	2 - 4	10/3/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-82	0 - 2	10/16/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-83	0 - 2	10/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-84	0 - 2	10/17/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-09	0 - 2	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-09	3 - 5	10/10/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-90	1 - 3	10/1/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	

Table A-3:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Sample Depth (ft.	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-94	2 - 3	10/18/90	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
S-99	0 - 2	1/18/93	38	U	76	U	38	U	38	U	38	U	38	U	120	P
T-21A	0 - 0.5	3/2/92	86	U	86	U	86	U	86	U	88		170	U	130	J
T-21B	0 - 0.5	3/2/92	170	U	170	U	170	U	170	U	170	U	340	U	640	
T-21C	0 - 0.5	3/2/92	85	U	85	U	85	U	85	U	85	U	170	U	480	
T-21D	0 - 0.5	3/2/92	460	U	460	U	460	U	460	U	460	U	920	U	2300	
T-21E	0 - 0.5	3/2/92	450	U	450	U	450	U	450	U	450	U	450	U	2400	
SB-05	0 - 1	8 / 94	460	U	460	U	460	U	460	U	460	U	930	U	2700	
SB-33	0 - 1	8 / 94	440	U	440	U	440	U	440	U	440	U	880	U	2600	
SB-35	0 - 1	8 / 94	500	U	500	U	500	U	500	U	500	U	990	U	3800	
SB-34	0 - 1	8 / 94	460	U	460	U	460	U	460	U	930	U	2500		2500	
SB-48	2 - 3	8 / 94	430	U	430	U	430	U	430	U	860	U	2000		1300	
SB-48	1 - 2	8 / 94	450	U	450	U	450	U	450	U	900	U	6000		3900	
SB-04	0 - 1	8 / 94	2000	U	2000	U	2000	U	2000	U	2000	U	4000	U	28000	
SB-15	4 - 5	8 / 94	80	U	80	U	80	U	80	U	80	U	160	U	110	J
SB-30	2 - 3	8 / 94	88	U	88	U	88	U	88	U	88	U	180	U	600	
SB-48	0 - 1	8 / 94	1900	U	1900	U	1900	U	1900	U	1900	U	3800	U	24000	
SB-18	0 - 1	8 / 94	490000	U	490000	U	490000	U	490000	U	490000	U	980000	U	2900000	
SB-45	0 - 1	8 / 94	54000	U	54000	U	54000	U	54000	U	54000	U	810000		250000	
SB-64	0 - 1	8 / 94	17000	U	34000	U	17000	U	17000	U	17000	U	17000	U	130000	
SB-71	0 - 1	8 / 94	33000	U	67000	U	33000	U	33000	U	33000	U	33000	U	680000	
SB-57	0 - 1	8 / 94	3300	U	6700	U	3300	U	3300	U	3300	U	3300	U	6400	
SB-67	0 - 1	8 / 94	3300000	U	6700000	U	3300000	U	3300000	U	3300000	U	3300000	U	9700000	
SB-16	6 - 7	8 / 94	33000	U	67000	U	33000	U	33000	U	33000	U	33000	U	380000	
SB-12	6 - 7	8 / 94	6600	U	13000	U	6600	U	6600	U	6600	U	6600	U	29000	
SB-68	0 - 1	8 / 94	4100000	U	8200000	U	4100000	U	4100000	U	4100000	U	4100000	U	31000000	
SB-61	0 - 1	8 / 94	17000	U	34000	U	17000	U	17000	U	17000	U	17000	U	200000	

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.	Sample		Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Calcium	
Location	Depth (ft.)	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA	
MW-19	0 - 2	12/8/90	NA		NA		NA		NA		NA		NA		NA	
MW-20	0 - 2	12/13/90	NA		NA		NA		NA		NA		NA		NA	
MW-21	0 - 2	12/8/90	NA		NA		NA		NA		NA		NA		NA	
MW-31	0 - 2	11/9/90	NA		NA		NA		NA		NA		NA		NA	
MW-34	0 - 2	11/30/90	2990		1.9	BN	7.7	S	43		<0.34		1.3		702	B
S-2	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA	
S-10	0 - 2	10/18/90	NA		NA		NA		NA		NA		NA		NA	
S-17	0 - 2	10/20/90	4430	N	<2.2	N	20		85	*	0.57	B	<0.94	*	1030	B
S-22	0 - 2	10/18/90	2220	N	3.5	BN	26		81	*	<0.37		<0.77	*	468	B
S-26	0 - 2	11/19/90	NA		NA		NA		NA		NA		NA		NA	
S-30	0 - 2	10/18/90	3950	N	2.4	BN	<1.2		23	B*	<0.36		<0.73	*	6850	
S-32	0 - 2	12/6/90	NA		NA		NA		NA		NA		NA		NA	
S-34	0 - 2	11/19/90	NA		NA		NA		NA		NA		NA		NA	
S-36	0 - 2	12/3/90	NA		NA		NA		NA		NA		NA		NA	
S-43	0 - 2	11/5/90	6170	N	3.5	BN	7.1		444	*	0.44	B	<1.1	*	6260	
S-62	0 - 2	10/26/90	4090	N	<1.7	N	3.1		43	B*	<0.36		<0.74	*	751	B
S-82	0 - 2	10/18/90	3410	N	<1.7	N	6.9		47	*	<0.35		<0.73	*	954	B
S-99	0 - 2	1/18/93	9370		4.2	U	16.8		50.6		0.22	B	0.40	U	920	B
S-100	0 - 2	1/18/93	8330		4.3	U	7.7		84.8		0.20	U	1.6		5900	
S-101	0 - 2	1/18/93	4050		4.3	U	25.0		154		0.21	U	9.2		8680	
S-102	0 - 2	1/18/93	3020		10.7	B	21.2		74.5		0.20	U	1.4		1630	
FC-21P	0.5 - 2.5	4/5/94	4360		8.9	UJV	1.1	J	29.2	B	0.23	B	0.45	U	12700	
FC-24P	0.5 - 2.5	4/5/94	4160		8.8	UJV	0.22	U	27.0	B	0.22	U	0.44	U	1070	
FC-18	1 - 3	4/6/94	3430	U	24.8	UJV	2.1	U	82.8	U	2.10	U	2.1	U	2430	
FC-24	1 - 3	4/5/94	3720		9.5	UJV	0.24	U	20.6	B	0.44	B	0.48	U	1010	
FC-27	1 - 3	4/4/94	2800		27.5	UJV	2.3	J	94.2		2.3	U	2.3	U	9220	
FC-31	1 - 3	4/5/94	5340		7.9	UJV	3.7	J	28.5	B	0.31	B	0.39	U	983	
FC-33	1 - 3	4/4/94	4320		9.5	UJV	2.4	J	36.5	B	0.24	U	0.48	U	5360	
FC-40	1 - 3	4/5/94	2870		8.8	U	1.3	J	47.1	B	0.26	B	0.64	B	942	
S-90	1 - 3	10/3/90	4530	N	<1.7	N	3.3		296	*	<0.35		1.3	*M	1890	
MW-58	2 - 3	12/7/93	4050		5.0	U	3.8	BS	68.0	JV	0.31	B	2.5		817	B
S-64	2 - 3	10/19/90	3000	N	4.8	BN	8.1		97	*	<0.38		2.1	*	1610	
S-134	2 - 4	11/8/93	6270		4.9	JV	8.9		83.5		0.23	U	3.7		2060	
S-38	2 - 4	11/30/90	11100		<1.8	N	1.1	BW	44	B	<0.38		<1.2		442	B
S-39	2 - 4	11/30/90	2840		<1.6	N	1.6	B	31	B	<0.34		<1.1		1250	

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D. Location	Sample Depth (ft.)	Date	Aluminum Conc.	Aluminum Lab. Qual.	Antimony Conc.	Antimony Lab. Qual.	Arsenic Conc.	Arsenic Lab. Qual.	Barium Conc.	Barium Lab. Qual.	Beryllium Conc.	Beryllium Lab. Qual.	Cadmium Conc.	Cadmium Lab. Qual.	Calcium Conc.	Calcium Lab. Qual.
S-47	2 - 4	10/20/90	4470	N	<1.6	N	11		70	*	0.43	B	<0.71	*	18100	
S-49	2 - 4	10/20/90	4620	N	<1.6	N	2.7		31	B*	<0.34		<0.71	*	2170	
S-80	2 - 4	10/5/90	5300	N	<1.6	N	2.7		41	B*	<0.33		<0.68	*	1200	
S-139	3 - 3.1	12/7/93	4430		5.1	U	2.5		52.0	JV	0.24	U	0.49	U	549	B
S-135	3 - 3.5	12/7/93	1910		4.5	U	0.37	B	30.3	JV	0.21	U	0.43	U	402	B
MW-54	3 - 5	11/29/93	1600		4.6	U	1.1	B	34.4	JV	0.22	U	0.43	U	242	B
S-129	3 - 5	11/29/93	2570		4.8	U	4.7		38.6	JV	0.23	U	0.46	U	5890	
S-41A	3.5 - 5.5	11/9/90	4740	N	<1.7	N	2.6		37	B*	<0.37		<1.1	*	1040	B
MW-25	4 - 6	11/19/90	3140	N	<1.6		<0.63		21	B*	<0.34		<1.1	*	425	B
S-33	4 - 6	12/14/90	4580	J	<1.6	JN	0.73	BJ	14	BJ	<0.34		<1.1		4920	J
S-37	4 - 6	12/3/90	3330		<1.7	N	<0.66		33	B	<0.35		<1.1		4170	
S-60	4 - 6	12/13/90	4580	J	<1.6	JN	<0.62	J	28	BJ	<0.33		1.2	BJ	1590	J
S-53	5 - 7	11/21/90	6490		<1.5	N	<0.6		16	B	<0.32		<1.0		2660	
S-61	5 - 7	10/26/90	4970	N	<1.7	N	2.6		418	*	0.46	B	<0.76	*	772	B
FC-36	7 - 9	4/6/94	2030		9.5	U	0.84	J	18.7	B	0.36	B	0.48	U	1510	
S-122	7.5 - 8.5	4/9/94	7000		9.2	U	1.6	B	65.9	B	0.63	B	0.72	B	1850	
S-35	8 - 10	12/1/90	4770		<1.7	N	<0.68	W	32	B	<0.36		<1.1		1400	
MW-26	9 - 11	12/6/90	3010		<1.6	N	<0.6		16	B	<0.34		<1.1		772	B

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.	Sample		Chromium		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury	
Location	Depth (ft.)	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA		22.5	
MW-19	0 - 2	12/8/90	NA		NA		NA		NA		498	J	NA		NA		NA	
MW-20	0 - 2	12/13/90	NA		NA		NA		NA		415	J	NA		NA		NA	
MW-21	0 - 2	12/8/90	NA		NA		NA		NA		<0.4		NA		NA		NA	
MW-31	0 - 2	11/9/90	NA		NA		NA		NA		1290	S	NA		NA		NA	
MW-34	0 - 2	11/30/90	14	N	5.8	B	140		14100		137		1280		130		<0.1	
S-2	0 - 2	10/26/90	NA		NA		NA		NA		332	N*	NA		NA		NA	
S-10	0 - 2	10/18/90	NA		NA		NA		NA		149	N*	NA		NA		NA	
S-17	0 - 2	10/20/90	36	N*	<2.0		244		28600		120	N*	1330	B	175	*	0.9	N
S-22	0 - 2	10/18/90	17	N*	2.3	B	349		27000		162	N*	610	B	142	*	0.38	N
S-26	0 - 2	11/19/90	NA		NA		NA		NA		201	S	NA		NA		NA	
S-30	0 - 2	10/18/90	13	N*	3.1	B	7.8		5610		8.8	N*	1510		165	*	<0.11	N
S-32	0 - 2	12/6/90	NA		NA		NA		NA		339		NA		NA		NA	
S-34	0 - 2	11/19/90	NA		NA		NA		NA		177	S	NA		NA		NA	
S-36	0 - 2	12/3/90	NA		NA		NA		NA		80	S	NA		NA		NA	
S-43	0 - 2	11/5/90	42	N*	13		377		58500	N	605	*	3810		471	*	<0.11	N
S-62	0 - 2	10/26/90	14	N*	2.5	B	76		10100		1080	NS*	1630		314	*	0.31	N
S-82	0 - 2	10/18/90	16	N*	4.0	B	73		17800		73	N*	1500		198	*	0.23	N
S-99	0 - 2	1/18/93	18.8		7.5	B	90.7	JV	21300		61.9		2180		321		0.20	
S-100	0 - 2	1/18/93	23.2		6.7	B	132	JV	21800		251		2510		318		0.49	
S-101	0 - 2	1/18/93	124		12.7		629	JV	91800		1190		2370		667		1.3	
S-102	0 - 2	1/18/93	29.4		6.5	B	344	JV	41800		393		1180		233		0.94	
FC-21P	0.5 - 2.5	4/5/94	7.5		4.1	B	11.7		5790		6.9		1920		230	NJ	0.093	
FC-24P	0.5 - 2.5	4/5/94	20.2		3.0	B	8.8		7610		3.0		1520		130	NJ	0.11	
FC-18	1 - 3	4/6/94	8.8		20.7	U	11.2		6660		4.9		1780		221	NJ	0.10	U
FC-24	1 - 3	4/5/94	15.7		3.0	B	7.4		5390		2.9		1440		47.6	NJ	0.10	
FC-27	1 - 3	4/4/94	9.7		22.9	U	27.8		10900		9.2		4020		198	NJ	0.24	
FC-31	1 - 3	4/5/94	16.8		4.5	B	19.2		9730		11.0		1520		272	NJ	0.086	
FC-33	1 - 3	4/4/94	10.3		3.6	B	13.7		7030		18.2		1280		94.3	NJ	0.10	
FC-40	1 - 3	4/5/94	8.6		3.1	B	22.7		5850		2.9	N	1200		207	NJ	0.13	
S-90	1 - 3	10/3/90	12	N*	4.8	B	57		10600		372	NS*	1670		276	*	0.98	N
MW-58	2 - 3	12/7/93	17.7		6.4	B	406		16900		529	JV	1390		112		0.12	
S-64	2 - 3	10/19/90	19	N*	3.1	B	279		38700		212	N*	1420		445	*	0.29	N
S-134	2 - 4	11/8/93	66.3	JV	5.7	B	168		25200		591		1760		206		0.37	JV
S-38	2 - 4	11/30/90	1.6	R	11	B	54		18900		20	S	2570		342		<0.11	
S-39	2 - 4	11/30/90	6.4	SN	3.4	B	42		7320		9.9		1820		249		<0.1	

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.	Sample		Chromium		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury	
Location	Depth (ft.)	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-47	2 - 4	10/20/90	9.4	N*	4.7	B	41		11200		129	S*N	4280		241	*	0.49	N
S-49	2 - 4	10/20/90	9.6	N*	5.4	B	27		9570		52	S*N	2170		274	*	0.22	N
S-80	2 - 4	10/5/90	15	N*	5.8	B	40		11300		45	NS*	3040		251	*	<0.1	N
S-139	3 - 3.1	12/7/93	11.6		3.4	B	54.2		10400		27.1	JV	1710		121		0.10	U
S-135	3 - 3.5	12/7/93	6.7		1.8	B	21.9		3910		5.4	JV	957	B	89.3		0.10	U
MW-54	3 - 5	11/29/93	5.1		2.5	B	22.0		6810		18.5	JV	802	B	148		0.11	U
S-129	3 - 5	11/29/93	17.0		4.3	B	106		17700		46.9	JV	3980		327		0.10	U
S-41A	3.5 - 5.5	11/9/90	18	N*	4.4	B	22		7400	N	52	*	1660		93	*	<0.11	N
MW-25	4 - 6	11/19/90	10	N*	4.4	B	25		8680	N	3.7	S*	1550		131	*	<0.1	N
S-33	4 - 6	12/14/90	7.5	JN	3.2	BJ	10	J	8190	J	4.0	J	4260	J	199	J	<0.1	
S-37	4 - 6	12/3/90	8.0	N	5.0	B	12		8440		3.3		3470		181		<0.1	
S-60	4 - 6	12/13/90	53	JN	5.4	BJ	53	J	7820	J	4.6	J	2260	J	333	J	0.31	
S-53	5 - 7	11/21/90	5.6	N	2.6	B	4.8	B	5680		1.4		2430		151		<0.1	R
S-61	5 - 7	10/26/90	10	N*S	6.4	B	96		13000		44	S*N	2150		82	*	0.17	N
FC-36	7 - 9	4/6/94	10.2		1.3	B	9.1		3080		11		874		30.6	J	0.10	U
S-122	7.5 - 8.5	4/9/94	16.1		6.6	B	33.7		16900		12.1		3660		624		0.10	U
S-35	8 - 10	12/1/90	8.2	N	3.0	B	12		11200		3.5		2510		224		<0.11	
MW-26	9 - 11	12/6/90	6.5	SN	1.9	B	8.2		5990		2.3		1360		148		<0.1	

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.	Sample		Nickel		Potassium		Selenium		Silver		Sodium		Thallium		Vanadium		Zinc	
Location	Depth (ft.)	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CS-43	0 - 2	1/18/93	NA		NA		NA		NA		NA		NA		NA		NA	
MW-19	0 - 2	12/8/90	NA		NA		NA		NA		NA		NA		NA		NA	
MW-20	0 - 2	12/13/90	NA		NA		NA		NA		NA		NA		NA		NA	
MW-21	0 - 2	12/8/90	NA		NA		NA		NA		NA		NA		NA		NA	
MW-31	0 - 2	11/9/90	NA		NA		NA		NA		NA		NA		NA		NA	
MW-34	0 - 2	11/30/90	8.1	B	448	B	<0.55	NW	<0.53	W	258	B	<0.75		47		149	
S-2	0 - 2	10/26/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-10	0 - 2	10/18/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-17	0 - 2	10/20/90	17		391	B	<0.74	N	<0.66	W	394	B	<0.8		97		95	
S-22	0 - 2	10/18/90	17		350	B	<0.61	NW	0.56	B	301	B	<0.65		75		61	
S-26	0 - 2	11/19/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-30	0 - 2	10/18/90	5.6	B	567	B	<0.58	NW	<0.51		231	B	<0.62		11	B	22	
S-32	0 - 2	12/6/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-34	0 - 2	11/19/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-36	0 - 2	12/3/90	NA		NA		NA		NA		NA		NA		NA		NA	
S-43	0 - 2	11/5/90	54		843	B	<0.57	WN	<0.60	BW	1770		<0.77		28		565	
S-62	0 - 2	10/26/90	10		466	B	<0.58		<0.52	W	607	B	<0.63		13		58	
S-82	0 - 2	10/18/90	12		476	B	<0.58	NW	<0.51		270	B	<0.62		15		37	
S-99	0 - 2	1/18/93	13.8		762	B	0.40	JV	0.60	U	96.9	B	0.40	U	30.6		56.8	
S-100	0 - 2	1/18/93	20.6		804	B	0.52	BJV	0.61	U	120	B	0.36	U	38.0		275	
S-101	0 - 2	1/18/93	168		928	B	0.78	BJV	0.62	U	260	B	0.45	U	41.8		1310	
S-102	0 - 2	1/18/93	26.1		616	B	1.4	JV	0.59	U	144	B	0.40	U	41.7		134	
FC-21P	0.5 - 2.5	4/5/94	7.4	B	438		0.22	U	0.67	U	78.9		0.22	U	12.1	B	17.2	
FC-24P	0.5 - 2.5	4/5/94	6.2	B	736		0.22	U	0.66	U	64.9		0.22	U	28.0		22.8	
FC-18	1 - 3	4/6/94	16.6	U	892		1.0	U	4.1	U	78.0		2.1	U	20.7	U	20.8	
FC-24	1 - 3	4/5/94	6.6	B	576		0.24	U	0.71	U	67.0		0.24	U	22.8	B	21.8	
FC-27	1 - 3	4/4/94	18.3	U	524		1.1	U	4.6	U	69.4		2.3	U	22.9	U	156	
FC-31	1 - 3	4/5/94	8.0	B	484		0.22	B	0.59	U	133		0.20	U	15.3	B	27.5	
FC-33	1 - 3	4/4/94	6.4	B	565		0.24	U	0.71	U	122		0.24	U	13.1	B	21.1	
FC-40	1 - 3	4/5/94	6.8	B	378		0.22	U	0.66	U	98.9		0.22	U	7.1	B	100	
S-90	1 - 3	10/3/90	11		604	B	<0.57	WN	0.59		306	B	<0.61		14		270	
MW-58	2 - 3	12/7/93	24.5		457	B	0.47	JV	0.47	U	107	B	0.24	JV	32.1		763	
S-64	2 - 3	10/19/90	23		412	B	<0.62	NW	0.79	BW	433	B	<0.67		37		303	
S-134	2 - 4	11/8/93	23.0		671	B	1.3	BJV	0.47	U	244	B	0.23	U	46.3		223	
S-38	2 - 4	11/30/90	15		760	B	<0.61	NW	<0.59	W	324	B	<0.82		25		39	
S-39	2 - 4	11/30/90	8.3	B	566	B	<0.56	NW	<0.53	W	184	B	<0.75		12		40	

Table A-4:

Concentrations of Metals (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.	Sample		Nickel		Potassium		Selenium		Silver		Sodium		Thallium		Vanadium		Zinc	
Location	Depth (ft.)	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-47	2 - 4	10/20/90	10		802	B	<0.56	N	<0.5	W	448	B	<0.6		20		65	
S-49	2 - 4	10/20/90	12		762	B	<0.56	N	<0.49	W	319	B	<0.6		13		94	
S-80	2 - 4	10/5/90	9.8		710	B	<0.54	NW	<0.48		336	B	<0.58		20		34	
S-139	3 - 3.1	12/7/93	8.3	B	421	B	0.49	JV	0.49	U	149	B	0.24	JV	14.9		38.3	
S-135	3 - 3.5	12/7/93	4.5	B	398	B	0.43	JV	0.43	U	46.8	B	0.21	JV	5.9	B	38.8	
MW-54	3 - 5	11/29/93	6.5	B	286	B	0.43	JV	0.43	U	29.3	B	0.22	JV	10.7	B	37.4	
S-129	3 - 5	11/29/93	14.0		516	B	0.46	JV	0.46	U	47.6	B	0.23	JV	15.2		50.2	
S-41A	3.5 - 5.5	11/9/90	7.3	B	711	B	<0.60	WN	<0.57	W	229	B	<0.80		14	M	144	
MW-25	4 - 6	11/19/90	5.3	B	474	B	<0.55	WN	<0.53	W	235	B	<0.74		9.7	B	27	
S-33	4 - 6	12/14/90	4.7	BJ	636	BJ	<0.56	N	<0.54	J	88	BJ	<0.75	J	13	J	18	J
S-37	4 - 6	12/3/90	9		1060	B	<0.57	NW	<0.55		188	B	<0.76		14		18	
S-60	4 - 6	12/13/90	<4.6		674	BJ	<0.54	N	<0.52	J	210	BJ	<0.73	J	13	J	22	J
S-53	5 - 7	11/21/90	6.0	B	318	B	<0.52	NW	<0.5		88	B	<0.7		5.2	B	27	
S-61	5 - 7	10/26/90	14		832	B	<0.6	N	<0.53		328	B	<0.64		32		100	
FC-36	7 - 9	4/6/94	4.4	B	220		0.24	U	0.72	U	233		0.24	U	7.8	B	22.8	
S-122	7.5 - 8.5	4/9/94	13.2	B	1240		0.23	U	0.69	U	103	B	0.23	U	26.5		66.0	
S-35	8 - 10	12/1/90	11		861	B	<0.59	NW	<0.57		456	B	<0.8		13		20	
MW-26	9 - 11	12/6/90	6.7	B	416	B	<0.55	NW	<0.53		113	B	<0.74		7.6	B	16	

< or U - Indicates analyte result less than instrument detection limit (IDL).
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
J - Estimated concentration.
S - The reported value was determined by the method of standard additions (MSA).
N - Matrix spike outside of recovery limits.
W - Post digest spike recovery out of range.
R - Declared unusable during data validation.
M - Duplicate injection precision not met.
V - Qualifier added and/or value altered during validation.
* - Duplicate RPD out of control.
NA - Not analyzed.

Table A-5:

Concentrations of Total Petroleum Hydrocarbons (TPH) (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Gasoline		Kerosene		Diesel		Residual Oil		#2 Fuel Oil		#4 Fuel Oil		#6 Fuel Oil		Varsol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
FC-19P	0.5 - 2.5	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-20P	0.5 - 2.5	4/6/94	2.0	U	2.0	U	NA		NA		23		NA		NA		2.0	U
FC-21P	0.5 - 2.5	4/5/94	2.0	U	2.0	U	NA		NA		14		NA		NA		2.0	U
FC-22P	0.5 - 2.5	4/6/94	2.0	U	2.0	U	NA		NA		8.3		NA		NA		2.0	U
FC-23P	0.5 - 2.5	4/5/94	2.0	U	2.0	U	NA		NA		2.6		NA		NA		2.0	U
FC-24P	0.5 - 2.5	4/5/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-31P	0.5 - 2.5	4/5/94	2.0	U	2.0	U	NA		NA		25		NA		NA		2.0	U
FC-32P	0.5 - 2.5	4/4/94	2.0	U	2.0	U	NA		NA		8.0		NA		NA		2.0	U
FC-33P	0.5 - 2.5	4/4/94	2.0	U	2.0	U	NA		NA		33		NA		NA		2.0	U
FC-34P	0.5 - 2.5	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-38P	0.5 - 2.5	4/5/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-17	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-18	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.1		NA		NA		2.0	U
FC-19	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-20	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		3.9		NA		NA		2.0	U
FC-21	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		15		NA		NA		2.0	U
FC-22	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		13		NA		NA		2.0	U
FC-23	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-24	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-25	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-26	1 - 3	4/4/94	2.0	U	10	U	NA		NA		10	U	NA		NA		10	U
FC-27	1 - 3	4/4/94	2.0	U	10	U	NA		NA		480		NA		NA		10	U
FC-28	1 - 3	4/4/94	2.0	U	10	U	NA		NA		10	U	NA		NA		10	U
FC-29	1 - 3	4/4/94	2.0	U	2.0	U	NA		NA		3.0		NA		NA		2.0	U
FC-30	1 - 3	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-31	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		4.0		NA		NA		2.0	U
FC-32	1 - 3	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-33	1 - 3	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-34	1 - 3	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-35	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-36	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-37	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-38	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		18		NA		NA		2.0	U
FC-39	1 - 3	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-40	1 - 3	4/5/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
MW-58	2 - 3	12/7/93		U		U		U		U	13,900			U		U	NA	
S-134	2 - 4	11/8/93		U		U		U		U	1,350			U		U	NA	
S-139	3 - 3.1	12/7/93		U		U		U		U		U		U		U	NA	
S-135	3 - 3.5	12/7/93		U		U		U		U		U		U		U	NA	
MW-54	3 - 5	11/29/93		U		U		U		U	11300			U		U	NA	

Table A-5:

Concentrations of Total Petroleum Hydrocarbons (TPH) (mg/kg) in Soil Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.			Gasoline		Kerosene		Diesel		Residual Oil		#2 Fuel Oil		#4 Fuel Oil		#6 Fuel Oil		Varsol	
Location	Sample Depth (ft):	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
S-129	3 - 5	11/29/93		U		U		U		U	770			U		U	NA	
FC-32	5 - 7	4/4/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
FC-36	7 - 9	4/6/94	2.0	U	2.0	U	NA		NA		2.0	U	NA		NA		2.0	U
S-122	8.5 - 9.5	4/9/94		U		U		U		U		U		U		U	NA	

U - Indicates compound was analyzed for but not detected.
V - Value altered during data validation.
NA - Not Analyzed

Table A-6:

Concentrations of Volatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Acetone		Benzene		Bromodi-chloromethane		Bromoform		Bromomethane		2-Butanone		Carbon Disulfide	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-13+	1/7/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-19	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-23	1/7/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-23D	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-26	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-28	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-29	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-32	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-33	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-33+	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-35	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	10	UV	5	U	5	U	5	U	10	U	10	U	5	U
MW-38D	2/17/94	10	UV	5	U	5	U	5	U	10	U	10	U	5	U
MW-39D	2/17/94	10	UV	5	U	5	U	5	U	10	U	10	U	5	U
MW-40D	2/17/94	10	UV	5	U	5	U	5	U	10	U	10	U	5	U
MW-41	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-44D	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-45	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
MW-57	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
MW-57+	2/17/94	10	UV	5	U	5	U	5	U	10	U	10	U	5	U
MW-59	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
MW-61	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
MW-62D	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
MW-63	2/17/94	10	U	5	U	5	U	5	U	10	U	10	U	5	U
TW-1	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TW-2	1/26/93	13	UV	10	U	10	U	10	U	10	U	10	U	10	UV

Table A-6:

Concentrations of Volatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Acetone		Benzene		Bromodi-chloromethane		Bromoform		Bromomethane		2-Butanone		Carbon Disulfide	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks															
FB-1	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
FB-2	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
FB-3	1/7/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-1	1/3/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-2	1/4/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-3	1/7/91	10.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U

Table A-6:

Concentrations of Volatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		Dibromo-chloromethane	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-13+	1/7/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-19	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-23	1/7/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-23D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-26	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-28	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-29	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-32	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-33	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-33+	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
MW-35	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	5	U	5	U	10	U	5	U	10	UJV	5	U
MW-38D	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
MW-39D	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
MW-40D	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
MW-41	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	5	U	5	U	10	U	5	U	10	UJV	5	U
MW-57	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
MW-57+	2/17/94	5	U	5	U	10	U	5	U	10	UJV	5	U
MW-59	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
MW-61	2/17/94	5	U	5	U	10	U	5	U	10	UJV	5	U
MW-62D	2/17/94	5	U	5	U	10	U	5	U	10	UJV	5	U
MW-63	2/17/94	5	U	5	U	10	U	5	U	10	U	5	U
TW-1	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U
TW-2	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U

Table A-6:

Concentrations of Volatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Carbon Tetrachloride		Chlorobenzene		Chloroethane		Chloroform		Chloromethane		Dibromo-chloromethane	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks													
FB-1	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
FB-2	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
FB-3	1/7/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
TB-1	1/3/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
TB-2	1/4/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U
TB-3	1/7/91	5.0	U	5.0	U	10.0	U	5.0	U	10.0	U	5.0	U

Table A-6:

Concentrations of Volatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		1,2-Dichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene (total)		1,2-Dichloropropane		cis-1,3-Dichloropropene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-13+	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-19	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-23	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-23D	2/9/93	10	U	2	J	10	U	10	U	10	U	10	U
MW-25	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-26	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-28	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-29	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-32	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-33	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-33+	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-35	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-38D	2/17/94	5	U	3	J	5	U	5	U	5	U	5	U
MW-39D	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-40D	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-41	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	2	J	10	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	46		10	U	10	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-57	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-57+	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-59	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-61	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-62D	2/17/94	5	U	5	U	5	U	5	U	5	U	5	U
MW-63	2/17/94	5	U	3	J	5	U	14		5	U	5	U
TW-1	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U
TW-2	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U

Table A-6:

Concentrations of Volatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		1,2-Dichloroethane		1,1-Dichloroethane		1,1-Dichloroethene		1,2-Dichloroethene (total)		1,2-Dichloropropane		cis-1,3-Dichloropropene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks													
FB-1	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
FB-2	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
FB-3	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-1	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-2	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-3	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Table A-6:

Concentrations of Volatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Ethylbenzene		2-Hexanone		4-Methyl-2-pentanone		Methylene Chloride		Styrene		1,1,2,2-Tetrachloroethane		Tetrachloroethene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-13+	1/7/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-19	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	2.9	J
MW-23	1/7/91	8.8		10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-23D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-26	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-28	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-29	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-32	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	2.3	J
MW-33	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-33+	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
MW-35	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-38D	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-39D	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-40D	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	
MW-41	2/9/93	2	J	10	U	10	U	10	U	10	U	10	U	10	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-44D	2/9/93	10	U	10	UV	10	UV	10	U	10	U	2	J	10	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-57	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-57+	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-59	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	5	U
MW-61	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	9	
MW-62D	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	3	J
MW-63	2/17/94	5	U	10	U	10	U	5	U	5	U	5	U	23	
TW-1	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TW-2	1/26/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U

Table A-6:

Concentrations of Volatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Ethylbenzene		2-Hexanone		4-Methyl-2-pentanone		Methylene Chloride		Styrene		1,1,2,2-Tetrachloroethane		Tetrachloroethene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks															
FB-1	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
FB-2	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
FB-3	1/7/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-1	1/3/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-2	1/4/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U
TB-3	1/7/91	5.0	U	10.0	U	10.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Table A-6:

Concentrations of Volatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Toluene		Trans-1,3-Dichloropropene		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Trichloroethene		Vinyl Acetate		Vinyl Chloride		Xylenes (total)	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-13+	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-19	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	2.0	J	10.0	U	10.0	U	5.0	U
MW-23	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	18	
MW-23D	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	1	J
MW-25	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-26	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-28	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-29	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-32	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-33	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-33+	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
MW-35	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-37	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-38D	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-39D	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-40D	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-41	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	11		NA		10	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	10	U	75		NA		10	U	10	U
MW-45	2/9/93	10	U	10	U	2	J	10	U	10	U	NA		10	U	10	U
MW-45+	2/9/93	10	U	10	U	1	J	10	U	10	U	NA		10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
MW-49	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-57	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-57+	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-59	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-61	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-62D	2/17/94	5	U	5	U	5	U	5	U	5	U	NA		10	U	5	U
MW-63	2/17/94	5	U	5	U	5	U	5	U	24		NA		10	U	5	U
TW-1	1/26/93	10	U	10	U	10	U	10	U	10	U	NA		10	U	10	U
TW-2	1/26/93	10	UV	10	U	10	U	10	U	10	U	NA		10	U	10	U

Table A-6:

Concentrations of Volatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Toluene		Trans-1,3-Dichloropropene		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Trichloroethene		Vinyl Acetate		Vinyl Chloride		Xylenes (total)	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
FB-2	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
FB-3	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-1	1/3/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-2	1/4/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U
TB-3	1/7/91	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	10.0	U	10.0	U	5.0	U

ug/L - Micrograms per liter
B - Detected in laboratory blank.
U - Below reported quantitation level.
J - Estimated concentration.
V - Qualifier added and/or value altered during validation.
FB - Field blank.
TB - Trip blank.
+ - Indicates replicate sample.

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Acenaphthene		Acenaphthylene		Anthracene		Benzidine		Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b+k) Fluoranthenes		Benzo(b)fluoranthene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	9.8	J	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-19	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-23	1/7/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-23+	1/7/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	NA	
MW-23D	2/9/93	4	J	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-25	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-26	1/3/91	10	UR	10	UR	10	UR	50	UR	10	UR	10	UR	10	UR	NA	
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	NA	
MW-28	1/3/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-29	1/3/91	10	UR	10	UR	10	UR	50	UR	10	UR	10	UR	10	UR	NA	
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	NA	
MW-32	1/3/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-33	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-33+	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
MW-35	2/9/93	2	J	10	U	1	J	NA		10	U	10	U	NA		10	U
MW-37	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-38D	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-39D	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-40D	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-42	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-43	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-44D	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-45	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-45+	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-46	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-47	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-48D	2/9/93	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-49	2/17/94	3	J	10	U	0.2	J	NA		10	U	10	UJV	NA		10	UJV
MW-57	2/17/94	10	U	10	U	10	U	NA		10	U	10	UJV	NA		10	UJV
MW-57+	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-59	2/17/94	10	U	10	U	10	U	NA		10	U	10	U	NA		10	U
MW-61	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-62D	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
MW-63	2/17/94	11	U	11	U	11	U	NA		11	U	11	U	NA		11	U
TW-3	12/6/93	11	U	11	U	11	U			11	U	11	U			11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Acenaphthene		Acenaphthylene		Anthracene		Benzidine		Benzo (a) Anthracene		Benzo (a) Pyrene		Benzo (b+k) Fluoranthenes		Benzo(b)fluoranthene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
FB-2	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
FB-3	1/7/91	10	UR	10	UR	10	UR	50	UR	10	UR	10	UR	10	UR	NA	
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	NA	
TB-1	1/3/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
TB-2	1/4/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	
TB-3	1/7/91	10	U	10	U	10	U	50	U	10	U	10	U	10	U	NA	

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Benzo(k)fluoranthene		Benzo (g,h,i) Perylene		Benzoic Acid		Benzyl Alcohol		4-Bromophenyl-phenylether		Butylbenzyl phthalate		4-Chloro-3-Methylphenol		4-Chloroaniline	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-19	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-23	1/7/91	NA		10	U	50	UIV	10	UIV	10	U	10	U	10	UIV	10	U
MW-23+	1/7/91	NA		10	UJV	50	UIV	10	UIV	10	UJV	10	UJV	10	UIV	10	UJV
MW-23D	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	U
MW-25	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-26	1/3/91	NA		10	UR	50	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-26+	1/3/91	NA		10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-28	1/3/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-29	1/3/91	NA		10	UR	50	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-29+	1/3/91	NA		10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-32	1/3/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-33	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-33+	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-35	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	U
MW-37	2/17/94	11	U	11	U	53	U	11	U	11	U	11	U	11	U	11	U
MW-38D	2/17/94	11	U	11	U	53	U	11	U	11	U	11	U	11	U	11	U
MW-39D	2/17/94	11	U	11	U	53	U	11	U	11	U	11	U	11	U	11	U
MW-40D	2/17/94	11	U	11	U	54	U	11	U	11	U	11	U	11	URV	11	U
MW-42	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-44D	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-45	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-45+	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-46	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-47	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	UJV
MW-48D	2/9/93	10	U	10	U	NA		NA		10	U	10	U	10	U	10	U
MW-49	2/17/94	10	UJV	10	UJV	51	U	10	U	10	U	10	U	10	URV	10	UJV
MW-57	2/17/94	10	UJV	10	UJV	50	U	10	U	10	U	10	U	10	U	10	UJV
MW-57+	2/17/94	11	U	11	U	53	U	11	U	11	U	11	U	11	U	11	UJV
MW-59	2/17/94	10	U	10	U	50	U	10	U	10	U	10	U	10	U	10	U
MW-61	2/17/94	11	U	11	U	56	U	11	U	11	U	11	U	11	U	11	UJV
MW-62D	2/17/94	11	U	11	U	53	U	11	U	11	U	11	U	11	U	11	UJV
MW-63	2/17/94	11	U	11	U	56	U	11	U	11	U	11	U	11	U	11	U
TW-3	12/6/93	11	U	11	U	10	J	11	U	11	U	11	U	11	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Benzo(k)fluoranthene		Benzo (g,h,i) Perylene		Benzoic Acid		Benzyl Alcohol		4-Bromophenyl-phenylether		Butylbenzyl phthalate		4-Chloro-3-Methylphenol		4-Chloroaniline	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
FB-2	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
FB-3	1/7/91	NA		10	UR	50	UR	10	UR	10	UR	10	UR	10	UR	10	UR
FB-3+	1/7/91	NA		10	UJV	50	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
TB-1	1/3/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
TB-2	1/4/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U
TB-3	1/7/91	NA		10	U	50	U	10	U	10	U	10	U	10	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Bis (2-Chloroethoxy) Methane		Bis (2-Chloroethyl) Ether		Bis (2-Chloroisopropyl) Ether		2-Chloronaphthalene		2-Chlorophenol		4-Chlorophenyl-phenylether		Chrysene		Di-n-Butylphthalate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-19	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-23	1/7/91	10	U	10	U	10	U	10	U	10	UIV	10	U	10	U	10	U
MW-23+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UIV	10	UJV	10	UJV	10	UJV
MW-23D	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-26	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-28	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-29	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-32	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-33	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-33+	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-35	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-37	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	UV
MW-38D	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	UV
MW-39D	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	U
MW-40D	2/17/94	11	U	11	U	NA		11	U	11	URV	11	U	11	U	11	UV
MW-42	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-44D	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-45	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-46	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-47	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-49	2/17/94	10	U	10	U	NA		10	U	10	URV	10	U	10	U	10	UV
MW-57	2/17/94	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-57+	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	UV
MW-59	2/17/94	10	U	10	U	NA		10	U	10	U	10	U	10	U	10	UV
MW-61	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	UV
MW-62D	2/17/94	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	U
MW-63	2/17/94	11	U	11	U	NA		11	U	11	URV	11	U	11	U	11	UV
TW-3	12/6/93	11	U	11	U	NA		11	U	11	U	11	U	11	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Bis (2-Chloroethoxy) Methane		Bis (2-Chloroethyl) Ether		Bis (2-Chloroisopropyl) Ether		2-Chloronaphthalene		2-Chlorophenol		4-Chlorophenyl-phenylether		Chrysene		Di-n-Butylphthalate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
FB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
FB-3	1/7/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
TB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TB-3	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Di-n-Octyl Phthalate		Dibenz (a,h) Anthracene		Dibenzofuran		1,2-Dichlorobenzene		1,3-Dichlorobenzene		1,4-Dichloro-benzene		3,3'-Dichloro-benzidine		2,4-Dichlorophenol	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10	U	10	U	13		10	U	10	U	10	U	20	U	10	U
MW-19	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-23	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	UIV
MW-23+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	20	UJV	10	UIV
MW-23D	2/9/93	10	U	10	U	4	J	10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-26	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	20	UR	10	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	20	UJV	10	UJV
MW-28	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-29	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	20	UR	10	UR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	20	UJV	10	UJV
MW-32	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-33	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-33+	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-35	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	11	U	11	U	1	J	11	U	11	U	11	U	21	U	11	U
MW-38D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	21	U	11	U
MW-39D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	21	U	11	U
MW-40D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	22	U	11	URV
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	10	UJV	10	UJV	0.8	J	10	U	10	U	10	U	20	U	10	URV
MW-57	2/17/94	10	UJV	10	UJV	10	U	10	U	10	U	10	U	20	U	10	U
MW-57+	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	21	U	11	U
MW-59	2/17/94	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
MW-61	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	22	U	11	U
MW-62D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	22	U	11	U
MW-63	2/17/94	11	UV	11	U	11	U	11	U	11	U	11	U	22	U	11	URV
TW-3	12/6/93	0.8	J	11	U	11	U	11	U	11	U	11	U	20	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Di-n-Octyl Phthalate		Dibenz (a,h) Anthracene		Dibenzofuran		1,2-Dichlorobenzene		1,3-Dichlorobenzene		1,4-Dichloro-benzene		3,3'-Dichloro-benzidine		2,4-Dichlorophenol	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
FB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
FB-3	1/7/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	20	UR	10	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	20	UJV	10	UJV
TB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
TB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U
TB-3	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	20	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Diethylphthalate		Dimethyl phthalate		2,4-Dimethylphenol		4,6-Dinitro-2-Methylphenol		2,4-Dinitrophenol		2,4-Dinitrotoluene		2,6-Dinitrotoluene		Bis (2-Ethylhexyl) Phthalate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	12	
MW-19	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U
MW-23	1/7/91	10	U	10	U	10	UIV	50	UIV	50	UIV	10	U	10	U	32	
MW-23+	1/7/91	10	UJV	10	UJV	10	UIV	50	UIV	50	UIV	10	UJV	10	UJV	9.3	UJV
MW-23D	2/9/93	10	U	10	U	10	U	25	U	25	U	10	U	10	U	10	UV
MW-25	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	B
MW-26	1/3/91	10	UR	10	UR	10	UR	50	UR	50	UR	10	UR	10	UR	10	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	50	UJV	10	UJV	10	UJV	10	UJV
MW-28	1/3/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	19	B
MW-29	1/3/91	10	UR	10	UR	10	UR	50	UR	50	UR	10	UR	10	UR	9.7	BJR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	50	UJV	10	UJV	10	UJV	10	UJV
MW-32	1/3/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	15	B
MW-33	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U
MW-33+	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U
MW-35	2/9/93	10	U	10	U	10	U	25	U	25	U	10	U	10	U	10	UV
MW-37	2/17/94	11	U	11	U	11	U	53	U	53	U	11	U	11	U	11	UV
MW-38D	2/17/94	11	U	11	U	11	U	53	U	53	U	11	U	11	U	11	UV
MW-39D	2/17/94	11	U	11	U	11	U	53	U	53	U	11	U	11	U	11	UV
MW-40D	2/17/94	11	U	11	U	11	URV	54	U	54	URV	11	U	11	U	11	UV
MW-42	2/9/93	10	U	10	U	10	U	25	U	25	U	10	U	10	U	10	UV
MW-43	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	UV
MW-44D	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	UV
MW-45	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	UV
MW-45+	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	UV
MW-46	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	26	U	26	UJV	10	U	10	U	10	UV
MW-48D	2/9/93	10	U	10	U	10	U	26	U	26	U	10	U	10	U	10	U
MW-49	2/17/94	10	U	10	U	10	URV	51	URV	51	URV	10	U	10	U	10	UV
MW-57	2/17/94	10	U	10	U	10	U	50	UJV	50	U	10	U	10	U	10	UV
MW-57+	2/17/94	11	U	11	U	11	U	53	UJV	53	U	11	U	11	U	11	UV
MW-59	2/17/94	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	UV
MW-61	2/17/94	11	U	11	U	11	U	56	UJV	56	U	11	U	11	U	11	UV
MW-62D	2/17/94	11	U	11	U	11	U	53	UJV	53	U	11	U	11	U	11	UV
MW-63	2/17/94	0.5	J	11	U	11	U	56	UJV	56	URV	11	U	11	U	11	UV
TW-3	12/6/93	11	U	11	U	11	U	56	U	56	U	11	U	11	U	10	UV

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Diethylphthalate		Dimethyl phthalate		2,4-Dimethylphenol		4,6-Dinitro-2-Methylphenol		2,4-Dinitrophenol		2,4-Dinitrotoluene		2,6-Dinitrotoluene		Bis (2-Ethylhexyl) Phthalate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U
FB-2	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U
FB-3	1/7/91	10	UR	10	UR	10	UR	50	UR	50	UR	10	UR	10	UR	10	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	50	UJV	50	UJV	10	UJV	10	UJV	10	UJV
TB-1	1/3/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	8.8	BJ
TB-2	1/4/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	8.8	BJ
TB-3	1/7/91	10	U	10	U	10	U	50	U	50	U	10	U	10	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Fluoranthene		Fluorene		Hexachloro-benzene		Hexachlorobutadiene		Hexachlorocyclopentadiene		Hexachloro-ethane		Indeno (1,2,3-cd) Pyrene		Isophorone	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10	U	14		10	U	10	U	10	U	10	U	10	U	10	U
MW-19	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-23	1/7/91	10	U	9.4	J	10	U	10	U	10	U	10	U	10	U	10	U
MW-23+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-23D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-25	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-26	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-28	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-29	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
MW-32	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-33	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-33+	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-35	2/9/93	1	J	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-37	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-38D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-39D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-40D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-49	2/17/94	0.2	J	3	J	10	U	10	U	10	U	10	U	10	UJV	10	U
MW-57	2/17/94	10	U	10	U	10	U	10	U	10	U	10	U	10	UJV	10	U
MW-57+	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-59	2/17/94	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MW-61	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-62D	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
MW-63	2/17/94	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U
TW-3	12/6/93	11	U	11	U	11	U	11	U	11	U	11	U	11	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Fluoranthene		Fluorene		Hexachloro-benzene		Hexachlorobutadiene		Hexachlorocyclopentadiene		Hexachloro-ethane		Indeno (1,2,3-cd) Pyrene		Isophorone	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
FB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
FB-3	1/7/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV
TB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
TB-3	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		2-Methylna-phthalene		4-Methylphenol		2-Methylphenol		N-Nitroso-Di-n-Propylamine		N-Nitrosodim-ethylamine		N-Nitrosodiphenylamine (1)		Naphthalene		2-Nitroaniline	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	66		10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-19	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-23	1/7/91	96		10	UIV	10	UIV	10	U	10	U	10	U	10	U	50	U
MW-23+	1/7/91	10	UJV	10	UIV	10	UIV	10	UJV	10	UJV	10	UJV	10	UJV	50	UJV
MW-23D	2/9/93	23		10	U	10	U	10	U			10	U	10	U	25	U
MW-25	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-26	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	50	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	50	UJV
MW-28	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-29	1/3/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	50	UR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	50	UJV
MW-32	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-33	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-33+	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
MW-35	2/9/93	5	J	10	U	10	U	10	U	NA		10	U	10	U	25	U
MW-37	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	0.4	J	53	U
MW-38D	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	11	U	53	U
MW-39D	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	1	J	53	U
MW-40D	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	11	U	54	U
MW-42	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	25	U
MW-43	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-44D	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-45	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-45+	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-46	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-47	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-48D	2/9/93	10	U	10	U	10	U	10	U	NA		10	U	10	U	26	U
MW-49	2/17/94	0.4	J	10	URV	10	URV	10	U	NA		10	U	2	J	51	U
MW-57	2/17/94	10	U	10	U	10	U	10	U	NA		10	U	10	U	50	U
MW-57+	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	11	U	53	U
MW-59	2/17/94	10	U	10	U	10	U	10	U	NA		10	U	10	U	50	U
MW-61	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	11	U	56	U
MW-62D	2/17/94	11	U	11	U	11	U	11	U	NA		11	U	0.4	J	53	U
MW-63	2/17/94	11	U	11	URV	11	URV	11	U	NA		11	U	0.1	J	56	U
TW-3	12/6/93	11	U	11	U	11	U	11	U	NA		11	U	1	J	56	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		2-Methylna-phthalene		4-Methylphenol		2-Methylphenol		N-Nitroso-Di-n-Propylamine		N-Nitrosodim-ethylamine		N-Nitrosodiphenylamine (1)		Naphthalene		2-Nitroaniline	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
FB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
FB-3	1/7/91	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	10	UR	50	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	10	UJV	50	UJV
TB-1	1/3/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
TB-2	1/4/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U
TB-3	1/7/91	10	U	10	U	10	U	10	U	10	U	10	U	10	U	50	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		4-Nitroaniline		3-Nitroaniline		Nitrobenzene		4-Nitrophenol		2-Nitrophenol		2,2'-oxybis(1-Chloropropane)		Pentachlorophenol		Phenanthrene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	11	
MW-19	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-23	1/7/91	50	U	50	U	10	U	50	UIV	10	UIV	NA		50	UIV	10	U
MW-23+	1/7/91	50	UJV	50	UJV	10	UJV	50	UIV	10	UIV	NA		50	UIV	10	UJV
MW-23D	2/9/93	25	U	25	U	10	U	25	U	10	U	10	U	25	U	2	J
MW-25	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-26	1/3/91	50	UR	50	UR	10	UR	50	UR	10	UR	NA		50	UR	10	UR
MW-26+	1/3/91	50	UJV	50	UJV	10	UJV	50	UJV	10	UJV	NA		50	UJV	10	UJV
MW-28	1/3/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-29	1/3/91	50	UR	50	UR	10	UR	50	UR	10	UR	NA		50	UR	10	UR
MW-29+	1/3/91	50	UJV	50	UJV	10	UJV	50	UJV	10	UJV	NA		50	UJV	10	UJV
MW-32	1/3/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-33	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-33+	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
MW-35	2/9/93	25	U	25	U	10	U	25	U	10	U	10	U	25	U	10	U
MW-37	2/17/94	53	U	53	U	11	U	53	U	11	U	11	U	53	U	11	U
MW-38D	2/17/94	53	U	53	U	11	U	53	U	11	U	11	U	53	U	11	U
MW-39D	2/17/94	53	U	53	U	11	U	53	U	11	U	11	U	53	U	11	U
MW-40D	2/17/94	54	U	54	U	11	U	54	URV	11	URV	11	U	54	URV	11	U
MW-42	2/9/93	25	U	25	U	10	U	25	U	10	U	10	U	25	U	10	U
MW-43	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-44D	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-45	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-45+	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-46	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-47	2/9/93	26	U	26	U	10	U	26	U	10	U	10	UJV	26	U	10	U
MW-48D	2/9/93	26	U	26	U	10	U	26	U	10	U	10	U	26	U	10	U
MW-49	2/17/94	51	U	51	U	10	U	51	URV	10	URV	10	U	51	URV	0.5	J
MW-57	2/17/94	50	U	50	U	10	U	50	U	10	U	10	U	50	U	10	U
MW-57+	2/17/94	53	U	53	U	11	U	53	U	11	U	11	U	53	U	11	U
MW-59	2/17/94	50	U	50	U	10	U	50	U	10	U	10	U	50	U	10	U
MW-61	2/17/94	56	U	56	U	11	U	56	U	11	U	11	U	56	U	11	U
MW-62D	2/17/94	53	U	53	U	11	U	53	U	11	U	11	U	53	U	11	U
MW-63	2/17/94	56	U	56	U	11	U	56	URV	11	URV	11	U	56	URV	11	U
TW-3	12/6/93	56	U	56	U	11	U	56	U	11	U	11	U	56	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		4-Nitroaniline		3-Nitroaniline		Nitrobenzene		4-Nitrophenol		2-Nitrophenol		2,2'-oxybis(1-Chloropropane)		Pentachlorophenol		Phenanthrene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/3/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
FB-2	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
FB-3	1/7/91	50	UR	50	UR	10	UR	50	UR	10	UR	NA		50	UR	10	UR
FB-3+	1/7/91	50	UJV	50	UJV	10	UJV	50	UJV	10	UJV	NA		50	UJV	10	UJV
TB-1	1/3/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
TB-2	1/4/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U
TB-3	1/7/91	50	U	50	U	10	U	50	U	10	U	NA		50	U	10	U

Table A-7:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Phenol		Pyrene		1,2,4-Trichlorobenzene		2,4,5-Trichlorophenol		2,4,6-Trichlorophenol	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/7/91	10	U	10	U	10	U	50	U	10	U
MW-19	1/4/91	10	U	10	U	10	U	50	U	10	U
MW-23	1/7/91	10	UIV	10	U	10	U	50	UIV	10	UIV
MW-23+	1/7/91	10	UIV	10	UJV	10	UJV	50	UIV	10	UIV
MW-23D	2/9/93	10	U	10	U	10	U	25	U	10	U
MW-25	1/4/91	10	U	10	U	10	U	50	U	10	U
MW-26	1/3/91	10	UR	10	UR	10	UR	50	UR	10	UR
MW-26+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV
MW-28	1/3/91	10	U	10	U	10	U	50	U	10	U
MW-29	1/3/91	10	UR	10	UR	10	UR	50	UR	10	UR
MW-29+	1/3/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV
MW-32	1/3/91	10	U	10	U	10	U	50	U	10	U
MW-33	1/4/91	10	U	10	U	10	U	50	U	10	U
MW-33+	1/4/91	10	U	10	U	10	U	50	U	10	U
MW-35	2/9/93	10	U	0.9	J	10	U	25	U	10	U
MW-37	2/17/94	11	U	0.4	J	11	U	53	U	11	U
MW-38D	2/17/94	11	U	11	U	11	U	53	U	11	U
MW-39D	2/17/94	11	U	11	U	11	U	53	U	11	U
MW-40D	2/17/94	11	URV	11	U	11	U	54	URV	11	URV
MW-42	2/9/93	10	U	10	U	10	U	25	U	10	U
MW-43	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-44D	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-45	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-45+	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-46	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-47	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-48D	2/9/93	10	U	10	U	10	U	26	U	10	U
MW-49	2/17/94	10	URV	0.4	J	10	U	51	URV	10	URV
MW-57	2/17/94	10	U	10	U	10	U	50	U	10	U
MW-57+	2/17/94	11	U	11	U	11	U	53	U	11	U
MW-59	2/17/94	10	U	10	U	10	U	50	U	10	U
MW-61	2/17/94	11	U	11	U	11	U	56	U	11	U
MW-62D	2/17/94	11	U	11	U	11	U	53	U	11	U
MW-63	2/17/94	11	URV	11	U	11	U	56	URV	11	URV
TW-3	12/6/93	11	U	0.7	J	11	U	56	U	11	U

Table A-7:

Concentrations of Semivolatile Organic Compounds (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Phenol		Pyrene		1,2,4-Trichlorobenzene		2,4,5-Trichlorophenol		2,4,6-Trichlorophenol	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks											
FB-1	1/3/91	10	U	10	U	10	U	50	U	10	U
FB-2	1/4/91	10	U	10	U	10	U	50	U	10	U
FB-3	1/7/91	10	UR	10	UR	10	UR	50	UR	10	UR
FB-3+	1/7/91	10	UJV	10	UJV	10	UJV	50	UJV	10	UJV
TB-1	1/3/91	10	U	10	U	10	U	50	U	10	U
TB-2	1/4/91	10	U	10	U	10	U	50	U	10	U
TB-3	1/7/91	10	U	10	U	10	U	50	U	10	U

ug/L- Micrograms per liter
NA- Not Analyzed
U - Indicates that the compound was analyzed for but not detected.
J - Estimated value.
I - Result declared inconclusive during data validation.
V - Qualifier added and/or value altered during data validation.
R - Declared unusable during data validation
B - Indicates comound was detected in laboratory blank.
FB - Field blank.
TB - Trip blank.
\+ - Indicates reanalysis.

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor Epoxide	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-3	2/21/91	NA		NA		NA		NA		NA		NA		NA	
MW-13	1/7/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-19	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-21	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-21 +	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-22	1/7/91	NA		NA		NA		NA		NA		NA		NA	
MW-23	1/7/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-23 +	1/7/91	NA		NA		NA		NA		NA		NA		NA	
MW-23D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-24	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-25	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-25A	1/22/93	NA		NA		NA		NA		NA		NA		NA	
MW-26	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-27	2/8/93	NA		NA		NA		NA		NA		NA		NA	
MW-27	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-27 +	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-28	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-29	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-30	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-32	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-34	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-31	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-33	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-33 +	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
MW-35	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-37	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-38D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-39D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-40D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-43	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-44D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-45	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-45 +	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-46	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-47	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-47	1/22/93	NA		NA		NA		NA		NA		NA		NA	
MW-48D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-49	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-57	2/17/94	NA		NA		NA		NA		NA		NA		NA	

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		alpha-BHC		beta-BHC		delta-BHC		gamma-BHC (Lindane)		Heptachlor		Aldrin		Heptachlor Epoxide	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-57+	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-59	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-61	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-62D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-63	2/17/94	NA		NA		NA		NA		NA		NA		NA	
TW-3	12/6/93	NA		NA		NA		NA		NA		NA		NA	
Field and Trip Blanks															
FB-1	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
FB-2	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
FB-3	1/7/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
TB-1	1/3/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
TB-2	1/4/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
TB-3	1/7/91	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-3	2/21/91	NA		NA		NA		NA		NA		NA		NA	
MW-13	1/7/91	0.05	U	0.10	U	0.10	UIV	0.10	U	0.10	U	0.10	U	0.10	U
MW-19	1/4/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-21	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-21+	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-22	1/7/91	NA		NA		NA		NA		NA		NA		NA	
MW-23	1/7/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-23+	1/7/91	NA		NA		NA		NA		NA		NA		NA	
MW-23D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-24	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-25	1/4/91	0.05	U	0.10	U	0.10	UIV	0.10	U	0.10	U	0.10	U	0.10	U
MW-25A	1/22/93	NA		NA		NA		NA		NA		NA		NA	
MW-26	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-27	2/8/93	NA		NA		NA		NA		NA		NA		NA	
MW-27	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-27+	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-28	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-29	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-30	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-32	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-34	1/3/91	NA		NA		NA		NA		NA		NA		NA	
MW-31	1/4/91	NA		NA		NA		NA		NA		NA		NA	
MW-33	1/4/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-33+	1/4/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
MW-35	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-37	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-38D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-39D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-40D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-43	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-44D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-45	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-45+	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-46	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-47	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-47	1/22/93	NA		NA		NA		NA		NA		NA		NA	
MW-48D	2/9/93	NA		NA		NA		NA		NA		NA		NA	
MW-49	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-57	2/17/94	NA		NA		NA		NA		NA		NA		NA	

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Endosulfan I		Dieldrin		4,4'-DDE		Endrin		Endosulfan II		4,4'-DDD		Endosulfate	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-57 +	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-59	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-61	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-62D	2/17/94	NA		NA		NA		NA		NA		NA		NA	
MW-63	2/17/94	NA		NA		NA		NA		NA		NA		NA	
TW-3	12/6/93	NA		NA		NA		NA		NA		NA		NA	
Field and Trip Blanks															
FB-1	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
FB-2	1/4/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
FB-3	1/7/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
TB-1	1/3/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
TB-2	1/4/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
TB-3	1/7/91	0.05	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		4,4'-DDT		Endrin Ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-3	2/21/91	NA		NA		NA		NA		NA		NA	
MW-13	1/7/91	0.10	UIV	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-19	1/4/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-21	1/4/91	NA		NA		NA		NA		NA		NA	
MW-21+	1/4/91	NA		NA		NA		NA		NA		NA	
MW-22	1/7/91	NA		NA		NA		NA		NA		NA	
MW-23	1/7/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-23+	1/7/91	NA		NA		NA		NA		NA		NA	
MW-23D	2/9/93	NA		NA		NA		NA		NA		NA	
MW-24	1/3/91	NA		NA		NA		NA		NA		NA	
MW-25	1/4/91	0.10	UIV	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-25A	1/22/93	NA		NA		NA		NA		NA		NA	
MW-26	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-27	2/8/93	NA		NA		NA		NA		NA		NA	
MW-27	1/4/91	NA		NA		NA		NA		NA		NA	
MW-27+	1/4/91	NA		NA		NA		NA		NA		NA	
MW-28	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-29	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-30	1/3/91	NA		NA		NA		NA		NA		NA	
MW-32	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-34	1/3/91	NA		NA		NA		NA		NA		NA	
MW-31	1/4/91	NA		NA		NA		NA		NA		NA	
MW-33	1/4/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-33+	1/4/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
MW-35	2/17/94	NA		NA		NA		NA		NA		NA	
MW-37	2/17/94	NA		NA		NA		NA		NA		NA	
MW-38D	2/17/94	NA		NA		NA		NA		NA		NA	
MW-39D	2/17/94	NA		NA		NA		NA		NA		NA	
MW-40D	2/17/94	NA		NA		NA		NA		NA		NA	
MW-43	2/9/93	NA		NA		NA		NA		NA		NA	
MW-44D	2/9/93	NA		NA		NA		NA		NA		NA	
MW-45	2/9/93	NA		NA		NA		NA		NA		NA	
MW-45+	2/9/93	NA		NA		NA		NA		NA		NA	
MW-46	2/17/94	NA		NA		NA		NA		NA		NA	
MW-47	2/9/93	NA		NA		NA		NA		NA		NA	
MW-47	1/22/93	NA		NA		NA		NA		NA		NA	
MW-48D	2/9/93	NA		NA		NA		NA		NA		NA	
MW-49	2/17/94	NA		NA		NA		NA		NA		NA	
MW-57	2/17/94	NA		NA		NA		NA		NA		NA	

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		4,4'-DDT		Endrin Ketone		Methoxychlor		alpha-chlordane		gamma-chlordane		Toxaphene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-57 +	2/17/94	NA		NA		NA		NA		NA		NA	
MW-59	2/17/94	NA		NA		NA		NA		NA		NA	
MW-61	2/17/94	NA		NA		NA		NA		NA		NA	
MW-62D	2/17/94	NA		NA		NA		NA		NA		NA	
MW-63	2/17/94	NA		NA		NA		NA		NA		NA	
TW-3	12/6/93	NA		NA		NA		NA		NA		NA	
Field and Trip Blanks													
FB-1	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
FB-2	1/4/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
FB-3	1/7/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
TB-1	1/3/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
TB-2	1/4/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U
TB-3	1/7/91	0.10	U	0.10	U	0.50	U	0.50	U	0.50	U	1.00	U

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-3	2/21/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-13	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-19	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-21	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-21+	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-22	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-23	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-23+	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-23D	2/9/93	0.066	U	0.066	UJV	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U
MW-24	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-25	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-25A	1/22/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.067	
MW-26	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-27	2/8/93	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
MW-27	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-27+	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-28	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-29	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-30	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-32	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-34	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-31	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-33	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-33+	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
MW-35	2/17/94	0.065	UJV	0.065	UJV	0.065	UJV	0.065	UJV	0.065	UJV	0.065	UJV	0.065	UJV
MW-37	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-38D	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	UJV
MW-39D	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-40D	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	UJV	0.065	U
MW-43	2/9/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U
MW-44D	2/9/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U
MW-45	2/9/93	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
MW-45+	2/9/93	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-46	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-47	2/9/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U
MW-47	1/22/93	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U
MW-48D	2/9/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U
MW-49	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-57	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U

Table A-8:

Concentrations of Pesticides and Polychlorinated Biphenyls (PCBs) (μg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-57 +	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-59	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-61	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-62D	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MW-63	2/17/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
TW-3	12/6/93	0.072	U	0.072	U	0.072	U	0.072	U	0.072	U	2.4		1.9	
Field and Trip Blanks															
FB-1	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
FB-2	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
FB-3	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
TB-1	1/3/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
TB-2	1/4/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	
TB-3	1/7/91	DNU		DNU		DNU		DNU		DNU		DNU		DNU	

ug/L- Micrograms per liter
DNU- Data determined to not be usable for purposes of quantitative risk assessment
NA - Not analyzed.
B - Detected in laboratory blank.
U - Indicates that the compound was analyzed for but not detected.
J - Estimated value.
V - Qualifier added and/or value altered during data validation.
I - Results declared inconclusive during data validation.
FB - Field blank
TB - Trip blank
\+ - Indicates reanalysis.

Table A-9:

Concentrations of Metals ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Calcium		Chromium	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/8/91	14200	N*V	<7.6	WV	5.0	B	132	B	<1.6		<5.0		12900		27	
MW-19	1/5/91	1710	N*V	<7.6		<3.0		89	B	<1.6		<5.0		49300		6.7	BWV
MW-23	1/8/91	887	N*V	<7.6		<3.0		532		<1.6		<5.0		70300	V	9.0	B
MW-25	1/5/91	22600	N*V	<7.6		<3.0		247		2.0	B	7.0		16500		81	
MW-25	1/15/93	18000		21	U	1.0	U	191	B	1.1	B	2.0	U	28100		42.0	
MW-26	1/4/91	15300	N*V	<7.6		3.3	B	318		<1.6		<5.0		75200		43	
MW-28	1/8/91	1760	N*V	<7.6		<3.0		47	B	<1.6		<5.0		24200		5.2	B
MW-29	1/4/91	294	N*V	<7.6		5.9	B	152	B	<1.6		<5.0		64500		<2.2	
MW-29	2/9/93	5800		21.0	U	5.4	B	168	B	1.0	U	2.0	U	63600		4.9	B
MW-32	1/4/91	869	N*V	<7.6		<3.0		28	B	<1.6		<5.0		31900		5.5	B
MW-33	1/5/91	4460	N*	<7.6		<3.0		95	B	<1.6		<5.0		28700		15	
MW-33+	1/5/91	3150	N*V	<7.6		<3.0		105		<1.6		<5.0		30400		13	
MW-35	2/9/93	9210		21.0	U	16.5	S	696		1.0	U	2.0	U	65300		27.8	
MW-37	2/17/94	297		29.0	U	3.4	BWJV	59.8	B	1.0	U	2.0	U	9950		8.0	U
MW-43	2/9/93	4420		21.0	U	1.2	B	142	B	1.0	U	2.0	U	29800		3.0	U
MW-44D	2/9/93	3260		21.0	U	2.0	B	207		1.0	U	2.0	U	148000		9.3	B
MW-45	2/9/93	1030		21.0	U	1.0	U	67.5	B	1.0	U	2.0	U	47600		3.0	U
MW-45+	2/9/93	872		21.0	U	1.2	B	66.0	B	1.0	U	2.0	U	47700		3.0	U
MW-46	2/9/93	80000		21.0	U	10.9		1030		3.7	B	4.4	B	57000		146	
MW-47	2/9/93	7660		21.0	U	2.1	B	87.6	B	1.0	U	2.2	B	83800		17.4	
MW-48D	2/9/93	11900		21.0	U	3.6	B	199	B	1.0	U	2.0	U	95300		39.1	
MW-49	2/17/94	86.2	B	29.0	U	7.4	B	330		1.0	U	2.0	U	24400		8.0	U
MW-57	2/17/94	470		29.0	U	1.0	B	47.0	B	1.0	U	2.0	U	27300		8.0	U
MW-57+	2/17/94	371		45.5	B	1.0	U	34.7	B	1.0	U	2.0	U	27500		8.0	U
MW-59	2/17/94	614		29.0	U	3.0	B	18.1	B	1.0	U	2.0	U	26800		8.0	U
MW-61	2/17/94	174	B	29.0	U	1.0	U	64.1	B	1.0	U	2.0	U	79800		8.0	U
MW-62D	2/17/94	264		46.9	B	1.0	U	102	B	1.0	U	2.0	U	108000		8.0	U
MW-63	2/17/94	823		29.0	U	1.0	U	176	B	1.0	U	2.0	U	128000		8.0	U

Table A-9:

Concentrations of Metals ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Calcium		Chromium	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/4/91	<97	N*V	<7.6		<3.0		<3.2		<1.6		<5.0					
FB-2	1/5/91	100	BN*V	<7.6		<3.0		<3.2		<1.6		<5.0		403	B	2.7	B
FB-3	1/8/91	168	BN*V	<7.6		<3.0		<3.2		<1.6		<5.0		568	B	<2.2	
TB-1	1/4/91	<97	N*V	<7.6		<3.0		<3.2		<1.6		<5.0		381	B	7.4	B
TB-2	1/5/91	<97	N*V	<7.6		<3.0		<3.2		<1.6		<5.0		523	B	<2.2	WV
TB-3	1/8/91	119	BN*V	<7.6		<3.0		<3.2		<1.6		<5.0		210	B	<2.2	
														496	B	8.2	B

Table A-9:

Concentrations of Metals (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury		Nickel	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/8/91	<8.7		61		24100		89	N*V	5780		1060	NV	0.5		26	B
MW-19	1/5/91	<8.7		17	B	2710		50	N*V	6290		2340	NV	0.5		<22	
MW-23	1/8/91	<8.7		31		14000		31	N*V	15900		2940	NV	0.7		<22	
MW-25	1/5/91	35	B	101		63000		93	N*V	11300		3490	NV	<0.2		71	
MW-25	1/15/93	26.1	B	98.1		50000	JV	37.8		13400		2550		0.20	U	56.3	
MW-26	1/4/91	23	B	62		28700		67	N*V	23400		3720	NV	0.2		38	B
MW-28	1/8/91	<8.7		<11		1790		40	N*V	4260	B	1090	N	0.5		26	
MW-29	1/4/91	<8.7		<11		21400		38	N*V	21200		2750	NV	0.2		<22	
MW-29	2/9/93	4.3	B	40.3		32600		43.7		21700		2380		0.20	U	21.0	U
MW-32	1/4/91	<8.7		18	B	1430		49	N*V	11500		229	NV	0.2		<22	
MW-33	1/5/91	12	B	<11		7450		17	N*	8860		484	N	<0.2		27	B
MW-33+	1/5/91	19		12		4940		53	N*V	8250		442	NV	<0.2		<22	
MW-35	2/9/93	6.2	B	114		45200		207		15100		1280		0.49		22.6	B
MW-37	2/17/94	3.0	U	6.5	B	749		1.3	BWJV	1540	B	803		0.20	U	11.0	U
MW-43	2/9/93	5.6	B	46.2		8410		5.4		15000		3470		0.20	U	21.0	U
MW-44D	2/9/93	3.4	B	43.0		8930		5.7		49800		1750		0.20	U	21.0	U
MW-45	2/9/93	3.0	U	31.2		1760		2.2	B	12500		142		0.20	U	21.0	U
MW-45+	2/9/93	3.0	U	19.1	B	1570		2.2	B	12400		126		0.20	U	21.0	U
MW-46	2/9/93	111		421		152000		165		47200		9410		0.40		186	
MW-47	2/9/93	5.8	B	38.8		9890		10.8		28000		135		0.20	U	21.1	B
MW-48D	2/9/93	11.3	B	62.0		28500		19.0		42200		721		0.20	U	24.5	B
MW-49	2/17/94	15.5	B	13.8	B	118000		1.0	BWJV	5340		3030		0.20	U	11.0	U
MW-57	2/17/94	3.0	U	31.2		874		5.7	W	5760		1700		0.20	U	11.0	U
MW-57+	2/17/94	3.5	B	28.7		689		4.9	W	5760		1700		0.20	U	11.0	U
MW-59	2/17/94	3.0	U	9.6	B	966		3.2	WJV	1750	B	85.2		0.20	U	11.0	U
MW-61	2/17/94	3.0	U	8.1	B	377		1.0	WJ	21100		96.8		0.20	U	11.0	U
MW-62D	2/17/94	3.0	U	11.8	B	679		1.0	UWJV	42900		130		0.20	U	11.0	U
MW-63	2/17/94	3.4	B	10.5	B	1900		1.4	BWJV	30900		2120		0.20	U	11.0	U

Table A-9:

Concentrations of Metals (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury		Nickel	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks																	
FB-1	1/4/91	<8.7		<11		69	B	41	N*V	<71		<3.4	N	0.7		<22	
FB-2	1/5/91	<8.7		<11		140		12	N*V	80	B	<3.4	N	0.3		<22	
FB-3	1/8/91	<8.7		12	B	81	B	9.1	WN*V	176	B	<3.4	N	0.2		<22	
TB-1	1/4/91	<8.7		<11		71		11	N*V	<71		<3.2	NV	<0.2		<22	
TB-2	1/5/91	<8.7		<11		79	B	9.2	N*V	<71		<3.4	NV	<0.2		<22	
TB-3	1/8/91	<8.7		<11		64	B	43	N*V	144	B	<3.4	NV	0.6		<22	

Table A-9:

Concentrations of Metals ($\mu g/L$) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Potassium		Selenium		Silver		Sodium		Thallium		Vanadium		Zinc	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-13	1/8/91	3830		<3.3	N*WV	<2.5		90000		<3.5	WNV	32	B	98	
MW-19	1/5/91	5820		<3.3	N*V	<2.8		40700		<3.5	WNV	<9.2		32	
MW-23	1/8/91	5460		<3.3	N*V	<2.5		209000		<3.5	WNV	<9.2		28	
MW-25	1/5/91	5370		<3.3	N*WV	<2.8		4470		<3.5	NV	79		228	
MW-25	1/15/93	4870	B	1.0	U	3.0	U	16700		2.0	U	61.6		234	UV
MW-26	1/4/91	5800		<3.3	N*WV	<2.8		12700		<3.5	WNV	30	B	73	
MW-28	1/8/91	5020		<3.3	N*WV	<2.8		134000		<3.5	WNV	<9.2		20	
MW-29	1/4/91	7070		<3.3	N*WV	<2.8	WV	169000		<3.5	WNV	<9.2		13	B
MW-29	2/9/93	7030		2.0	U	3.0	U	132000		2.0	U	24.8	B	35.8	
MW-32	1/4/91	3640	B	<3.3	N*V	<2.8		93400		<3.5	NV	<9.2		31	
MW-33	1/5/91	4470	B	10.1	R	<2.8		43900		<3.5	WNV	<9.2		92	
MW-33+	1/5/91	4180		<3.3	N*WV	<2.8	WV	44800		<3.5	WNV	<9.2		71	
MW-35	2/9/93	6180		2.0	U	3.0	U	131000		2.0	U	51.4		153	
MW-37	2/17/94	1220	B	1.2	BW	3.0	U	176000		1.0	U	9.4	B	19.1	B
MW-43	2/9/93	1590	B	2.0	U	3.0	U	213000		2.0	U	6.0	U	55.1	
MW-44D	2/9/93	7470		2.0	U	3.0	U	91900		2.0	U	9.2	B	36.3	
MW-45	2/9/93	2950	B	2.0	U	3.0	U	14700		2.0	U	6.0	U	27.8	
MW-45+	2/9/93	3040	B	2.0	U	3.0	U	14700		2.0	U	6.0	U	20.3	
MW-46	2/9/93	19800		2.0	U	3.0	U	41400		2.0	U	205		696	
MW-47	2/9/93	7160		2.0	U	3.0	U	61900		2.0	U	47.0	B	53.0	
MW-48D	2/9/93	11900		2.0	U	3.0	U	19300		2.0	U	53.5		67.4	
MW-49	2/17/94	2630	B	1.0	WJV	3.0	U	13700		1.0	U	7.0	U	76.5	
MW-57	2/17/94	2890	B	1.1	BWJV	3.0	U	71500		1.0	U	7.0	U	41.5	
MW-57+	2/17/94	2980	B	1.9	BW	3.0	U	71400		1.0	U	7.0	U	39.8	
MW-59	2/17/94	4370	B	3.0	BWJV	3.0	U	54300		1.0	U	10.9	B	25.2	
MW-61	2/17/94	2220	B	4.7	BS	3.0	U	26800		1.0	U	7.0	U	13.7	B
MW-62D	2/17/94	2860	B	2.7	BJV	3.0	U	130000		1.0	U	7.0	U	14.6	B
MW-63	2/17/94	5140		1.4	BWJV	3.0	U	77200		1.0	U	7.0	U	25.9	

Table A-9:

Concentrations of Metals (µg/L) in Ground-Water Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Potassium		Selenium		Silver		Sodium		Thallium		Vanadium		Zinc	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
Field and Trip Blanks															
FB-1	1/4/91	<34		<3.3	N*V	<2.8	WV	720	B	<3.5	NV	<9.2		11	B
FB-2	1/5/91	<34		<3.3	N*WV	<2.8		800	B	<3.5	NV	<9.2		28	
FB-3	1/8/91	140	B	<3.3	N*WV	<2.5	W	230	B	<3.5	N	16	B	9.0	B
TB-1	1/4/91	<34		<3.3	N*V	<2.8		660	B	<3.5	NV	<9.2		13	B
TB-2	1/5/91	<34		<3.3	N*V	<2.8		530	B	<3.5	N	<9.2		8.0	B
TB-3	1/8/91	250	B	<3.3	N*WV	<2.5		480	B	<3.5	N	12	B	6.0	B

ug/L - Micrograms per liter
< or U - Indicates analyte result less than instrument detection limit (IDL).
B - Indicates analyte result between IDL and contract required detection limit (CRDL).
S - The reported value was determined by the method of standard additions (MSA).
J - Estimated value.
V - Qualifier added and/or value altered during validation.
W - Post digest spike recovery out of range.
N- Matrix spike outside of recovery limits.
R- Declared unusable during data validation.
FB- Field blank.
TB- Trip blank.
+ - Indicates reanalysis
*- Indicates duplicate RPD is out of control

Table A-10:

Concentrations of Polychlorinated Biphenyls (PCBs) (μg/kg) in Sediment Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
CBS-28 (bottom)	4/28/94	96	U	96	U	96	U	96	U	96	U	230		260	
MHS-1 (bottom)	4/28/94	530	U	530	U	530	U	530	U	530	U	1,800		1,700	
MHS-2	2/9/93	5,400	U	11,000	U	5,400	U	5,400	U	5,400	U	24,000	V	58,000	V
MHS-2 (bottom)	4/26/94	1,200	U	1,200	U	1,200	U	1,200	U	2,000	J	2,400	U	9,900	J
MHS-29 (bottom)	4/27/94	100	U	100	U	100	U	100	U	100	U	200	U	170	J
MHS-3	2/8/93	4,100	U	8,400	U	4,100	U	3,000	JPV	4,100	U	29,000	PV	22,000	PV
MHS-35	4/28/94	170	U	170	U	170	U	700		170	U	340	U	250	J
MHS-37 (bottom)	4/28/94	510	U	510	U	510	U	510	U	510	U	1,000	U	9,400	
MHS-40 (east)	4/25/94	1,000	U	1,000	U	1,000	U	1,000	U	5,200	J	2,000	U	11,000	J
MHS-40 (south)	4/25/94	1,000	U	1,000	U	1,000	U	1,000	U	2,100	J	2,000	U	13,000	J
MHS-42 (bottom)	4/26/94	2,100	U	2,100	U	2,100	U	2,100	U	13,000	J	4,300	U	38,000	J
MHS-45 (bottom)	4/28/94	110	U	110	U	110	U	110	U	53	J	700	J	750	J
MHS-52 (bottom)	4/26/94	110	U	110	U	110	U	110	U	110	U	1,600	J	1,300	J
MHS-55 (bottom)	4/26/94	1,000	U	1,000	U	1,000	U	1,000	U	1,000	U	13,000	J	12,000	J
MHS-65 (bottom)	4/28/94	150	U	150	U	150	U	150	U	220		300	U	440	
MHS-69 (northeast)	4/28/94	1,100	U	1,100	U	1,100	U	1,100	U	1,100	U	2,100	U	4,700	
MHS-69 (east)	4/28/94	2,000	U	2,000	U	2,000	U	2,000	U	2,000	U	4,100	U	29,000	J
MHS-8	2/9/93	43	U	87	U	43	U	43	U	43	U	860	P	2,200	
MHS-8DL	2/9/93	430	U	870	U	430	U	430	U	430	U	1,300	JPDV	2,900	DV

U - Indicates that the compound was analyzed for but not detected.
D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.
P - This flag is used for a pesticide/aroclor target analyte when there is a greater than 25 percent difference for detected concentrations between the two GC columns. The lower of the two concentrations was reported.
J - Estimated value.
V - Qualifier added and/or value altered during validation.
DL - Indicates sample was analyzed at a secondary (higher) dilution. Based on data validation, either the primary or secondary results of some of some Aroclors were considered to be more representative of actual conditions.

Table A-11:

Concentrations of Volatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Chloromethane		Bromomethane		Vinyl Chloride		Chloroethane		Methylene Chloride		Acetone		Carbon Disulfide	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	10	U	10	U	10	U	10	UV	10	U
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	10	UV	10	U

Table A-11:

Concentrations of Volatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		1,1-Dichloroethene		1,1-Dichloroethane		1,2-Dichloroethene (total)		Chloroform		1,2-Dichloroethane		2-Butanone		1,1,1-Trichloroethane	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	10	U	1	J	10	U	10	U	6	J
MHW-2	2/9/93	10	U	10	U	10	U	5	J	10	U	10	U	10	U

Table A-11:

Concentrations of Volatile Organic Compounds (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Carbon Tetrachloride		Bromodichloro methane		1,2-Dichloropropane		cis-1,3-Dichloropropene		Trichloroethene		Dibromochloro-methane		1,1,2-Trichloroethane	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U

Table A-11:

Concentrations of Volatile Organic Compounds (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Benzene		trans-1,3-Dichloropropene		Bromoform		4-Methyl-2-Pentanone		2-Hexanone		Tetrachloroethene		1,1,2,2-Tetrachloroethane	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	6	J	10	U	10	U	10	UV	10	U	10	U	10	U
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U

Table A-11:

Concentrations of Volatile Organic Compounds (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Toluene		Chlorobenzene		Ethylbenzene		Styrene		Xylenes (total)	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	8	J	10	U	3	J	10	U	51	
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U

U - Indicates that the compound was analyzed for but not detected.

J - Estimated value.

V - Qualifier added and/or value altered during validation.

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Phenol		bis(2-Chloroethyl)ether		2-Chlorophenol		1,3-Dichlorobenzene		1,4-Dichlorobenzene		Benzyl alcohol		1,2-Dichlorobenzene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	NA		10	U

Table A-12:

Concentrations of Semivolatile Organic Compounds (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		2-Methylphenol		2,2'-oxybis(1-Chloropropane)		4-Methylphenol		N-Nitroso-di-n-propylamine		Hexachloroethane		Nitrobenzene		Isophorone	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	UJV	10	U	10	U	10	U	10	U	10	U
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U

05523G\6\A1SWSVC.XLS

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		2-Nitrophenol		2,4-Dimethylphenol		Benzoic acid		bis(2-Chloroethoxy) methane		2,4-Dichlorophenol		1,2,4-Trichlorobenzene		Naphthalene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	NA		10	U	10	U	10	U	2	J
MHW-2	2/9/93	10	U	10	U	NA		10	U	10	U	1	J	0.7	J

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		4-Chloroaniline		Hexachloro butadiene		4-Chloro-3-Methylphenol		2-Methylna phthalene		Hexachlorocyclo pentadiene		2,4,6-Trichlorophenol		2,4,5-Trichlorophenol		2-Chlorona
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.
MHW-1	2/9/93	10	UJV	10	U	10	U	1	J	10	U	10	U	25	U	10
MHW-2	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	26	U	10

Table A-12:

Concentrations of Semivolatile Organic Compounds (μg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		hthalene	2-Nitroaniline		Dimethylphthalate		Acenaphthylene		2,6-Dinitrotoluene		3-Nitroaniline		Acenaphthene		2,4-Dinitrophenol	
Location	Date	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	U	25	U	10	U	10	U	10	U	25	U	10	U	25	UJV
MHW-2	2/9/93	U	26	U	10	U	10	U	10	U	26	U	10	U	26	U

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		4-Nitrophenol		Dibenzofuran		2,4-Dinitrotoluene		Diethylphthalate		4-Chlorophenyl-phenylether		Fluorene		4-Nitroaniline	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	25	U	10	U	10	U	10	U	10	U	10	U	25	U
MHW-2	2/9/93	26	U	0.9	J	10	U	10	UV	10	U	10	U	26	U

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		4,6-Dinitro-2-methylphenol		N-Nitrosodiphenylamine (1)		4-Bromophenyl-phenylether		Hexachloro benzene		Pentachloro phenol		Phenanthrene		Anthracene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	25	U	10	U	10	U	10	U	25	U	10	U	10	U
MHW-2	2/9/93	26	U	10	U	10	U	10	U	26	U	7	J	2	J

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Di-n-butylphthalate		Fluoranthene		Pyrene		Butylbenzyl phthalate		3,3'-Dichlorobenzidine		Benzo(a)anthracene		Chrysene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MHW-2	2/9/93	10	UV	16		10	J	10	UV	10	U	3	J	7	J

Table A-12:

Concentrations of Semivolatile Organic Compounds ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Bis(2-Ethylhexyl) phthalate		Di-n-octylphthalate		Benzo(b) fluoranthene		Benzo(k fluoranthene		Benzo(a) pyrene		Indeno(1,2,3-cd) pyrene		Dibenz(a,h) anthracene		Benzo(g,h,i) perylene	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	10	UV	10	U	10	U	10	U	10	U	10	U	10	U	10	U
MHW-2	2/9/93	10	UV	10	U	4	J	10	U	10	U	10	U	10	U	10	U

U - Indicates that the compound was analyzed for but not detected.

J - Estimated value.

V - Qualifier added and/or value altered during validation.

Table A-13:
Concentrations of Polychlorinated Biphenyls (PCBs) ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MHW-1	2/9/93	0.066	U	0.066	U	0.066	U	0.066	U	0.066	U	0.33	UV	0.13	UV
MHW-1 (bottom)	4/28/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHWF-1	4/28/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-2	2/9/93	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	1.1	JV	1.2	JV
MHW-2	4/26/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.23	J	0.43	J
MHWF-2	4/26/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ
MHW-3	2/8/93	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.32	UV	0.31	UV
MHW-5	2/8/93	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-6	2/8/93	0.067	U	0.067	U	0.067	U	0.067	U	0.067	U	0.48	UV	0.33	UV
MHW-7	2/8/93	0.32	U	0.32	U	0.32	U	0.32	U	2.6		5.9		6.3	
MHW-8	2/9/93	0.33	U	0.33	U	0.33	U	0.33	U	0.33	U	9.6	JV	11	JV
MHW-29 (bottom)	4/27/94	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	1.0	U	1.0	U
MHW-39 (bottom)	4/26/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.20	J
MHW-39	4/26/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-40	4/25/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-40	4/25/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.24	J	0.27	J
MHWF-40	4/25/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-43	4/27/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ
MHW-43 DUP	4/27/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.22	J	0.56	J
MHW-52	4/26/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-52	4/26/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-52	4/26/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHWF-52	4/26/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ
MHW-59	4/28/94	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U	0.065	U
MHW-69	4/28/94	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U	1.0	U	4.4	
CBW-28	4/28/94	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ	0.065	UJ

U - Indicates that the compound was analyzed for but not detected.
J - The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.
B - Indicates that compound was found in blanks as well as the sample.
V - Qualifier added and/or value altered during data validation.
DUP - Duplicate sample
F - Filtered sample

Table A-14:

Concentrations of Metals (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Calcium		Chromium	
Location	Date	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
MHW-1	2/9/93	131	B	21.0	U	5.0	B	150	B	1.0	U	2.0	U	52300		7.6	B
MHW-2	2/9/93	501		21.0	U	2.8	B	154	B	1.0	U	7.8		8380		34	

Table A-14:

Concentrations of Metals ($\mu g/L$) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Cobalt		Copper		Iron		Lead		Magnesium		Manganese		Mercury		Nickel	
Location	Date	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
MHW-1	2/9/93	3.0	U	50.6		33000		15.1		16000		1670		1.6	UV	21.0	U
MHW-2	2/9/93	3.0	U	94.5		15300		21.6	S	2010	B	175		2.0	UV	21.0	U

Table A-14:

Concentrations of Metals (µg/L) in Water Samples Collected from the Sewers at the Sunnyside Yard, Queens, New York

Sample I.D.		Potassium		Selenium		Silver		Sodium		Thallium		Vanadium		Zinc	
Location	Date	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.	Conc.	Qual.
MHW-1	2/9/93	4940	B	2.0	U	3.0	U	90000		2.0	U	6.0	U	75.5	
MHW-2	2/9/93	2660	B	2.0	U	3.0	U	12800		2.0	U	6.0	U	130	

U - Indicates analyte result less than instrument detection limit (IDL).

B - Indicates analyte result between IDL and contract required detection limit (CRDL).

S - The reported value was determined by the method of standard additions (MSA).

V - Qualifier added and/or value altered during validation.

Table A-15:

Concentrations of Polychlorinated Biphenyls (PCBs) (μg/kg) in Separate-Phase Petroleum Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Aroclor-1016		Aroclor-1221		Aroclor-1232		Aroclor-1242		Aroclor-1248		Aroclor-1254		Aroclor-1260	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-36DL	2/8/93	10,000	U	20,000	U	10,000	U	10,000	U	10,000	U	10,000	U	14,000	PD
MW-36	2/8/93	1,000	U	2,000	U	1,000	U	1,000	U	1,000	U	1,000	U	14,000	
MW-50	2/17/94	2,400	U	2,400	U	2,400	U	2,400	U	2,400	U	4,800	U	18,000	
MW-53	2/17/94	2,400	U	2,400	U	2,400	U	2,400	U	2,400	U	5,300	JV	3,100	JV
MW-54	2/17/94	2,400	U	2,400	U	2,400	U	2,400	U	2,400	U	5,200	JV	2,200	JV
MW-60	2/17/94	2,400	U	2,400	U	2,400	U	2,400	U	2,400	U	4,800	UJV	830	

U - Indicates that the compound was analyzed for but not detected.
D - Indicates analysis performed at a secondary dilution factor.
P - This flag is used for a pesticide/Aroclor target analyte when there is a greater than 25 percent difference for detected concentrations between the two GC columns. The lower of the two concentrations was reported.
J - Estimated value.
V - Qualifier added and/or value altered during validation.
DL - Indicates sample was analyzed at a secondary (higher) dilution. During data validation, either the primary or secondary results of some Aroclor species are considered to be more representative of actual conditions.

Although these data were reported by the laboratory in ug/kg, specific gravity of 0.87 was used to convert units to ug/L.

Table A-16:

Concentrations of Total Petroleum Hydrocarbons (TPH) (mg/kg) in Separate-Phase Petroleum Samples Collected at the Sunnyside Yard, Queens, New York

Sample I.D.		Gasoline		Kerosene		Diesel		Residual Oil		#2 Fuel Oil		#4 Fuel Oil		#6 Fuel Oil	
Location	Date	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.	Conc.	Lab. Qual.
MW-50	2/17/94		U		U		U		U	1090000.0	U		U		U
MW-53	2/17/94		U		U		U		U	961000.0	U		U		U
MW-54	2/17/94		U		U		U		U	1550000.0	U		U		U
MW-60	2/17/94		U		U		U		U	920000.0	U		U		U

U - Indicates that the compound was analyzed for but not detected.
These data were not used quantitatively in the baseline RA. See Section 3.6.2.6.

APPENDIX B

Toxicological Profiles

TABLE OF CONTENTS

TABLES

1.0 VOLATILE ORGANIC COMPOUNDS

1.1 Acetone

Acetone is a clear, volatile liquid that is also highly flammable. Acetone is used as a solvent for waxes, resins, rubber, plastics, lacquers, varnishes and rubber cement. It is also found in paint removers (Merck, 1989). Acetone is extensively used in laboratories and is considered by the USEPA to be one of the common laboratory contaminants (USEPA, 1989).

Acetone is considered to be one of the least toxic solvents (Krasavage *et al.*, 1981). The main effects noted in humans following exposure to acetone are eye, nose and throat irritation. However, exposure to concentrations of acetone greater than 10,000 parts per million (ppm) may result in central nervous system (CNS) depression (Krasavage *et al.*, 1981). Data from the workplace have confirmed the relatively low toxicity of acetone. Workers exposed 8 hours a day for 5 days a week to an average atmospheric concentration of acetone of 1000 ppm experienced only an occasional incidence of eye and nose irritation (Raleigh and McGee, 1972). From this study it was concluded that airborne concentrations of 1000 ppm or less are not associated with negative human health effects with the exception of some eye and nose irritation.

A reference dose of 1E-1 mg/kg-day has been developed by the USEPA based upon a subchronic oral study in rats (USEPA, 1994). Acetone was given to rats at doses of 0, 100, 500, or 2500 mg/kg/day. Critical effects noted were increased liver and kidney weights and tubular degeneration in the kidneys. The lowest observed adverse effect level (LOAEL) in this study was 500 mg/kg/day (USEPA, 1994). Acetone is given a D classification by the Carcinogen Assessment Group (CAG), which means that acetone is not classifiable as to human carcinogenicity.

In the atmosphere, acetone should exist exclusively in the vapor phase (ATSDR, 1992). Acetone is completely miscible in water, suggesting that the partitioning of acetone from water to soils and sediments is not significant (ATSDR, 1992). The log of the organic carbon partition coefficient (K_{oc}) for acetone has been estimated at 0.73, further indicating that adsorption of acetone onto soil particulates is not significant (ATSDR, 1992).

ATSDR. 1992. Toxicological Profile for Acetone. Agency for Toxic Substances and Disease Registry.

Krasavage, W., J. O'Donoghue, and G. Divincenzo. 1981. Chapter 56: Ketones. Patty's Industrial Hygiene and Toxicology. Edited by Clayton and Clayton.

Merck. 1989. The Merck Index. Eleventh Edition. Published by Merck Co. Inc., Rahway, NJ.

Raleigh, R. and W. McGee. 1972. Effects of Short High Concentration Exposures to Acetone as Determined by Observation in the Work Area. J. Occup. Med. 14: 607-610.

USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, Interim Final, EPA/540/1-89/002, December.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.2 Benzene

Benzene is a colorless liquid that is widely used due to its effective solvent properties. Benzene is used extensively in the glue and veneer industries and in the metal processing industries (Sandmeyer, 1981).

The acute and chronic human health effects associated with benzene exposure have been known since at least the 1920s (Greenburg, 1926a, 1926b; Hamilton, 1922, 1931). This early information regarding benzene toxicity resulted from observations in factories where benzene was extensively used as a solvent (Greenburg, 1926a, 1926b; Hamilton, 1922, 1931). Acutely, benzene vapors work as an asphyxiation agent, leading to central nervous system irritation, convulsions, and ultimately death due to paralysis of the respiratory center (Hamilton, 1922, 1931). Ingestion of benzene is also associated with CNS depression and respiratory arrest. Lethal oral doses in humans are estimated at 10 ml (8.8 g or 125 mg/kg) (ATSDR, 1991).

The hematopoietic system is the target organ system for the toxic action of benzene in humans and animals. Chronic exposure to benzene results in pancytopenia, a reduction in the amount of all three major types of blood cells (red blood cells, white blood cells and platelets). If exposure continues, pancytopenia may progress to aplastic anemia, a condition in which the bone marrow fails to produce any blood cell elements.

Early reports of chronic benzene poisoning (Greenburg, 1926a, 1926b; Hamilton, 1922, 1931) describe hemorrhages ("purpuric" spots) seen under the skin of employees repeatedly exposed to benzene vapors. Bleeding from the gums and nose was also observed in these employees (Hamilton, 1922.) Autopsies on persons who had died as a result of chronic benzene exposure revealed decreased numbers of white and red blood cells and fatty degeneration of the heart and liver (Greenburg, 1926a; Hamilton, 1922, 1931). More recently, the work histories and medical records of over 400 workers employed between 1940 and 1975 at a rubber manufacturing plant were reviewed (Kipen *et al.*, 1989). During the period of 1940 to 1949 when benzene concentrations in air were approximately 75 parts per million (ppm), workers exhibited significant decreases in the number of total blood cell elements (white cells, red cells and platelets). However, for the years 1940 to 1975, when airborne benzene concentrations were decreased to approximately 20 ppm, this trend did not persist among the workers (Kipen *et al.*, 1989).

Exposure to benzene is associated with leukemia, a neoplastic disease of the hematopoietic system. Aksoy *et al.* (1974) noted an increased incidence of leukemia and pre-leukemia in Turkish shoe workers exposed to benzene. These employees had a mean duration of employment of 9.7 years and peak to airborne concentrations of benzene were reported to be 210 to 650 ppm. In a retrospective cohort mortality study, Rinsky *et al.* (1981) observed a statistically significant increase of leukemia in workers exposed to benzene. Both gavage and inhalation exposure of rodents to benzene have resulted in the development of neoplasms (ATSDR, 1991).

A risk assessment is currently under review for benzene by a USEPA workgroup (USEPA, 1994a). No RfD is currently available on IRIS (USEPA, 1994a) for any potential noncarcinogenic health effects resulting from benzene exposure. Benzene is classified by the USEPA as a human carcinogen (class A) based on increased incidence of nonlymphocytic leukemia in workers exposed to benzene and increased incidence of neoplasia in rats and mice exposed by inhalation and gavage (USEPA, 1994a). The USEPA (1994a) has established an oral CPF of 2.9E-2 $(mg/kg/day)^{-1}$ for the carcinogenic effects of benzene. For inhalation exposure, the same CPF, 2.9E-2 $(mg/kg/day)^{-1}$, is presented in HEAST (USEPA, 1994b) for benzene.

Benzene is highly volatile (vapor pressure of 95 mm Hg at 25° C) and soluble in water (1780 mg/L at 25° C). These two properties are considered to have the greatest influence on the environmental transport and partitioning of benzene (ATSDR, 1991). The Henry's Law Constant of 5.5E-3 atm-m^3/mol indicates that benzene present in surface waters partitions into the air. Since benzene is very soluble in water, removal of benzene from the atmosphere by wet deposition is expected. Based on the log octanol-water partition coefficient of 2.13 for benzene, benzene is not expected to bioconcentrate in aquatic organisms (ATSDR, 1991). The half-life of benzene in surface soil is approximately five to sixteen days.

Aksoy, M.S. Erdem, and G. Dincol. 1974. Leukemia in shoe-workers exposed chronically to benzene. Blood. **44**: 837; as cited in USEPA, 1994a.

ATSDR. 1991. Draft Toxicological Report for Benzene. Agency for Toxic Substances and Disease Registry.

Greenburg, L. 1926a. Benzol poisoning as an industrial hazard. Parts I and II. Public Health Reports. **41**: 1357-1375.

Greenburg, L. 1926b. Benzol poisoning as an industrial hazard. Parts III, IV, and V. Public Health Reports. **41**: 1410-1431.

Hamilton, A.. 1922. The growing menace of benzene (benzol) poisoning in American industry. J Amer Med Assoc. **78**: 627-630.

Hamilton, A. 1931. Benzene (benzol) poisoning. Arch Pathol. **11**: 434-454.

Kipen, H.M., R.P. Cody, and B.D. Goldstein. 1989. Use of longitudinal analysis of peripheral blood counts to validate historical reconstructions of benzene exposure. Environ Health Perspect. **82**: 199-206; as cited in ATSDR, 1991.

Rinsky, R.A., R.J. Young, and A.B. Smith. 1981. Leukemia in benzene workers. Amer J Ind Med. **2**: 217-245; as cited in USEPA, 1994a.

Sandmeyer, E.E. 1981. Chapter 47: Aromatic Hydrocarbons. In: Patty's Industrial Hygiene and Toxicology. Vol. II B.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

1.3 Carbon Disulfide

Carbon disulfide is a yellowish liquid that evaporates at room temperature. While carbon disulfide is used predominately in the viscose rayon industry, carbon disulfide is also used as a solvent for cleaning and extractions in the metal treatment and plating industries (USEPA, 1994).

The main target organ of carbon disulfide toxicity is the CNS. Persons exposed to carbon disulfide in the workplace have experienced headache, delirium, dizziness, tremor, and convulsions (HSDB, 1991). There is also evidence that exposure to carbon disulfide affects the cardiovascular system in humans. Epidemiology studies have reported increased mortality rates from cardiovascular disease in workers occupationally exposed to carbon disulfide (ATSDR, 1990). Hernberg *et al.* (1971) observed an increase in incidence of elevated blood pressure among persons occupationally exposed to carbon disulfide. Carbon disulfide is also a strong dermal irritant; dermal contact with carbon disulfide may result in severe burns.

In a study to evaluate the potential effects of carbon disulfide exposure on laboratory animals, female rats and rabbits were exposed to 20 ppm and 40 ppm carbon disulfide for 34 weeks prior to breeding and also during the entire length of pregnancy (Hardin *et al.*, 1981). The dose concentrations of 20 ppm and 40 ppm correspond to estimated equivalent dosages of 5 and 10 mg/kg for rats and 11 and 22 mg/kg for rabbits. No effects on fetal development in rats or rabbits were noted at either of these two dose concentrations. However, fetal resorption was observed in rabbits at a dose of 25 mg/kg/day in an oral study (Jones-Price *et al.*, 1984a, 1984b).

The USEPA (1994) presents an oral RfD for carbon disulfide of 1E-1 mg/kg-day based upon the data from Hardin *et al.* (1981) and Jones-Price *et al.*, (1984a, 1984b). Carbon disulfide does not appear to have any carcinogenic potential.

Carbon disulfide has a high vapor pressure (352 mm Hg at 25 ° C) and preferentially partitions to the atmosphere when released to the environment. The Henry's Law Constant of 1.4E-3 atm-m^3/mol indicates that carbon disulfide in surface waters will partition into the air. Carbon disulfide has been classified as a mobile solvent with a minimal tendency to be retained by soils (ATSDR, 1990).

ATSDR. 1990. Draft Toxicological Profile for Carbon Disulfide. Agency for Toxic Substances and Disease Registry.

Hardin, B. D. , G. P. Bond, M. R. Sikor, F. D. Andrew, R. P. Beliles and R. W. Niemeir. 1981. Testing of selected work place chemicals for teratogenic potential. Scand. J. Work Environ. Health. 7(4): 66-75; as cited in USEPA, 1994.

Hernberg, S., C. H. Nordman, T. Partanen, *et al.* 1971. Blood lipids, glucose tolerance and plasma creatinine in workers exposed to carbon disulfide. Work Environ. Health. **8**: 11-16; as cited in ATSDR, 1990.

HSDB. 1991. Record for Carbon Disulfide from Hazardous Substance Data Bank. Database from National Library of Medicine.

Jones-Price, C., R. W. Tyl, M. C. Marr and C. A. Kimmel. 1984a. Teratologic Evaluation of Carbon Disulfide Administered to CD Rats on Gestational Days 6 through 15. National Center for Toxicological Research, Jefferson AR. PB 84-192343; as cited in USEPA, 1994.

Jones-Price, C., R. W. Tyl, M. C. Marr and C. A. Kimmel. 1984b. Teratologic Evaluation of Carbon Disulfide Administered to New Zealand White Rabbits on Gestational Days 6 through 15. National Center for Toxicological Research, Jefferson AR. PB 84-192343; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.4 Chloroform

Chloroform is a colorless liquid with a characteristic ethereal odor. It is used as a solvent for resins, as a cleaning agent, and in fire extinguishers (Merck, 1989; Torkelson and Rowe, 1981).

Hepatotoxicity is one of the major effects observed in both humans and animals following exposure to chloroform. Persons exposed to concentrations of chloroform in air ranging from 14 to 400 ppm for one to 6 months developed toxic hepatitis and jaundice. Additional symptoms noted among these persons included nausea and vomiting (Phoon *et al.*, 1983). In mice, fatty changes in the liver have been noted after acute inhalation exposures to chloroform at vapor concentrations of 100 ppm and greater (Culliford and Hewitt, 1957). Liver necrosis has been noted in rats exposed to airborne concentrations of 4885 ppm chloroform for 4 hours (Lundberg *et al.*, 1986).

The CNS is also a target for the toxic action of chloroform in both humans and animals. Airborne chloroform concentrations ranging from 8000 to 30,000 ppm were used in the past to induce anesthesia in humans (Smith *et al.*, 1973). Concentrations of chloroform exceeding 40,000 ppm are generally considered fatal to humans when administered for several minutes (ATSDR, 1991). Exposure to non-anesthetic concentrations of chloroform produces dizziness, vertigo, and headache in humans (ATSDR, 1991). In animals, exposure to chloroform via ingestion or inhalation has produced symptoms such as ataxia, narcosis, and anesthesia (ATSDR, 1991).

The USEPA (1994) has developed a RfD for chloroform of 1E-2 mg/kg-day. This RfD is based upon the observed formation of fatty cysts in the livers of beagle dogs receiving 15 or 30 mg chloroform/kg/day for 6 days/week for 7.5 years (Heywood *et al.*, 1979). Although the data for human carcinogenicity of chloroform are limited, chloroform is considered to be a probable human carcinogen (Class B2) based upon animal studies. In a gavage bioassay (NCI, 1976), rats and mice received chloroform in doses ranging from 90 to 500 mg/kg/day for 78 weeks. Significant increases in the incidence of kidney epithelial tumors and hepatocellular carcinomas were observed in some of the animals. Additionally, liver nodule hyperplasia and hepatomas were also observed. The oral cancer potency factor (CPF) developed by the USEPA (1994) for chloroform and used in the baseline RA is 6.1E-3 $(mg/kg/day)^{-1}$.

Based upon a vapor pressure of 159 mm Hg at 20 degrees C, chloroform is expected to exist predominately in the vapor phase in the atmosphere. Chloroform is also very soluble in water (approximately 7000 mg/L at 25 degrees C), and may be removed from the atmosphere by wet deposition (ATSDR, 1991).

ATSDR. 1991. Draft Toxicological Profile for Chloroform. Agency for Toxic Substances and Disease Registry.

Culliford, D. and H. Hewitt. 1957. The influence of sex hormone status on the susceptibility of mice to chloroform-induced necrosis of the renal tubules. J. Endocrin. **14**: 381-393; as cited in ATSDR, 1991.

Heywood, R., R. Sortwell, P. Noel, *et al.* 1979. Safety evaluation of toothpaste containing chloroform. III Long-term study in beagle dogs. J. Environ. Pathol. Toxicol. **2**: 835-851; as cited in USEPA, 1994.

Lundberg, I., M. Ekdahl, T. Kronevi, *et al.* 1986. Relative hepatotoxicity of some industrial solvents after intraperitoneal injection or inhalation exposure in rats. Environ. Res. **40**: 411-420; as cited in ATSDR, 1991.

Merck. 1989. The Merck Index. Eleventh Edition. Published by Merck Co. Inc., Rahway, NJ.

NCI. 1976. Report on Carcinogenesis Bioassay of Chloroform. National Cancer Institute. PB-265018; as cited in USEPA, 1994.

Phoon W. H. , K. T. Goh, L. T. Lee, *et al.* 1983. Toxic jaundice from occupational exposure to chloroform. Med. J. Malaysia. **38**: 31-34; as cited in ATSDR, 1991.

Smith, A.A., P.P. Volpitto, Z.W. Gramling, *et al.* 1973. Chloroform, halothane, and regional anesthesia: A comparative study. Anesth. Analg. **52**: 1-11; as cited in ATSDR, 1991.

Torkelson, T. and V. Rowe. 1981. Chapter 48: Halogenated aliphatic hydrocarbons containing chlorine, bromine, and iodine. Patty's Industrial Hygiene and Toxicology. Vol. 2 B, edited by Clayton and Clayton.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.5 1,1-Dichloroethane

1,1-Dichloroethene (1,1-DCE), also known as vinylidene chloride, is a volatile, colorless liquid with a mild, sweet odor. It is used in adhesives (Sax and Lewis, 1987). Human health effects resulting from exposure to 1,1-DCE indicate that the primary effects in humans are CNS depression and ataxia following inhalation exposure in enclosed spaces. Workers in a 1,1-DCE polymerization plant who were reportedly exposed for up to 6 years to airborne concentrations of 1,1-DCE exhibited liver dysfunction and enzyme alterations (Tierney *et al.*, 1979). However, because this study contained data gaps, the results should only be considered in a qualitative manner (ATSDR, 1988). There are no studies of potential systemic effects in humans following oral exposure (ATSDR, 1988).

In laboratory animals exposed to 1,1-DCE, the target organs of toxicity are the CNS, liver, kidney, and to a lessor degree, the lungs. Signs of CNS depression are similar across the species (ATSDR, 1988). Symptoms noted in animals exposed to 1,1-DCE via inhalation include lacrimation, tremor, and convulsions. Hepatotoxicity noted in laboratory animals has consisted of altered serum enzyme levels and centrilobular swelling in the liver. In one inhalation study, mice receiving continuous airborne concentrations of 15 ppm 1,1-DCE for five days exhibited increased serum enzyme levels (Short *et al.*, 1977). Although renal effects have not been noted in humans following inhalation exposure to 1,1-DCE, hemoglobinuria has been noted in rats

(McKenna *et al.*, 1978). Respiratory effects noted in laboratory animals include irritation of the upper respiratory tract.

Quast *et al.* (1983) conducted a chronic oral bioassay in rats and a subchronic oral bioassay in dogs using 1,1-DCE. Male and female rats received 1,1-DCE in the drinking water at concentrations of 0, 50, 100 and 200 ppm for two years. No treatment related effects were noted on mortality, body or organ weights, or clinical chemistries. However, some slight hepatocellular swelling and fatty changes were noted in all of the female dosing groups. In this same study (Quast *et al.*, 1983), beagle dogs were fed 1,1-DCE in gelatin capsules at doses of 0, 6.25, 12.5, and 25 mg/kg/day for 97 days. No treatment related effects were noted. Based on the hepatic lesions noted in the female rats at the LOAEL of 50 ppm, the USEPA (1994) calculates a reference dose of 9E-3 mg/kg-day for oral exposure to 1,1-DCE.

Human carcinogenicity data for 1,1-DCE are considered inadequate. Animal carcinogenicity data have produced differing conclusions; therefore, 1,1-DCE is given a weight-of-evidence classification of C, a possible human carcinogen (USEPA, 1994). 1,1-DCE is structurally related to the known human carcinogen vinyl chloride, and a metabolite of 1,1-DCE is known to covalently bind to DNA (USEPA, 1994).

In the chronic oral bioassay conducted by Quast *et al.* (1983), 1,1-DCE did not demonstrate any carcinogenic activity in the rats that were exposed for two years. However, inhalation studies have demonstrated a carcinogenic potential of 1,1-DCE in mice. Maltoni *et al.* (1985) exposed mice to airborne concentrations of 10 and 25 ppm of 1,1-DCE for 4 to 5 days a week for one year. A statistically significant increase in incidence of kidney adenocarcinomas was noted in male mice. Additionally, a statistically significant increase in mammary carcinomas was noted in female mice, and a statistically significant increase in pulmonary adenomas in both sexes was noted. Based upon the dose-response relationships in this study, the USEPA (1994) presents an oral CPF of 6E-1 $(mg/kg/day)^{-1}$ for 1,1-DCA. An inhalation unit risk of 5E-5 ($\mu g/m^3$) is also presented by the USEPA, and from this a CPF of 1.7E-1 $(mg/kg/day)^{-1}$ for inhalation exposure to 1,1-DCE is calculated (USEPA, 1994).

The half-life of 1,1-DCE ranges from 4 weeks to 6 months in soil and surface water, and from 8 weeks to 132 days in ground water (Howard *et al.*, 1991). Because 1,1-DCE is chemically stable in water and mobile through the soils, it is expected to migrate with ground water (ATSDR, 1988). 1,1-DCE may be a degradation product of trichloroethylene and tetrachloroethylene because 1,1-DCE has been found to co-occur in ground water with these two compounds. 1,1-DCE is not believed to bioaccumulate in plants or animals (ATSDR, 1988).

ATSDR. 1988. Draft Toxicological Profile for 1,1-Dichloroethene. Agency for Toxic Substances and Disease Registry.

Howard, P. H., R. S. Boethling, W. F. Jarvis, W. M. Meylan, and E. M. Michalenko. 1991. Handbook of Environmental Degradation Rates. Lewis Publishers.

Maltoni, C., P. Lefemine, P. Chieco, C. Cothe, and V. Patella. 1985. Experimental research on vinylidene chloride carcinogenesis. In: Archives of Research on Industrial Carcinogenesis. Vol. 3. Princeton Scientific Publishers; as cited in USEPA, 1994.

McKenna, M.J., J.A. Zempel, E.O. Madrid, P.J. Gehring. 1978. The pharmacokinetics of C^{14} vinylidene chloride in rats following inhalation exposure. Toxicol Appl Pharmacol **45**: 599-610.

Quast, J., C. Humiston, C. Wade, J. Ballard, J. Beyer, R. Schwetz, and J. Norris. 1983. A chronic toxicity and oncogenicity study in rats and subchronic toxicity study in dogs on ingested vinylidene chloride. Fundam Appl Toxicol **3**(1): 55-62.

Sax, N. I and R. L. Lewis. 1987. Hawley's Condensed Chemical Dictionary. Van Nostrand Reinhold Company, Inc.

Short, R. D., J. Winston, J. Minor, J. Seifter, and C. Lee. 1977. Effect of various treatments on toxicity of inhaled vinylidene chloride. Environ Health Perspect **21**: 125-129.

Tierney, D. R., T. Mackwood, and M. Piana. 1979. Status Assessment of Toxic Chemicals: Vinylidene Chloride. USEPA, Cincinnati, OH. EPA 600/2-79-2100. PB80-146442

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.6 1,2-Dichloroethene (total)

1,2-Dichloroethene (1,2-DCE) is a colorless liquid with a sweet, pleasant odor. It is used as a low temperature solvent (Kirk-Othmer, 1985). Two geometric isomers of 1,2-DCE exist, the *cis* and *trans* isomers.

The toxicity of 1,2-DCE in humans is not well documented. CNS depression and ataxia are the predominant systemic effects seen in humans following inhalation. However, these symptoms are seen to disappear quickly once exposure is stopped (ATSDR, 1989). There has been one known fatality due to inhalation of 1,2-DCE in a small enclosure (Hamilton, 1934), but neither the exposure duration nor concentration were reported.

Biochemical changes in the liver, such as decreased activity of hepatic alkaline phosphatase, have been noted in rats exposed to single oral doses of 400 to 1500 mg/kg of both isomers (Jenkins *et al.*, 1972). However, because these effects can not be related to any changes in liver pathology, these biochemical alterations are not classified as being indicative of hepatic toxicity (ATSDR, 1989).

The USEPA presents a RfD for *trans*-1,2-dichloroethene of 2E-2 mg/kg-day (USEPA, 1994a). This RfD is based upon an increase in serum alkaline phosphatase noted in male mice in a 90 day drinking water study (Barnes *et al.*, 1985). A risk assessment for *cis*-1,2-dichloroethene is currently under review. Although no reference dose is available on IRIS (USEPA, 1994a) for *cis*-1,2-dichloroethene, an RfD of 1E-2 mg/kg-day is presented in HEAST for *cis*-1,2-dichloroethene (USEPA, 1994b). Additionally, for mixtures of both isomers, HEAST (USEPA, 1994b) presents a RfD of 9E-3 mg/kg-day. Therefore, because concentrations for total 1,2-DCE were requested for samples collected during the RI conducted by Roux Associates, an RfD of 9E-3 mg/kg-day was used in the baseline RA.

The K_{oc} of 1,2-DCE has been estimated at approximately 40, indicating that 1,2-DCE does not readily adsorb onto soil particulates. 1,2-DCE is removed from surface soils and surface waters primarily by volatilization (ATSDR, 1989)

ATSDR. 1989. Draft Toxicological Profile for 1,2-Dichloroethene. Agency for Toxic Substances and Disease Registry.

Barnes, D., V. Sanders, K. White, G. Shopp and A. Munson. 1985. Toxicology of *trans*-1,2-dichloroethylene in the mouse. Drug Chem. Toxicol. **8**:373-392.

Hamilton, A. 1934. Industrial Toxicology. NY: Harper and Brothers, as cited in ATSDR. 1989.

Jenkins, J., M. Trabulus, S. Murphy. 1972. Biochemical effects of 1,1-dichloroethylene in rats: Comparison with carbon tetrachloride and 1,2-dichloroethylene. Tox. Appl. Pharmacol. **23**: 501-510.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

1.7 Ethylbenzene

Ethylbenzene is a colorless, flammable liquid with a gasoline-like odor. While ethylbenzene is a component of gasoline, ethylbenzene is also a solvent and a component of paints and inks. Due to the volatility of ethylbenzene, human exposure is generally via inhalation (ATSDR, 1989).

The principle effects on persons exposed to concentrations of ethylbenzene in air are dizziness and vertigo (ATSDR, 1989). However, these symptoms do not persist once exposure stops. Inhalation of low concentrations of ethylbenzene reportedly irritates the eyes and throat in humans (ATSDR, 1989).

Little data are available regarding the long-term effects of ethylbenzene exposure in humans (ATSDR, 1989). The hematopoietic system may be a target organ in humans for the toxic effects of ethylbenzene, although data from long-term occupational studies have been inconclusive. Workers chronically exposed to ethylbenzene-containing solvents demonstrated decreases in average lymphocyte and hemoglobin concentrations compared to controls (Angerer and Wulf, 1985). However, in a 20 year study involving workers exposed to ethylbenzene, no adverse hematological effects were noted (Bardodej and Cirek, 1988). Additionally, Bardodej and Cirek (1988) did not observe any liver lesions or differences in liver function tests between exposed and non-exposed workers in this study.

Data from animal studies suggest that ethylbenzene exposure may result in hepatic and renal toxicity. In one oral bioassay, rats were given ethylbenzene in doses of 0, 13.6, 136, 408 or 680 mg/kg/day by gavage 5 days per week for 26 weeks (Wolf *et al.*, 1956). The lowest-observed-adverse-effect level (LOAEL) was 408 mg/kg/day, and this LOAEL was associated with histopathologic changes in the liver and kidney.

The USEPA (1994) presents an RfD of 1E-1 mg/kg-day for ethylbenzene based on the histopathologic changes observed in the liver and kidney in the Wolf *et al.* (1956) study. Ethylbenzene is listed as a class D carcinogen, indicating that ethylbenzene is not classifiable as to human carcinogenicity (USEPA, 1994).

Based on its vapor pressure of 9.5 mm Hg at 25 ° C and its Henry's Law Constant of 8.4E-3 atm-m^3/mol, ethylbenzene present in surface soil and surface water tends to partition into the atmosphere. In subsurface soils, sorption of ethylbenzene onto soil particulates is not expected to be a significant enough to retard the migration of ethylbenzene into ground water (ATSDR, 1989). The half-life of ethylbenzene in surface soil has been estimated to be approximately 3 to 10 days, and the half-life of ethylbenzene in ground water has been estimated to be approximately 6 to 228 days.

Angerer, J. and H. Wulf. 1985. Occupational chronic exposure to organic solvents. XI. Alkylbenzene exposure of varnish workers: Effects on hematopoietic system. Int Arch Occup Environ Health **56**: 307-321; as cited in ATSDR, 1989.

ATSDR. 1989. Draft Toxicological Profile for Ethylbenzene. Agency for Toxic Substances and Disease Registry.

Bardodej, Z. and A. Cirek. 1988. Long-term study on workers occupationally exposed to ethylbenzene. J Hyg Epidemiol Microbiol Immunol **32**: 1-5; as cited in ATSDR, 1989.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

Wolf, M.A., V.K. Rowe, D.D. McCollister, R.L. Hollingsworth and F. Oyen. 1956. Toxicological studies of certain alkylated benzenes and benzene. Arch Ind Health **14**: 387-398; as cited in USEPA, 1994.

1.8 Methylene Chloride

Methylene chloride is a volatile liquid that is only slightly soluble in water. Its major use is as a solvent in a variety of industrial products such as paint removers, metal cleaners, and insecticides.

Methylene chloride is a know anesthetic agent, and the primary human health effect from exposure to methylene chloride is CNS depression. While some liver toxicity has been noted in laboratory animals exposed to methylene chloride, liver toxicity in not typically noted in humans (ATSDR, 1991). Exposure to methylene chloride produces symptoms similar to alcohol intoxication, such as sluggishness, irritability, lightheadedness, and nausea. However, these symptoms disappear rapidly when exposure ceases (ATSDR, 1991). Short-term exposure to methylene chloride was evaluated in human volunteers who were exposed to concentrations of DCM from 0 to 751 ppm for up to 4 hours (Winneke, 1974). At 300 ppm, decreased visual and auditory functions were noted in participants. Decreased performance in psychomotor tasks was noted in participants who were exposeed to 751 ppm (Winneke, 1974). Long term exposure to methylene chloride in industries such as auto and plastics manufacturing has also resulted in CNS effects among workers. Complaints of headaches, dizziness, nausea, and tingling in hands and feet have been reported in workers while performing painting, spraying, and cleaning operations (ATSDR, 1991). The CNS effects associated with methylene chloride exposure may result directly from methylene chloride, or from one of its metabolites. Metabolism of methylene chloride produces carbon monoxide, which binds to hemoglobin, ultimately reducing the oxygen carrying capacity of the blood.

Laboratory animals also experienced a CNS depressant effect when exposed to methylene chloride. Rats exposed to 1000 ppm methylene chloride had disturbed sleep patterns (Fodor and Winneke, 1971). In this study, a NOEL of 500 ppm was established. Hepatotoxic effects, such as cytoplasmic vacoulization and fatty changes, were also noted in animals following exposure to methylene chloride. Mice, rats, dogs, and monkeys exposed to inhalation concentrations of 25 to 1000 ppm for 100 days exhibited these changes (Haun *et al.*, 1972). Rats and dogs showed slight liver changes at concentrations as low as 25 ppm, while mice exhibited fat accumulation and glycogen depletion after continuous exposure to 100 ppm. To evaluate the long term effects of DCM exposure, rats were given doses of 0, 5, 50, 125 and 250 mg/kg/day in drinking water for periods of 78 and 104 weeks (NCA, 1982). Areas of cellular alterations in the liver were detected in rats exposed to 50, 125 and 250 mg/kg/day for 78 and 104 weeks.

Human data on the potential carcinogenic effects of methylene chloride are limited. Epidemiological studies do not show increased mortality rates in workers exposed to dichloromethane (ATSDR 1991). Workers exposed to 30 to 125 ppm of DCM for up to 30 years did not show any excess liver or lung cancer mortality (Friedlander *et al.*, 1978). Although epidemiological studies have produced negative results, the limited population size in most studies makes it impossible to say that methylene chloride does not possess human carcinogenic potential.

Unlike human studies, animal data has shown evidence of carcinogenicity. Male and female mice exposed to inhalation concentrations of 2000 to 4000 ppm of methylene chloride throughout life showed a statistically significant and dose-dependent increase in liver and lung adenomas and carcinomas (NTP, 1986). Long term oral exposures to dichloromethane also produced increased incidences of neoplastic nodules and hepatocellular carcinomas in mice and rats (NCA, 1982; 1983).

The USEPA (1994) presents an RfD for methylene chloride of 6E-2 mg/kg-day based upon the data from NCA (1982). A CPF of 7.5E-3 $(mg/kg/day)^{-1}$ has been established by the USEPA (1994a) for oral exposure to methylene chloride. For inhalation exposure, a unit risk of 4.7E-7 $(\mu g/m^3)^{-1}$ is presented on IRIS (USEPA, 1994). Using this unit risk and an assumed daily inhalation rate of 20 m^3/day by a 70 kg individual, a CPF of 1.6E-3 $(mg/kg/day)^{-1}$ was calculated to estimate the carcinogenic risk associated with exposure to methylene chloride via inhalation.

Methylene chloride is a volatile compound (vapor pressure of 349 mm Hg at 20 °C) and rapidly partitions into the air. The Henry's Law Constant of 2E-3 atm-m^3/mol indicates that methylene chloride partitions from surface water into the air. Based upon its low soil organic carbon partition coefficient (K_{oc}) of 25, methylene chloride does not bind strongly to soil particulates and is therefore, mobile in the soils (ATSDR, 1991).

ATSDR, 1991. Draft Toxicological Profile for Methylene Chloride. Agency for Toxic Substances Disease Registry.

Fodor, G. and G. Winneke. 1971. Nervous system disturbances in man and animals experimentally exposed to industrial solbent vapors in England. Proceedings of the Second International Clean Air Congress. Academic Press: NY; as cited in ATSDR, 1991.

Friedlander, B. R., F. T. Hearn, and S. Hall. 1978. Epidemiologic investigation of employees chronically exposed to methylene chloride--mortality analysis. J Occup Med **20**: 657-666; as cited in ATSDR, 1991.

Haun, C., E. Vernot, K. I. Darmer, *et al.* 1972. Continuous animal exposure to low levels of dichloromethane. In: Proceedings of the Third Annual Conference on Environmental Toxicology. Wright Patterson Air Force Base, OH. Aerospace Medical Research Laboratory, pp. 199-208. AMRL-TR-72-130; as cited in ATSDR, 1991.

NCA. 1982. Twenty-four month chronic toxicity and oncogenicity study of methylene chloride in rats. Final report. Vol. 1-4. Report to National Coffee Association by Hazelton Laboratories Inc. Unpublished; as cited in USEPA, 1994.

NCA. 1983. Twenty-four month oncogenicity study of methylene chloride in mice. Final report. Vol. 1. Report to National Coffee Association by Hazelton Laboratories Inc. Unpublished; as cited in USEPA, 1994.

NTP. 1986. Technical Report Series 306. Toxicology and carcinogenesis studies of dichloromethane (methylene chloride) in F344/N rats and B6C3F mice (inhalation studies). Research Triangle Park, NC. US Department of Health and Human Services; as cited in ATSDR, 1991.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

Winneke, G. 1974. Behavioral effects of methylene chloride and carbon monoxide as assessed by sensory and psychomotor performance. In: Behavioral Toxicology, ed. C. Xintaras, B. L. Johnson, I. de Groot; as cited in ATSDR, 1991.

1.9 Tetrachloroethene

Tetrachloroethene, also known as perchloroethylene (PCE), is widely used as an industrial solvent and metal degreaser. Exposure to tetrachloroethene produces CNS depression in humans (Torkelson and Rowe, 1981). In the 1920's and 1930's, PCE was used as an anthelmintic in certain parts of the world (Lambert, 1933). Doses of PCE used for anthelmintic purposes were in the range of 2.8 to 4 ml (60 to 80 mg/kg).

Available toxicological data indicate that the target organs of the toxic action of PCE are the CNS and the hepatic system. Therapeutic doses of PCE in the 60 to 80 mg/kg range reportedly had some narcotic effects in patients (Lambert, 1933). Thus, the 60 mg/kg dose is considered the LOAEL for CNS effects in humans (ATSDR, 1990).

Hepatic effects, such as elevated hepatic enzyme levels, fatty degeneration in the liver and hepatomegaly have been reported in persons who have accidentally ingested PCE. The exposure concentrations causing these effects are not well documented, but these health effects are usually transient in nature (ATSDR, 1990). Data regarding intermediate and chronic human oral exposure to PCE are not available. Effects such as eye and throat irritation have been reported in persons exposed to PCE in the workplace (Torkelson and Rowe, 1981).

Laboratory animal studies have shown PCE's potential effects on the hepatic system. Buben and O'Flaherty (1985) exposed mice to doses of 0 to 2000 mg/kg of PCE by gavage for five days a week for six weeks. Parameters evaluated in this study included triglyceride content, serum enzyme levels, and liver-to-body weight ratios. Mice in the 100 mg/kg dose group experienced increased liver triglyceride levels and increased liver weights. At the higher doses, other hepatotoxic effects noted included cellular necrosis and degeneration (Buben and O'Flaherty, 1985). The USEPA (1994) presents a reference dose of 1E-2 mg/kg-day for PCE based upon the no observed adverse effect level (NOAEL) of 20 mg/kg-day determined in the Buben and O'Flaherty (1985) study.

At the time of this baseline RA (1994), the USEPA has not determined the weight-of-evidence classification (Section 4.0) for PCE. Previously, PCE has been classified in both the C (possible human carcinogen) and B2 (probable human carcinogen) classes, based upon data and data interpretations available at the time. In 1991, the Science Advisory Board (SAB) of the USEPA stated that the weight-of-evidence classification for PCE is on the C-B2 continuum (USEPA, 1992). Although a final position has not been taken on the classification of tetrachloroethene, the Superfund Health Risk Technical Support Center recommends using an oral slope factor of 5.2E-2 $(mg/kg/day)^{-1}$ and an inhalation slope factor of 2E-3 $(mg/kg/day)^{-1}$ (USEPA, 1992). The oral slope factor is based upon the 1985 Health Assessment document and the inhalation slope factor is based upon a 1987 Addendum to the Health Assessment (USEPA, 1992). Although these values are not currently verified on IRIS (USEPA, 1994), they were used in this risk assessment as the best available guidance (USEPA, 1992).

Volatilization via reactions with photochemically produced hydroxyl radicals is the main transport process for PCE in the atmosphere. Tetrachloroethene is very mobile in soil and can migrate into the ground water. In ground water, tetrachloroethene may degrade to trichloroethene, dichloroethene and ultimately vinyl chloride (ATSDR, 1990)

ATSDR. 1990. Toxicological Profile for Tetrachloroethylene. Agency for Toxic Substances and Disease Registry.

Buben, J. and E. O'Flaherty. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: A dose effect study. Toxicol. Appl. Pharmacol. **78**(1): 105-122.

Lambert, S. 1933. Hookworm disease in the South Pacific: Ten years of tetrachlorides. JAMA. **100** (4): 247-248.

Torkelson, T. and V. Rowe. 1981. Chapter 48: Halogenated aliphatic hydrocarbons containing chlorine, bromine, and iodine. Patty's Industrial Hygiene and Toxicology. Vol. 2 B, edited by Clayton and Clayton.

USEPA. 1992. Superfund Health Risk Technical Support Center at ECAO-Cincinnati. Correspondence regarding carcinogenicity of trichloroethene and tetrachloroethene.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.10 1,1,2,2-Tetrachloroethane

1,1,2,2-Tetrachloroethane is a dense liquid that is non-flammable at room temperature. It is used for cleaning and degreasing metals, and in paint removers (Sax and Lewis, 1987).

The liver is the principle target organ for the toxic action of 1,1,2,2-tetrachloroethane in both humans and laboratory animals. Jaundice and liver enlargement have been observed in humans exposed to 1,1,2,2-tetrachloroethane in the workplace (ATSDR, 1989). Laboratory animals exposed in 1,1,2,2-tetrachloroethane had fatty degeneration and hyperplasia of the liver (ATSDR, 1989). 1,1,2,2-Tetrachloroethane may induce CNS depression in humans following inhalation; however, this is not a predominant toxic effect following inhalation of 1,1,2,2-tetrachloroethane due, in part, to the low volatility (vapor pressure 5.95 mm Hg at 25 degrees C) of 1,1,2,2-tetrachloroethane (Torkelson and Rowe, 1981; ATSDR, 1989). Gastrointestinal effects such as nausea and vomiting have been reported in persons exposed to 1,1,2,2-tetrachloroethane (ATSDR, 1989).

A toxicity assessment for 1,1,2,2-tetrachloroethane is currently under review by an USEPA workgroup; therefore, an RfD is not available on IRIS (USEPA, 1994). However, 1,1,2,2-tetrachloroethane is classified as a possible human carcinogen (Class C) by the USEPA (1994). This classification is based upon an increased incidence of hepatocellular carcinomas observed in mice exposed to 1,1,2,2-tetrachloroethane (NCI, 1978). The oral CPF listed on IRIS (USEPA, 1994) and used in the baseline RA is 2E-1 $(mg/kg/day)^{-1}$.

Based upon its vapor pressure of 5.95 mm Hg at 25 degrees C and its low adsorptivity to soil (K_{oc} of 46), 1,1,2,2-tetrachloroethane is expected to volatilize from the soil surface. 1,1,2,2-Tetrachloroethane is not expected to bioaccumulate in aquatic organisms (ATSDR, 1989).

ATSDR. 1989. Draft Toxicological Profile for 1,1,2,2-Tetrachloroethane. Agency for Toxic Substances and Disease Registry.

NCI. 1978. Bioassay of 1,1,2,2-Tetrachloroethane for Possible Carcinogenicity. PB-78-827; as cited in USEPA, 1994.

Sax, N. I and R. L. Lewis. 1987. Hawley's Condensed Chemical Dictionary. Van Nostrand Reinhold Company, Inc.

Torkelson, T. and V. Rowe. 1981. Chapter 48: Halogenated Aliphatic Hydrocarbons Containing Chlorine, Bromine, and Iodine. In: Patty's Industrial Hygiene and Toxicology. Vol. 2 B, edited by Clayton and Clayton.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.11 Toluene

Toluene is a clear, volatile liquid with a characteristic aromatic odor. It is used as a solvent for paints and resins (Kirk-Othmer, 1985).

In humans, toluene is a known respiratory and dermal irritant (ATSDR, 1988). Exposure to airborne concentrations of toluene are associated with reversible CNS disturbances such as impaired neuromuscular function in humans. However, acute exposure to low concentrations of toluene causes few if any effects in humans. Effects on the CNS have also been noted in animals exposed to toluene.

Toluene does not appear to impact the hematological system. In recent occupational studies, no significant hematological effects were observed in workers exposed for several years to toluene or a mixture of toluene-containing solvents (Yin *et al.*, 1987).

The oral toxicity of toluene in rats was investigated in a subchronic gavage study. The rats were given doses of toluene in the amounts of 0, 312, 625, 1250, 2500, and 5000 mg/kg/day for five days a week for 13 weeks (NTP, 1989). Effects noted in the animals included ataxia, body tremors and increases in the absolute and relative weights of the liver and kidneys. Based on this study (NTP, 1989), the USEPA has developed a RfD of 2E-1 mg/kg-day for the critical effects of liver and kidney weight changes (USEPA, 1994). Toluene has not demonstrated carcinogenic activity in animal bioassays and is thus assigned by USEPA (1994) to Group D, indicating that it is not classifiable for carcinogenicity.

The majority of toluene released to the environment partitions into the air. Because toluene is moderately soluble in water (500 mg/L at 25°C), toluene may be removed from the atmosphere by wet deposition (ATSDR, 1988). Toluene has a moderate tendency to bioconcentrate in the fatty tissues of aquatic organisms (ATSDR, 1988).

ATSDR. 1988. Draft Toxicological Profile for Toluene. Agency for Toxic Substances and Disease Registry.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

NTP. 1989. Toxicology and Carcinogenesis Studies of Toluene in F344/N rats and B6C3F1 mice. Technical Report Series No. 371; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

Yin, S., G. Li, T Hu *et al.* 1987. Symptoms and signs of workers exposed to benzene, toluene or the combination. Ind Health **25**: 113-130; as cited in ATSDR, 1988.

1.12 1,1,1-Trichloroethane

1,1,1-Trichloroethane (1,1,1-TCA) is a colorless, nonflammable liquid with a sweet odor. It is used almost exclusively as a solvent, with worldwide consumption approximating one billion pounds per year (ATSDR, 1989). Although extensive testing and use has shown 1,1,1-trichloroethane to be the least toxic of the chlorinated solvents, its high volatility and careless use and abuse has resulted in occupational deaths (Torkelson and Rowe, 1981). Concentrations above 15,000 ppm are generally fatal to humans, and persons exposed to these concentrations in enclosed areas have died, usually due to CNS depression or cardiac arrhythmias. In situations where workers were removed from such enclosed spaces while still alive, recovery has generally been complete (Torkelson and Rowe, 1981).

The first response in humans and animals following acute or chronic exposure to excessive amounts of 1,1,1-trichloroethane is CNS depression. 1,1,1-TCA has little capacity to produce organ injury following either single or repeated doses, but at high levels it can sensitize the heart to epinephrine (Torkelson and Rowe, 1981). The low systemic toxicity of 1,1,1-TCA appears to be related to the fact that only a small amount is metabolized in animals and man. Metabolic information from both humans and animals indicate that about 80 to 90 percent of inhaled 1,1,1-TCA is excreted unchanged by the lungs (ATSDR, 1989).

Laboratory animals exposed to 1,1,1-TCA by the inhalation route have exhibited mild hepatic changes such as fatty accumulation in the liver and alterations in liver enzyme activities. These effects are usually reversible, and are not indicative of permanent impairment. Because a risk assessment for 1,1,1-trichloroethane is currently under review by an USEPA workgroup, no reference dose is available on IRIS (USEPA, 1994a). However, a RfD of 9E-2 mg/kg-day is available in HEAST (USEPA, 1994b) and is used in the baseline RA.

Rats and mice were chronically exposed to moderate to high doses of 1,1,1-trichloroethane to determine its potential to produce carcinogenic effects (NCI, 1977). Following necropsy, there was no evidence of statistically significant dose-related increases in any type of neoplasms. For this reason, the USEPA classifies 1,1,1-trichloroethane in the weight-of-evidence group D, indicating that 1,1,1,-trichloroethane is non-classifiable as to human carcinogenicity (USEPA, 1994a).

1,1,1-Trichloroethane released to soils migrates into ground water, as it does not readily adsorb onto soil particulates. The hydrolysis half-life of 1,1,1-trichloroethane in ground water is approximately six months. Unlike aromatic chlorinated compounds such as polychlorinated biphenyls, 1,1,1-trichloroethane has not been found to bioaccumulate in animals or food chains (ATSDR, 1989).

ATSDR. 1989. Draft Toxicological Profile for 1,1,1-Trichloroethane. Agency for Toxic Substances and Disease Registry.

NCI. 1977. Bioassay of 1,1,1-trichloroethane for possible carcinogenicity. National Cancer Institute Carcinogenesis Technical Report Series 3; as cited in USEPA, 1994.

Torkelson, T. and V. Rowe. 1981. Chapter 48: Halogenated Aliphatic Hydrocarbons Containing Chlorine, Bromine, and Iodine. In: Patty's Industrial Hygiene and Toxicology. Vol. 2 B, edited by Clayton and Clayton.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

1.13 Trichloroethene

Trichloroethene (TCE) is a colorless volatile liquid with a chloroform-like odor. It is widely used as an industrial solvent and degreaser. While contact with TCE may be irritating to the mucous membranes, TCE is not believed to induce permanent mucous membrane damage (Torkelson and Rowe, 1981).

Target organs for trichloroethene toxicity are the CNS and liver. Humans exposed to concentrations of trichloroethene in air experience CNS depression with symptoms of ataxia, headache, drowsiness, visual disturbances, mental confusion, and fatigue. The human response of CNS depression to TCE exposure is well known, but the doses associated with this response are not well quantified (ATSDR, 1989). Most human data originate from occupational studies, where actual exposure concentrations are difficult to document. The available data indicate that CNS effects may be associated with ingestion of TCE. However, it is believed that the oral dose required to produce a given level of CNS depression is greater than the inhaled dose required to produce the same level of CNS depression since much of an ingested dose of TCE is subject to first pass metabolism by the liver (ATSDR, 1989). While liver damage has been reported in humans exposed to acute high concentrations of trichloroethene, hepatic injury is not associated with long term occupational exposure (ATSDR, 1989).

When given acutely, TCE has been found to be of moderate to low toxicity in laboratory animals. An LD_{50} of 4920 mg/kg has been reported in rats (Torkelson and Rowe, 1981). While mice exposed to inhalation and oral (gavage) doses of TCE experienced an increase in liver weights, this increase was not always determined to be an adverse effect (Kjellstrand *et al.*, 1983; Tucker *et al.*, 1982). In the inhalation study by Kjellstrand *et al.* (1983), histological examination revealed that the vacuolated liver cells and general hypertrophy of the liver were reversible effects. And, the increase in liver weight noted in mice given a gavage dose of 240 mg/kg/day for 14 days was associated with enzyme induction (Tucker *et al.*, 1982). Because the increase in liver weight was associated with enzyme induction, the increase in liver weight was not considered an adverse effect (Tucker *et al.*, 1982).

Retrospective occupational epidemiological studies of workers with presumed exposure to TCE have been conducted to evaluate TCE's carcinogenic potential in humans. However, because exposure concentrations are not adequately documented, no conclusions can be drawn regarding the carcinogenic potential of TCE in humans. However, based upon animal bioassay data, TCE was formerly classified as a B2 carcinogen. Inhalation and/or oral exposure to TCE is associated with liver and lung tumors in mice, and possibly leukemia in rats (ATSDR, 1989). In 1988, based upon data re-evaluation, the Science Advisory Board (SAB) of the USEPA concluded that TCE was on a C-to-B2 continuum. In July, 1989, the Agency withdrew the IRIS carcinogenicity file and has not yet adopted a current position on the weight-of-evidence classification for TCE (USEPA, 1992). Additionally, a reference dose (RfD) is under review by a workgroup and publication of a specific dose is therefore pending (USEPA, 1994). Thus, there is no USEPA verified regulatory guidance currently available for either the potential carcinogenic or noncarcinogenic health effects of TCE. However, the Superfund Health Risk Technical Support Center (USEPA, 1992) presents an oral slope factor of 1.1E-2 $(mg/kg/day)^{-1}$ based upon the USEPA 1985 Health Assessment and an inhalation slope factor of 6E-3 $(mg/kg/day)^{-1}$ based upon the 1987 Health Assessment Addendum (USEPA, 1992). While these numbers have been reviewed by the Carcinogen Risk Assessment Verification Endeavor (CRAVE) workgroup, the numbers will not be verified until the weight-of-evidence status is resolved. In the baseline RA, the oral slope factor of 1.1E-2 $(mg/kg/day)^{-1}$ and the inhalation slope factor of 6E-3 $(mg/kg/day)^{-1}$ were used.

TCE has a half-life of approximately seven days in air, and most TCE released to surface waters or surface soil volatilizes into the atmosphere (ATSDR, 1989). TCE is mobile through soils and can migrate to ground water, where it may remain for 1 to 5 years (Howard *et al.*, 1991). TCE may also be present in ground water due to the degradation of tetrachloroethene; under certain conditions, TCE may itself degrade to dichloroethene and vinyl chloride. Unlike most chlorinated solvents, TCE does not appear to bioaccumulate in food chains (ATSDR, 1989).

ATSDR. 1989. Toxicological Profile for Trichloroethene. Agency for Toxic Substances and Disease Registry.

Kjellstrand P., B. Holmquist, P. Alm, M. Kanje, S. Romare, I. Jonsson, L. Mannson, and M. Bjerkemo. 1983. Trichloroethylene: Further studies of the effects on body and organ weights and plasma butyryl cholinesterase activity in mice. Acta Pharmacol. Toxicol. **53**: 375-384.

Howard, P.H., R. S. Boethling, W. F. Jarvis, W. M. Meylan, and E. M. Michalenko. 1991. Handbook of Environmental Degradation Rates. Lewis Publishers.

Torkelson, T. and V. Rowe. 1981. Chapter 48: Halogenated aliphatic hydrocarbons containing chlorine, bromine, and iodine. Patty's Industrial Hygiene and Toxicology. Vol. 2 B, edited by Clayton and Clayton.

Tucker, A., V. Sanders, D. Barnes, T. Bradshaw, K. White, L. Sain, J. Barzelleca and A. Munson. 1982. Toxicology of trichloroethylene in the mouse. Toxicol. Appl. Pharmacol. **62**: 351-357.

USEPA. 1992. Superfund Health Risk Technical Support Center at ECAO-Cincinnati. Correspondence regarding carcinogenicity of trichloroethene and tetrachloroethene.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

1.14 Xylene (total)

Xylene is primarily a man-made chemical, although xylene occurs naturally in petroleum and coal tar (ATSDR, 1989). There are three isomeric forms of xylene, *ortho (o)*, *meta (m)* and *para (p)*. The term total xylenes generally refers to the combination of these three isomers. The term mixed xylenes generally refers to total xylenes plus additional solvents such as ethylbenzene which are frequently present in xylene mixtures. Xylene is widely used as a solvent and thinner in paints and varnishes and is a component of gasoline and other fuels.

Acute and chronic inhalation exposure to xylene and xylene-containing solvents is associated with neurological effects in humans (ATSDR, 1989). Persons exposed to xylene vapors have experienced headaches, mental confusion, dizziness, alterations in body balance, impaired short-term memory and tremors (ATSDR, 1989). Acute inhalation of xylene by humans is also associated with nose and throat irritation (Neresian *et al.*, 1985).

Neurotoxic effects have also been observed in laboratory animals following inhalation exposures to xylene. These neurotoxic effects observed in rats and mice include narcosis, prostration, incoordination, tremors and hyperactivity (ATSDR, 1989; Carpenter *et al.*, 1975). In a chronic study (NTP, 1986), male and female rats and mice were given doses of xylene by gavage for 5 days a week for 103 weeks. Doses for the rats were 0, 250 and 500 mg/kg/day and doses for the mice were 0, 500 and 1000 mg/kg/day (NTP, 1986). There was a dose-related increase in mortality in male rats, and the increase in mortality was statistically significant at the highest dose of 500 mg/kg/day. Mice receiving the highest dose exhibited hyperactivity. Additionally, there were no changes in the incidence of neoplastic or nonneoplastic lesions in either the rats or the mice that could be considered related to treatment with xylene.

The USEPA (1994) presents a RfD of 2E+0 mg/kg-day for exposure to xylene. The critical toxicological effects associated with the RfD are hyperactivity (observed in mice) and increased mortality (observed in male rats). Xylene is given a carcinogenicity classification of D, indicating that xylene is not classifiable in terms of human carcinogenicity (USEPA, 1994). Xylene has not demonstrated carcinogenic potential in laboratory animals (USEPA, 1994).

Volatilization is the dominant environmental transport process for xylene (ATSDR, 1989). Based on a Henry's Law Constant of approximately 5.2E-3 atm-m^3/mol for xylene, the estimated half-life for volatilization of xylene from surface water is three hours (Howard, 1990). Xylene is not expected to bioconcentrate in aquatic organisms to any significant degree (Howard, 1990).

ATSDR. 1989. Draft Toxicological Profile for Total Xylenes. Agency for Toxic Substances and Disease Registry.

Carpenter, C.P., E.R. Kinkead, D.J. Geary, *et al.* 1975. Petroleum Hydrocorbon Toxicity Studies: V. Animal and Human Responses to Vapors of Mixed Xylenes. Toxicol. Appl. Pharmacol. **33**: 543-558.

Howard, P.H., G.W. Sage, W.F. Jarvis, D.A. Gray. 1990. Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Volume II - Solvents. Lewis Publishers, Chelsea, Michigan.

Neresian, W, H. Booth, D. Hoxie, *et al.* 1985. Illness in office attributed to xylene [Letter]. Occup Health Saf. **54**: 88; as cited in ATSDR, 1989.

NTP. 1986. National Toxicology Program Technical Report on the Toxicology and Carcinogenesis of Xylenes (mixed) in F344/N rats and B6C3F1 Mice (gavage studies). NIH Pub. No. 86-2583; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

2.1 Polynuclear Aromatic Hydrocarbons (PAHs)

Polynuclear aromatic hydrocarbons (PAHs) are a family of compounds that are formed as a result of incomplete combustion. Structurally, PAHs are fused benzene ring systems in linear, staggered or three dimensional forms. PAHs occur as mixtures of the individual compounds and are widely distributed throughout the environment (ATSDR, 1989). The combustion of wood and fossil fuels is the largest source of environmental PAHs.

PAHs are known to be dermal irritants in both animals and humans. However, the majority of information on the health effects resulting from exposure to PAHs is based on animal studies. In animal studies, PAH exposure has also been found to impact proliferating tissues such as the hematopoietic and lymphoid tissues. In humans, similar effects on these tissues have not been as clearly documented (ATSDR, 1989).

Some, but not all, of the PAHs are considered to be potential carcinogens (Sandmeyer, 1981). There are no human studies clearly linking exposure to a particular PAH with an increased incidence of cancer, but there are occupational and epidemiological studies showing an increase in cancer mortality in persons exposed to PAH-containing materials such as tar, oils and tobacco products (ATSDR, 1989). Because these products contain a variety of compounds in addition to PAHs, it is impossible to associate the increased incidence of cancer with exposure to PAHs alone (ATSDR, 1989). With the exception of benzo(a)pyrene (B(a)P), there are few chronic animal studies to evaluate potential carcinogenic properties of PAHs (ATSDR, 1989). While B(a)P has been administered to several animal species by several routes of administration, the majority of PAHs have only been tested using the mouse skin assay. For most of the PAHs considered to be potential carcinogens, there are insufficient data to reasonably estimate a CPF.

In order to evaluate the toxicity of the carcinogenic PAHs, a toxicity equivalency factor (TEF) methodology has been proposed (USEPA, 1992). This TEF methodology compares the relative potency of the carcinogenic PAHs to the potency of B(a)P. The following sections present specific information on individual PAHs that are considered to be chemicals of potential concern at the Site based on the toxicological screening described in Section 3.5. Where available, individual RfDs are presented for individual PAHs. For the carcinogenic PAHs, the TEFs used in the baseline RA are also presented (USEPA, 1992). These TEFs were used to convert each concentration of carcinogenic PAHs into an equivalent concentration of B(a)P.

PAHs released to the atmosphere are subject to transportation over both short and long distances. They are removed from the atmosphere by wet and dry deposition. In surface waters, PAHs can volatilize, photodegrade, oxidize, biodegrade, bind to particulates or accumulate in aquatic organisms. Bioconcentration factors range from 100 to over 2000 (ATSDR, 1989). In both soils and sediments, PAHs can biodegrade or accumulate in plant material (ATSDR, 1989). The transport and partitioning of PAHs are determined largely by the physical and chemical properties of each PAH (ATSDR, 1989).

ATSDR. 1989. Draft Toxicological Profile for Polycyclic Aromatic Hydrocarbons. Agency for Toxic Substances and Disease Registry.

Sandmeyer, E. 1981. Chapter 47: Aromatic Hydrocarbons. In: Patty's Industrial Hygiene and Toxicology. Vol. II B.

USEPA. 1992. Memo of New Interim Region IV Guidance: TEF Methodology for carcinogenic PAHs. Feb. 11, 1992.

2.1.1 Acenaphthene

Acenaphthene, used as a dye intermediate, is considered to be one of the noncarcinogenic PAHs. In a feeding study, mice were given 0, 175, 350 or 700 mg/kg/day of acenaphthene. Increased liver weights and cellular hypertrophy were noted in the mice in the mid and high dose group (USEPA, 1989). Based on these results, a RfD of 6E-2 mg/kg-day has been established for acenaphthene (USEPA, 1994).

USEPA. 1989. Mouse oral subchronic study with acenaphthene. Study conducted by Hazelton Laboratories, Inc. for the Office of Solid Waste, Washington, DC.; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.2 Anthracene

Anthracene, the simplest tricyclic PAH, is used in the preparation of industrial dyes. Phototoxic and photoallergic responses have been noted in humans following dermal contact with anthracene (Sandmeyer, 1981). In a subchronic study, anthracene was administered to mice at doses of 0, 250, 500 and 1000 mg/kg/day for 90 days. Animals were observed for differences in mortality, body weight, food consumption, and hematology. No treatment related effects were noted (USEPA, 1989). Based on the no-observed-adverse-effect level (NOAEL) from this study, a RfD of 3E-1 mg/kg-day was established (USEPA, 1994). Anthracene is considered to be a noncarcinogenic PAH.

Sandmeyer, E. 1981. Chapter 47: Aromatic Hydrocarbons. In: Patty's Industrial Hygiene and Toxicology. Vol. II B.

USEPA. 1989. Subchronic toxicity in mice with anthracene. Final Report. Hazelton Laboratories. Prepared for the Office of Sold Waste, Washington, DC; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.3 Benzo(a)anthracene

Benzo(a)anthracene is considered a probable human carcinogen (USEPA, 1994). Human data are lacking, but mice given a 3 percent benzo(a)anthracene solution three times a week for five weeks demonstrated an increase incidence of pulmonary adenoma and hepatoma (Klein, 1963).

While listed as a B2 carcinogen, a specific CPF is not available on IRIS (USEPA, 1994). However, using the CPF of 7.3E+0 $(mg/kg/day)^{-1}$ developed for B(a)P, a TEF of 0.1 has been proposed for benzo(a)anthracene (USEPA, 1992).

Klein. 1963. Susceptibility of strain B6Af/J hybrid infant mice to tumorigenesis with 1,2-benzanthracene, deoxycholic acid, and 3-methylcholanthrene. Cancer Res. **23**: 1701-1707; as cited in USEPA, 1994.

USEPA. 1992. Memo of New Interim Region IV Guidance: TEF Methodology for carcinogenic PAHs. Feb. 11, 1992.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.4 Benzo(a)pyrene

A major source of environmental benzo(a)pyrene (B(a)P) is cigarette smoke, which may contain up to 0.1 percent of B(a)P (Sandmeyer, 1981). A RfD is not available for B(a)P. The long-term effect of B(a)P exposure in humans is believed to be bronchial carcinoma. In animal studies, repeated administration of B(a)P via different routes of administration has been associated with an increase in total tumors and tumors at the exposure site. In one study, mice were administered B(a)P in the diet at concentrations of 0 to 250 ppm for up to 197 days (Neal and Rigdon, 1967). Mice in the dosing groups of 20 ppm and above had an increased incidence of forestomach tumors. Because of its tumor promoting activity, B(a)P is often used as a positive control in carcinogenicity bioassays. B(a)P has also been shown to be a tumor initiator. Dermal application of a single dose of B(a)P followed by a promoter such as croton oil produced an increased incidence of skin papillomas (ATSDR, 1989). The USEPA (1994) determined a CPF of 7.3E+0 $(mg/kg/day)^{-1}$ for B(a)P, and this value was used in the baseline RA.

ATSDR. 1989. Draft Toxicological Profile for Polycyclic Aromatic Hydrocarbons.

Neal, J. and R.H. Rigdon. 1967. Gastric tumors in mice fed benz(a)pyrene: A quantitative study. Tex Rep Bio Med. **25**(4): 553-557; as cited in ATSDR, 1989.

Sandmeyer, E. 1981. Chapter 47: Aromatic Hydrocarbons. In: Patty's Industrial Hygiene and Toxicology. Vol. II B.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.5 Benzo(b)fluoranthene

A RfD is not available for benzo(b)fluoranthene. Based on data from animal bioassays, benzo(b)fluoranthene is classified as a probable human carcinogen, class B2 (USEPA, 1994). Mice and rats given benzo(b)fluoranthene via lung implantation, intraperitoneal injection and subcutaneous injection have demonstrated an increased incidence of tumors (USEPA, 1992). Using the CPF of 7.3E+0 $(mg/kg/day)^{-1}$ developed for B(a)P, a TEF of 0.1 has been proposed for benzo(b)fluoranthene (USEPA, 1992).

USEPA. 1992. Memo of New Interim Region IV Guidance: TEF Methodology for carcinogenic PAHs. Feb. 11, 1992.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.6 Chrysene

Chrysene is present in crude petroleum and coal tar (Sandmeyer, 1981). No data were available regarding a RfD for exposure to chrysene (USEPA, 1994). Chrysene has been associated with a carcinogenic response in animals. Mice have developed carcinomas following intraperitoneal injections of chrysene and skin carcinomas following dermal exposure to chrysene (USEPA, 1994). Using the CPF of 7.3E+0 $(mg/kg/day)^{-1}$ developed for B(a)P, a TEF of 0.01 has been proposed for chrysene (USEPA, 1992).

Sandmeyer, E. 1981. Chapter 47: Aromatic Hydrocarbons. In: Patty's Industrial Hygiene and Toxicology. Vol. II B.

USEPA. 1992. Memo of New Interim Region IV Guidance: TEF Methodology for carcinogenic PAHs. Feb. 11, 1992.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.7 Dibenzo(a,h)anthracene

Oral or dermal exposure to dibenzo(a,h)anthracene has been associated with carcinomas in mice (USEPA, 1994). Additionally, subcutaneous injections of dibenzo(a,h)anthracene have been found to produce fibrosarcomas in some strains of mice (USEPA, 1994). Using the CPF developed for B(a)P, a TEF of 1.0 is proposed for dibenzo(a,h)anthracene (USEPA, 1992).

USEPA. 1992. Memo of New Interim Region IV Guidance: TEF Methodology for carcinogenic PAHs. Feb. 11, 1992.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.8 Fluoranthene

Mice administered fluoranthene by gavage at a range of doses from 0 to 500 mg/kg/day for 13 weeks exhibited nephropathy and increased serum liver enzyme concentrations (USEPA, 1988). These effects were only statistically significant for groups administered 250 and 500 mg/kg/day. Based on this study, fluoranthene is given a RfD of 4E-2 mg/kg-day (USEPA, 1994). Fluoranthene is not considered to have carcinogenic potential; thus, no CPF is available (USEPA, 1994).

USEPA, 1988. 13 Week mouse oral subchronic toxicity study. Prepared by Toxicity Research Laboratories, Ltd. Muskegon, MI for the Office of Solid Waste, Washington, DC; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.9 Fluorene

Mice administered fluorene by gavage at a range of doses from 0 to 500 mg/kg/day (USEPA, 1989) exhibited a statistically significant decrease in red blood cell count in the high dose group. Based on these experimental data, a RfD of 4E-2 mg/kg-day was assigned to fluorene (USEPA, 1994) and was used in the baseline RA. Like fluoranthene, fluorene is considered to be a noncarcinogenic PAH (USEPA, 1994).

USEPA. 1989. Mouse oral subchronic toxicity study. Prepared by Toxicity Research Laboratories, Ltd, Muskegon, MI for the Office of Solid Waste, Washington, DC; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.10 Naphthalene and 2-Methylnaphthalene

Naphthalene is a white solid substance that is used industrially in the manufacture of dyes and resins. There is little information regarding the effects on human health of inhaled naphthalene. Persons exposed to the pure compound via inhalation have reportedly experienced headache, nausea, vomiting, abdominal pain, malaise, confusion, anemia, jaundice and renal disease (ATSDR, 1989). Exposures to naphthalene are often confounded by simultaneous exposure to other agents; therefore, a degree of uncertainty exists when attributing reported health effects to specific exposure to naphthalene. Toxicological data for naphthalene are applied to 2-methylnaphthalene based on the structural similarity of the compounds.

The primary human health effects resulting from ingestion of naphthalene are hemolytic anemia and jaundice. Hemolytic anemia is a condition in which the red blood cells break down. Other effects that have been reported from oral exposure to naphthalene include nausea, vomiting, diarrhea, abdominal pain and kidney failure. In case reports relating to the ingestion of naphthalene, symptoms of intoxication usually do not appear for several hours or even days following ingestion. Acute hemolytic anemia and jaundice have been noted in infants exposed to moth-ball treated blankets (Valaes *et al.*, 1963).

No RfD is available on IRIS (USEPA, 1994) for naphthalene because a risk assessment for naphthalene is currently under review by the USEPA. An oral RfD of 4E-2 mg/kg-day is given in HEAST (USEPA, 1994) and is used in this baseline RA. The critical effect associated with this RfD is decreased body weight. Naphthalene has not demonstrated any carcinogenic potential, based on the negative results obtained in animal carcinogenicity bioassays. In one two-year feeding study, rats received naphthalene at doses of approximately 41 mg/kg/day. There was no evidence of tumor development (ATSDR, 1989). Naphthalene is given a weight-of-evidence classification of D by the USEPA (1994).

The information on environmental fate and transport of naphthalene is derived from Mackay *et al.* (1992). Naphthalene biodegrades in soil with a reported half life up to approximately two years. Soil type appears to influence the rate of biodegradation. Photolysis on soil surface may also be a significant loss mechanism. Moderate to extensive adsorption onto soil is generally expected. Slow volatilization of naphthalene can occur from moist near-surface soil. Under experimental conditions, naphthalene in water undergoes photolysis (half-life 19 hours to 550 days, at the water surface and 5 meters deep, respectively). Naphthalene is expected to bioaccumulate in aquatic species and adsorb onto suspended particulates. In sediments, biodegradation is likely to be an important removal process (estimated half-life of 4.9 hours in oil-contaminated sediment and greater than 88 days in uncontaminated sediment). In the atmosphere, naphthalene is expected to reach with photochemically-produced hydroxyl radicals (estimated half-life is less than one day).

ATSDR. 1989. Draft Toxicological Profile for Naphthalene and 2-Methylnaphthalene. Agency for Toxic Substances and Disease Registry.

Mackay, D., W.Y., Shiu, and K.C. Ma. 1992. Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals, Volume I: Monoaromatic Hydrocarbons, Chlorobenzenes, and PCBs. Lewis Publishers, Chelsea, Michigan.

Valaes, T., S. Doxisdis, and P. Fessas. 1963. Acute hemolysis due to naphthalene inhalation. J Pediatr. **63**: 904-915; as cited in ATSDR, 1989.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.1.11 Phenanthrene

Phenanthrene, a crystalline solid, is considered to be one of the noncarcinogenic PAHs. Phenanthrene is known to be a mild allergen and dermal photosensitizer in humans (Sandmeyer, 1981). The data are considered inadequate for a quantitative risk assessment for phenanthrene (USEPA, 1994a, 1994b). Thus, a RfD for phenanthrene is not available on IRIS (USEPA, 1994a). Phenanthrene is given a carcinogenicity classification by the USEPA (1994a) of D, indicating that phenanthrene is not classifiable as to human carcinogenicity.

USEPA. 1994a. Intergrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Intergrated Risk Information System Tables (HEAST), Environmental Criteria and Assessment Office.

2.1.12 Pyrene

Mice were given oral doses of pyrene at levels ranging from 0 to 250 mg/kg/day. Nephropathies were noted in mice receiving 125 mg/kg/day (USEPA, 1989). A RfD of

3E-2 mg/kg-day was assigned to pyrene based on the nephropathy noted in this feeding study. Pyrene is not considered to have any carcinogenic potential (USEPA, 1994).

USEPA. 1989. Mouse oral subchronic toxicity of pyrene. Study conducted by Toxicity Research Laboratories, Muskegon, MI for the Office of Solid Waste, Washington, DC; as cited in USEPA, 1994.

USEPA. 1994. Intergrated Risk Information System (IRIS) electronic database.

2.2 Bis(2-ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate is in the family of chemicals known as phthalate esters. Phthalate esters are used in the manufacture of plastics and are ubiquitous in the environment. Phthalate esters are commonly present in drinking water and food (Menzer, 1991). The general public is exposed to approximately 0.3 to 2.0 mg/day of bis(2-ethylhexyl)phthalate through ingestion of food and water that contain bis(2-ethylhexyl)phthalate (ATSDR, 1991). Phthalate esters are considered to be common laboratory contaminants (USEPA, 1989).

Currently, there is minimal evidence of adverse health effects to humans resulting from exposure to bis(2-ethylhexyl)phthalate. Ingestion of a single oral dose of 10 grams of bis(2-ethylhexyl)phthalate resulted in gastrointestinal distress, but did not prove to be fatal to the patient (Shaffer *et al.*, 1945).

In a one year study, guinea pigs were fed diets containing bis(2-ethylhexyl)phthalate at a range of levels from 0 to 64 mg/kg/day (Carpenter *et al.*, 1953). No treatment related effects were observed on the parameters of mortality, body weight, kidney weight or organ histopathologies (Carpenter *et al.*, 1953). However, a statistically significant increase in relative liver weights was observed in the females in both treatment groups. Using the LOAEL of 19 mg/kg/day in this study, the USEPA presents a RfD of 2E-2 mg/kg-day for bis(2-ethylhexyl)phthalate (USEPA, 1994). This RfD was used in the baseline RA.

Despite the lack of adverse health effects seen in humans following exposure to bis(2-ethylhexyl)phthalate, exposure to this compound has been associated with an increase in liver tumors in rats and mice. Rats and mice fed diets containing 6000 or 12,000 ppm bis(2-ethylhexyl)phthalate for 103 weeks exhibited a statistically significant increase in hepatocellular carcinomas compared to the control animals (NTP, 1982). Bis(2-ethylhexyl)phthalate is considered a probable human carcinogen (class B2), and a cancer potency factor of 1.4E-2 $(mg/kg/day)^{-1}$ has been established by the USEPA for oral exposure to bis(2-ethylhexyl)phthalate (USEPA, 1994). This CPF was used in the baseline RA.

Volatilization is not an important environmental transport process for bis(2-ethylhexyl)phthalate. The evaporative half-life for bis(2-ethylhexyl)phthalate from water has been estimated at 15 years (ATSDR, 1991). Adsorption onto soils and sediments appears to be the primary environmental transport process for bis(2-ethylhexyl)phthalate into the water media (ATSDR, 1991).

ATSDR. 1991. Draft Toxicological Profile for Di(2-ethylhexyl)phthalate (DEHP). Agency for Toxic Substances and Disease Registry.

Carpenter, C. P. and C. Weil and H. Smith. 1953. Chronic oral toxicity of di(2-ethylhexyl)phthalate for rats and guinea pigs. Arch Indust Hyg Occup Med. **8**: 219-226.

Menzer, R. E. 1991. Chapter 26: Water and Soil Pollutants. In: Casarett and Doull's Toxicology: The Basic Science of Poisons. Edited by: M. Amdur, J. Doull, and C. Klaassen. Fourth edition.

NTP. 1982. Carcinogenesis bioassay of di-(2-ethylhexyl)phthalate in F344 rats and B6C3F mice (Feed Study). Tech. Rep. No. 217, National Toxicology Program, Research Triangle Park, NC. ; as cited in USEPA, 1994.

Shaffer, C., C. Carpenter and H. Smyth. 1945. Acute and subacute toxicity of di(2-ethylhexyl)phthalate with note upon its metabolism. J Ind Hyg Toxicol. **27**: 130-135.

USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response, Interim Final, EPA/540/1-89/043.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.3 Di-n-octyl Phthalate

Di-n-octyl phthalate is in the family of chemicals known as phthalate esters. Phthalate esters are used in the manufacture of plastics and are also considered to be common laboratory contaminants (USEPA, 1989).

Di-n-octyl phthalate is considered to be of slight to moderate toxicity (HSDB, 1994). Exposure to di-n-octyl phthalate has been noted to cause irritation to mucous membranes, such as the eyes, nose and throat in humans (HSDB, 1994). Ingestion of di-n-octyl phthalate may produce CNS depression in humans (HSDB, 1994). An oral LD_{50} of 30.0 g/kg has been reported in the rat (HSDB, 1994).

A risk assessment for di-n-octyl phthalate is currently under review by an USEPA work group (USEPA, 1994).

HSDB. 1994. Hazardous Substance Data Bank (HSDB). HSDB file for di-n-octyl phthalate. Electronic database from USEPA.

USEPA. 1989. Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. Interim Final. EPA/540/1-89/002. December.

USEPA. 1994. Integrated Risk Information System (IRIS). USEPA electronic database.

2.4 Dibutyl Phthalate

Dibutyl phthalate (DBP) is an odorless oily liquid used as a plasticizer in a wide variety of products such as food wraps, vinyl plastics and lacquers. Dibutyl phthalate is also a component of nail polish, insecticides, hair products, and adhesives (ATSDR, 1989; USEPA, 1992). The phthalate esters, of which dibutyl phthalate is a member, are considered by the USEPA to be common laboratory contaminants for purposes of evaluating analytical data according to the contract laboratory program (CLP) (USEPA, 1989).

Toxic effects from exposure to dibutyl phthalate have not been reported in humans (ATSDR, 1989). In laboratory animals, the main target for dibutyl phthalate toxicity appears to be the reproductive system. Atrophy of the seminiferous tubules and decreased sperm counts are noted in some laboratory animals (ATSDR, 1989). Dibutyl phthalate may also be fetotoxic in rats and mice. Because single dose oral LD_{50} values are estimated to be in the range of 20000 to 25000 mg/kg in the rat (White *et al.*, 1983), it is unlikely that a human would accidentally ingest a fatal dose of dibutyl phthalate.

In a subchronic/chronic oral bioassay, male rats were fed diets containing dibutyl phthalate ranging from 0 to 1.25 percent of the diet for one year (Smith, 1953). One half of the rats in the highest dose group (1.25 percent of the diet) died during the first week of exposure. However, the remaining rats survived the rest of the study duration with no ill effects noted. Based on the increased mortality noted in this study, the USEPA (1992) presents a RfD of 1E-1 mg/kg/day for dibutyl phthalate. Because DBP does not appear to have carcinogenic potential, DBP is given a weight-of-evidence classification of D.

Dibutyl phthalate does not rapidly volatilize from surface waters, based on a Henry's Law Constant of 4.6E-7 atm-m^3/mol. The half-life for DBP is surface water has been estimated at 47 days (Howard, 1989). Due to its low vapor pressure and moderate adsorption to soil, DBP does not rapidly volatilize from soils (Howard, 1989). Dibutyl phthalate does not bioconcentrate in aquatic organisms since it is rapidly metabolized (Howard, 1989).

ATSDR. 1989. Draft Toxicological Profile for Di-n-Butyl Phthalate. Agency for Toxic Substances and Disease Registry.

Howard, P.H. 1989. Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Volume I - Large Production and Priority Pollutants. Lewis Publishers, Chelsea, Michigan.

Smith, C. 1953. Toxicity of butyl sterate, dibutyl sebacate, dibutyl phthalate and methoxyethyl oleate. Arch Hyg Occup Med. 7: 310-318.

USEPA. 1989. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response, Interim Final, EPA/540/1-89/002, December.

USEPA. 1992. Guidelines for Exposure Assessment - Final. Office of Health and Environmental Assessment.

White, R., D. Earnest and D. Carter. 1983. The effect of intestinal esterase inhibition on the *in vivo* absorption and toxicity of di-n-butyl phthalate. Food Chem Toxicol. **21**: 99-101; as cited in ATSDR, 1989.

2.5 4-Chloro-3-methylphenol

No specific toxicity information for 4-chloro-3-methylphenol was located in the literature. However, 4-chloro-2-methylphenol, a structurally related compound, was used as a surrogate compound for toxicity information for 4-chloro-3-methylphenol. The major use of 4-chloro-2-methylphenol is as a chemical intermediate, primarily for the manufacture of herbicides (HSDB, 1994).

4-Chloro-3-methylphenol belongs to a family of chemicals known as chlorophenols. The toxic effects of chlorophenols that have been observed in laboratory animals include restlessness, increased rate of respiration, tremors, convulsions and coma (Diechmann and Keplinger, 1981). Ingestion of 4-chloro-2-methylphenol may be associated with low blood pressure (hypotension), vomiting and seizures in humans (HSDB, 1994). No toxicity data are available for 4-chloro-3-methylphenol from either IRIS (USEPA, 1994a) or HEAST (USEPA, 1994b).

Diechmann, W. and M. Keplinger. 1981. Chapter 36: Phenols and Phenolic Compounds. In: Patty's Industrial Hygiene and Toxicology. Vol. IIA. Third Revised edition. Edited by Clayton and Clayton.

HSDB. 1994. Hazardous Substance Data Bank (HSDB). HSDB file on 4-chloro-2-methylphenol. USEPA electronic database.

USEPA. 1994a. Integrated Risk Information System (IRIS). USEPA electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST). Office of Solid Waste and Emergency Response.

2.6 2,4-Dimethylphenol

2,4-Dimethylphenol is a member of a class of compounds known as phenols. 2,4-Dimethylphenol is used as a disinfectant, solvent, and in dyestuffs (Sax and Lewis, 1987).

Very little toxicological data are available regarding 2,4-dimethylphenol. In a subchronic (90 day) study, mice were administered daily doses of 2,4-dimethylphenol by gavage at concentrations of 0, 5, 50, and 250 mg/kg/day (USEPA, 1989). Parameters observed in this study included mortality, body weights, food consumption, clinical chemistry, and gross histopathology. No significant differences were noted between treated animals and control animals in mean body weight, body weight gains or food consumption. After six weeks of treatment, both males and females in the highest dose group exhibited squinting, lethargy and ataxia. At the end of the study, statistically significant hematological changes were noted. Statistically significant decreases in mean corpuscular volume and mean hemoglobin concentration were noted in the female mice.

The USEPA (1994) presents an oral RfD of 2E-2 mg/kg-day for 2,4-dimethylphenol. 2,4-Dimethylphenol does not appear to have any carcinogenic potential.

Sax, N. I. and R. J. Lewis. 1987. Hawley's Condensed Chemical Dictionary. Revised by N. Sax and R. Lewis. Eleventh Edition. Van Nostrand Reinhold Company, Inc.

USEPA. 1989. Ninety-day gavage study in Albino mice using 2,4-dimethylphenol. Study No. 410-2831. Office of Solid Waste and Emergency Response; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

2.7 4-Methylphenol

4-Methylphenol, also known as *para*-cresol (*p*-cresol), is a member of a family of compounds known as cresols. Cresols, of which there are three types [*ortho* (*o*), *meta* (*m*) and *para* (*p*)], are a group of compounds that can be either solids or liquids at room temperature, depending on whether they occur separately or as mixtures (ATSDR, 1990). Cresols are used as solvents and disinfectants, and 4-methylphenol is used in the dye industry (ATSDR, 1990).

Like the other cresols, 4-methylphenol is very corrosive to mucous membranes. Ingestion of cresols in humans results in damage to the mouth, throat, and gastrointestinal tract as well as abdominal pain and vomiting (ATSDR, 1990). Ingestion of a cresol-containing disinfectant solution has reportedly been fatal. Death was the result of acute intravascular hemolysis and renal failure, with the lethal dose estimated at approximately 2 g/kg (Chan, 1971). Other effects noted in persons ingesting cresol-containing solutions are formation of methemoglobin, renal congestion and coma (Dellal, 1931; Issacs, 1922). The occurrence of coma, death and systemic effects in two humans dermally exposed to cresols indicates that these compounds can be absorbed through the skin (Cason, 1959; Green, 1975).

In animals, the target organs of toxicity for cresols appear to be the kidney and hematopoietic system. Rats administered doses of *ortho-* and *para-* cresol by gavage ranging from 0 to 600 mg/kg/day for 90 days exhibited a variety of effects, including reduced body weight, reduced food consumption and increased kidney-to-body weight-ratio (USEPA, 1986; 1987). Additionally, CNS effects, such as ataxia, coma and tremor were noted.

The oral RfD for 4-methylphenol was withdrawn from IRIS in 1991 for further review (USEPA, 1994a). However, HEAST (USEPA, 1994b) presents a chronic RfD of 5E-3 mg/kg-day. This RfD is based upon a gestational study in rabbits in which the critical toxicological effects that were noted include maternal death, respiratory distress and hypoactivity (USEPA, 1994b). Although human data regarding the carcinogenicity of 4-methylphenol are considered inadequate, 4-methylphenol is listed as a possible human carcinogen, CAG Class C (USEPA, 1994a). This designation is based on studies in mice where cresols were found to be tumor promoters of skin papillomas (Boutwell and Bosch, 1959). However, a CPF is not available from either IRIS (USEPA, 1994a) or HEAST (USEPA, 1994b).

In the atmosphere, 4-methylphenol is primarily in the vapor form. In surface water, volatilization of 4-methylphenol is expected to be a slow process based upon the Henry's Law Constant of approximately 1.2E-6 atm-m^3/mol (ATSDR, 1990). 4-Methylphenol is highly mobile in soils, based upon its log K_{oc} of 49.

ATSDR. 1990. Draft Toxicological Profile for Cresols. Agency for Toxic Substances and Diseas Registry.

Boutwell, R. K. and D. K. Bosch. 1959. The tumor-promoting action of phenol and related compounds for mouse skin. Cancer Res **19**: 413-424; as cited in USEPA, 1994a.

Cason, J. S. 1959. Report on three extensive industrial chemical burns. Br Med J **1**: 827-829; as cited in ATSDR, 1990.

Chan, T. K., L. Mak, R. Ng. 1971. Methemoglobinemia, Heinz bodies and acute massive intravasuclar hemolysis in Lysol poisoning. Blood. **38**: 739-744; as cited in ATSDR, 1990.

Dellal, V. 1931. Acute pancreatitis following Lysol poisoning. Lancet **1**: 407; as cited in ATSDR, 1990.

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2.8 1,2,4-Trichlorobenzene

1,2,4-Trichlorobenzene (1,2,4-TCB) is a member of a family of compounds called chlorinated benzenes. Chlorinated benzenes are used in synthetic transformer oils (Sax and Lewis, 1987).

Specific human toxicology data for 1,2,4-TCB are limited. However, some data on the potential health effects resulting from 1,2,4-TCB exposure are available based upon data from occupational and home use of other chlorinated benzenes such as the dichlorobenzene isomers. Although the dichlorobenzenes have only 2 chlorine atoms per molecule while 1,2,4-TCB has three chlorine atoms per molecule, the increased number of chlorine atoms does not appear to increase toxicity. In general, the signs and symptoms of exposure to dichlorobenzenes are headache, dizziness, and anemia (Deichmann, 1981). These symptoms generally disappear when exposure ceases. There are also some reports of leukemia in workers exposed to mixtures of dichlorobenzenes for 10 or more years (Deichmann, 1981).

In a study to evaluate the effects of 1,2,4-TCB exposure, rats were given 0, 25, 100 or 400 ppm of 1,2,4-TCB in their drinking water (Robinson *et al.*, 1981). Rats in the 400 ppm dosing group experienced a significant increase in adrenal gland weight. Additional toxicokinetic studies have shown that adrenal glands have the highest initial concentration of 1,2,4-TCB following single oral doses of the compound (Smith and Carlson, 1980). Based upon the available evidence of the effects of 1,2,4-TCB exposure on the adrenal gland, the USEPA has established a reference dose (RfD) of 1E-2 mg/kg-day (USEPA, 1994). 1,2,4-Trichlorobenzene is given a D carcinogenicity classification, indicating that it is non-classifiable for human carcinogenicity (USEPA, 1994).

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3.0 POLYCHLORINATED BIPHENYLS AND PESTICIDES

3.1 Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are a family of over 200 individual congeners composed of two linked benzene rings that are chlorinated at one or more sites on the biphenyl structure. PCB mixtures contain biphenyl congeners with varying degrees of chlorination and the mixtures are defined by the total percentage of chlorination. In the USA, commercial PCB mixtures were sold under the trade name Aroclor, with a number to designate the degree of chlorination. In the past, PCBs were used widely as coolants and lubricants and in the manufacture of products such as plastics and adhesives because of their flame retardant and insulating properties. The manufacture of PCBs in the USA ceased in 1977 due to evidence that PCBs are environmentally persistent and at high doses were toxic to animals. There was a concern that PCBs may also have the potential to impact human health.

Several factors impact the toxicological evaluation of PCBs. PCB mixtures (Aroclors) contain many different congeners. Thus, different production lots of the same mixture can vary greatly in the congener content, even when the average chlorine content is the same. Additionally, PCB mixtures are known to sometimes contain various impurities, such as polychlorinated dibenzofurans (PCDFs) and polycholorinated quaterphenyls (PCQs), which may have toxicities equal to or greater than PCBs (Kashimoto *et al.*, 1985). Furthermore, PCBs that humans are ultimately exposed to may be significantly different from the original mixture because of changes in the congener and purity level following environmental and biological transformation. Laboratory experiments performed to determine the toxicological properties of PCBs are often limited to a specific mixture of PCBs. The scientific evidence to date does not support the assumption that all PCB mixtures are carcinogens. There is evidence that one Aroclor mixture, namely Aroclor 1260, at high doses does cause the formation of a statistically significant number of cancerous tumors in rats.

The Institute for Evaluating Health Risks (IEHR) completed a study in which they reassessed the pathological diagnoses in five key rat PCB studies (Abelson, 1991; Moore, 1991; USEPA, 1991). Based on this study, John A. Moore, President of IEHR and former EPA deputy administrator, recommends that the USEPA reconsider their PCB cancer risk policy (Moore, 1991). Specifically, he recommends that separate risk assessments be developed for each of the major PCB formulations to reflect the fact that rats fed PCB mixtures of 54 percent or 42 percent chlorination (Aroclor 1254 and Aroclor 1242) did not experience statistically significant elevations in incidences of liver tumors. Furthermore, he recommends lowering the cancer potency factor (CPF) for Aroclor 1260 to 1.9 $(mg/kg/day)^{-1}$. Additionally, the USEPA has recently considered (June, 1994) deriving RfDs for several Aroclors, including Aroclor 1016, Aroclor 1248 and Aroclor 1254. However, of these three Aroclors, only Aroclor 1016 currently has a published RfD (USEPA, 1994a). Thus, based on available information, for purposes of this risk assessment, only Aroclor 1260 was assumed to be carcinogenic. All other Aroclors were considered to be noncarcinogenic. The following sections outline the relevant toxicological studies and information regarding the noncarcinogenic and carcinogenic properties of PCBs.

3.1.1 Noncarcinogenic Properties of PCBs

Very little data exists regarding the kinetics of PCB mixtures in humans or animals. Metabolic and pharmacokinetic behavior varies with each congener, according to position and degree of chlorination. PCB mixtures are known to be absorbed through the gastrointestinal tract, epidermis, and pulmonary tissues. The gastrointestinal absorption of most congeners is probably greater than 90 percent, but the degree of absorption of PCBs following dermal or pulmonary exposure in not known (ATSDR, 1989). Maroni *et al.* (1981a) evaluated 80 industrial workers exposed to PCB mixtures with 42 percent chlorine content as a result of their specific work assignments. PCBs were measured in the air, on workroom surfaces, on palms of workers hands, and in workers' blood. Blood PCB levels were found to correlate closely with length of exposure, but not to assumed exposure amounts, and the authors concluded that dermal absorption of PCBs was the main route of exposure for these workers.

PCBs are very lipophilic and resistant to metabolic breakdown. Thus, they concentrate in fatty tissues in the body, and will tend to be present in a given organ in proportion to the fat content of that organ. Because humans excrete very little fat, excretion of PCBs from the body is slow. PCBs in serum fat remain in steady state with PCB stored in body fat. The half-lives of elimination from the blood of three PCB congeners present in Aroclor 1254 were found to range from 124 to 338 days (Buhler *et al.*, 1988). PCBs are known to be excreted through human breast milk because of its high fat content. Numerous studies have been conducted on the PCB content of human milk, and there is evidence that the transfer of PCBs from mother to child is greater via breast milk than across the placenta (Masuda *et al.*, 1978).

Analytical studies indicate that most individuals carry body burdens of PCBs in their adipose tissues in the range of 0.1 to 1.0 ppm as a result of environmental exposure (Safe, 1989). Any potential health effects that may result from these background levels have not been evaluated. Furthermore, data regarding human health effects from exposure to high levels of PCBs are not extensive. Only two groups of people are known to have experienced exposure to high levels of PCBs:

- Those persons who ingested PCB-containing rice oil in the "Yusho" and "Yu Cheng" incidents
- Occupationally exposed workers

Although victims of the "Yusho" and "Yu Cheng" accidents experienced symptoms such as severe skin disorders and nausea and even some deaths resulted, it was later determined that the PCB mixtures involved also contained high levels of polychlorinated dibenzofurans and polychlorinated quaterphenyls. Based on subsequent studies, it has been generally concluded among the scientific community that the toxic effects seen in the persons who accidentally ingested the contaminated rice oil were most likely due to the presence of dibenzofurans and quaterphenyls rather than the PCBs (Kashimoto *et al.*, 1985).

Persons who have had the potential to be exposed to PCBs through their work represent the best source of information on possible health effects resulting from PCB exposure. For example, workers in the electrical industry have been found to have serum PCB levels higher than the general population (Smith *et al.*, 1982; Hosek, 1988; Emmett *et al.*, 1988). Occupational exposure has been associated with reversible skin lesions and increases in serum hepatic enzymes. These increases in serum enzymes have, however, shown inconsistent patterns and typically have not been associated with hepatic dysfunction (ATSDR, 1989). Smith *et al.* (1982) found serum glutamic-oxaloacetic transaminase (SGOT), gamma-glutamyl transpeptidase (GGTP) and triglyceride were positively and significantly correlated with serum PCB concentrations in workers occupationally exposed to PCBs. However, on clinical examination, these workers did not demonstrate a consistent pattern of abnormalities, and none were found to have acneform lesions indicative of chloracne. In a similar study of underground electric utility workers, Hosek (1988) reported slightly different findings. While workers did demonstrate a positive correlation between serum PCB levels and liver enzymes, the correlation was weak at best. However, a correlation was found between serum PCBs and triglycerides. As in the study by Smith *et al.* (1982), Hosek (1988) did not find any additional clinical or physical symptoms in the workers that were typically associated with PCB exposure. After adjusting for confounding variables in his epidemiological study, Emmett (1985) did not note significant differences between exposed and comparison groups on liver function tests. However, even after adjusting for confounding variables, there was a statistically significant correlation between serum PCBs and serum gamma glutamyl transpeptidase. Since PCBs are known inducers of hepatic microsomal enzymes, Emmett suggested that the elevation of this enzyme level could be related to microsomal enzyme induction rather than frank liver damage.

Dermatological effects associated with long-term exposure to PCBs were evaluated in a cross-sectional study of capacitor manufacturing workers, where almost 40 percent of the workers had been employed for 20 years or more (Fischbein *et al.*, 1982). While a high prevalence (37 percent) of dermatological abnormalities was found among these capacitor workers following examination, the PCB-associated chloracne was noted less frequently than among the "Yusho" patients. There was an association between dermatological findings and plasma PCB concentration; however, the authors stress that PCB contaminants such as polychlorinated dibenzofurans should be considered as having a potential to contribute to these dermatological effects.

Maroni *et al.* (1981b) also conducted a study of 80 electrical workers who had been exposed to the 42 percent chlorinated PCB mixtures. While some dermatological effects such as chloracne were noted, these effects could not be related to PCB blood concentrations. In another study, a tentative blood PCB concentration of 2.0 micrograms per deciliter (μg PCB/dL) (20 ppb) for occupationally exposed workers was suggested (Ouw *et al.*, 1976). This value was determined following the examination of 34 electrical workers who complained of nausea and a burning sensation of the face and hands after having worked with Aroclor 1242. While only 6 workers had dermatological lesions, including a single case of chloracne, and the mean blood levels of Aroclor 1242 were approximately 40 μg PCB/dL blood (400 ppb), the hepatic function tests were normal.

Thus, epidemiological studies have not documented human health effects that can consistently be associated with PCB exposure. While there is suggestive evidence for subclinical increases in serum hepatic enzymes, these changes may in reality be indicators of microsomal enzyme induction and not non-reversible hepatic lesions. Dermatological effects such as rashes and chloracne have not been consistently related to serum PCB levels.

PCB exposure in laboratory animals produces similar effects to those seen in humans. For example, effects seen in animals following PCB exposure include microsomal enzyme induction, increased serum levels of liver associated enzymes, liver enlargement, and fat deposition with the liver. Many of these changes appear to be reversible, as reversible degenerative lesions of the liver were noticed in rats, mice, rabbits, cats and guinea pigs exposed to 1.5 mg/m^3 (0.11 ppm) Aroclor 1254 vapor for 7 hours a day, 5 days a week, for 213 days (Treon *et al.*, 1956). Sprague-Dawley rats fed a diet containing a mixture of PCB congeners at a concentration of 100 ppm for 52 weeks appeared healthy and gained weight as rapidly as the control animals throughout the study; however, there were other distinct changes. There was an increase in total serum lipids and cholesterol, as well as liver hypertrophy and focal areas of cellular degeneration (Allen *et al.*, 1976).

Female monkeys have been fed diets containing Aroclor 1248 at concentrations of 2.5, 5.0, and 25.0 ppm for time periods ranging from 2 months for the 25.0 ppm dose to 1 year for the 2.5 and 5.0 doses (Allen *et al.*, 1974; Barsotti and Allen, 1975). Monkeys receiving the

25 ppm dose developed facial edema, alopecia, and acne within 1 month, and one animal died from PCB intoxication two months after being removed from the diet. These monkeys also developed hyperplastic gastritis, which is a possible PCB-related effect that appears to be unique to monkeys. The surviving monkeys from this experiment continued to show clinical signs of PCB toxicity 2 years following the exposure. Infants born to these females were smaller than normal and had detectable levels of PCBs in their tissues. Of the laboratory animals, monkeys are considered to be the most sensitive to PCB effects (ATSDR, 1989).

The National Cancer Institute (NCI, 1977) conducted a chronic feeding study in male and female rats. Rats were given 25, 50, and 100 ppm Aroclor 1254 in the diet for 104 to 105 weeks. While mean body weights for all females and for mid- and high-dose males were below controls by week 10, other symptoms such as alopecia, facial edema, and exophthalmos did not appear until week 72, and then only in the high-dose group. In the mid-dose (50 ppm), these symptoms did not appear until the end of the study (week 104). Nodular hyperplasia (non-neoplastic) was noted in a dose-related frequency in both male and female rats at all dose levels. Hepatocellular carcinomas were observed in mid- and high-dose males, and hepatocellular adenomas were observed in mid- and high-dose males and females. However, the incidence of these tumors were not statistically significant. It was thus concluded that under the conditions of this study, Aroclor 1254 was not carcinogenic in Fisher rats.

3.1.2 Reference Doses (RfDs) for Aroclor 1248 and Aroclor 1254

As previously indicated, the toxicological data for PCBs other than Aroclor 1260 suggest that these Aroclors should be treated as noncarcinogens. However, RfD are not available for Aroclor 1248 and Aroclor 1254, two Aroclors that were detected at the Yard. Therefore, appropriate RfDs for these Aroclors were developed for this risk assessment. The approach adopted was an extensive review of the literature to identify key studies which had sufficient information regarding dose and effect, if any, such that it would be possible to generate either a "no observed adverse effect level" (NOAEL) or the "lowest observed adverse effect level" (LOAEL).

In dose-response experiments, the NOAEL is defined as the exposure level (or dose) at which there is no significant increase in adverse effects in the experimental population as compared to control. While some effects may be noted at this dose level, the effects are considered neither adverse in themselves nor precursors to adverse effects. When more than one NOAEL is noted in a particular study, the highest NOAEL is considered the appropriate NOAEL. On the other hand, the LOAEL is defined as the lowest exposure level in a dose-response study at which there are significant increases in the frequency or severity of adverse effects in the experimental population as compared to the control population. The NOAELs and LOAELs from dose response studies are then used to estimate an appropriate RfD. The RfD, which is an estimate of daily intake that is likely to be without appreciable risks of deleterious effects during a portion of a lifetime, is developed by dividing the NOAEL (or LOAEL if the NOAEL is not available) by an uncertainty factor. The uncertainty factor reflects professional judgement regarding different types of data used to estimate the RfD. For example, a 10-fold factor of uncertainty might be assumed in the following situations:

- To account for variations in human sensitivity in the general population following data extrapolation from human studies
- To extrapolate from long-term animal studies to humans
- To extrapolate from sub-chronic studies in animals to chronic effects
- To extrapolate from a LOAEL to a NOAEL

In some cases, based on professional judgment, other uncertainty factors may be included or the 10-fold factors typically used may be modified to account for perceived uncertainty in animal sensitivity versus human sensitivity. Thus, when uncertainty factors that reflect the uncertainty inherent in the extrapolation process are applied to NOAELs and LOAELs, health-protective RfDs can be derived.

Table B-1 is a summary of the data used to derive the RfDs of 2.3E-4 mg/kg-day and 2.0E-4 mg/kg-day for the noncarcinogenic effects of Aroclor 1248 and Aroclor 1254, respectively. The pertinent LOAELs and NOAELs of each study are presented along with the rationale for the selection of uncertainty factors. To determine the final RfD for each Aroclor, the geometric mean of the five study-based RfDs for Aroclor 1248 and the geometric mean of the three study-based RfDs for Aroclor 1254 were calculated. The geometric mean was utilized because the geometric mean places equal weight on relative changes in magnitude within a data set.

3.1.3 Carcinogenic Properties of PCBs

The potential carcinogenicity of PCBs in man has not been clearly established. Epidemiological studies have yielded inconclusive results due to problems such as small cohort size, inability to quantify PCB exposure, and the likelihood of worker exposure to other potential carcinogens. Brown and Jones (1981) performed a retrospective cohort mortality study on over 2,000 workers who had been employed at least 3 months in two capacitor factories using Aroclors 1254, 1242 and 1016. Mortality from all causes was lower than expected in this study. However, while excess mortality from liver and rectal cancer was noted, this excess was not statistically significant. Studies on both research personnel and plant workers at a petrochemical plant where Aroclor 1254 had been used for 9 years were performed (Bahn *et al.*, 1976, 1977; Lawrence, 1977; NIOSH, 1977). NIOSH (1977) noted that a greater-than-expected number of cancers occurred in this population, as 8 cancers were noted compared to an expected 5.7. However, this data should be considered inconclusive not only because of the small cohort size and lack of PCB exposure quantification, but also because of the confounding influences from likely worker exposure to other potential carcinogens.

The USEPA has based its evaluation of the carcinogenic potential of PCBs on the study conducted by Kimbrough (1975) and more recently, on the Norback and Weltman (1985) study. Both of these studies were long-term feeding studies utilizing a single level high dose of Aroclor 1260 in different strains of rats. In the Kimbrough (1975) study, 200 female

Sherman rats were fed 100 ppm Aroclor 1260 in the diet for 21 months. After 23 months, all remaining animals (184) were killed and examined. Of the 184 treated females, 170 had elevated tan nodules on the surface and interior of their livers, and these nodules were characteristic of neoplastic nodules. Hepatocellular carcinomas of the trabecular type were noted in 26 of the 184 treated animals, but in only 1 of the 200 control animals.

In the Norback and Weltman (1985) study, 70 male and 70 female Sprague-Dawley rats received 100 ppm Aroclor 1260 in the diet for 16 months. Then, because of evident toxicity, the dose was reduced to 50 ppm for 8 months, and finally a control diet was provided for the final 5 months prior to sacrifice. The female rats exhibited a significantly elevated cancer rate over the males. Periodic sacrifices were also performed, and even after 1 month of the dietary treatment, hepatomegaly was noted in these rats. Pathologic changes were noted in the livers that progressed from hypertrophy to adenocarcinoma. However, while these tumors met morphologic criteria for carcinoma, they were biologically unaggressive, as neither metastasis nor invasion of surrounding tissues occurred. Additionally, the rats did not exhibit increased mortality that could be attributed to the presence of these tumors.

3.1.4 Carcinogenic Potency Factor (CPF) for Aroclor 1260

Quantitative carcinogenic risk assessments, using mathematical extrapolation models such as the linearized multistage model, are used by the USEPA to estimate CPFs. These CPFs are upper bound risk estimates, such that the true cancer risk to humans would not be expected to exceed this value. The USEPA developed a CPF for PCBs of 7.7 $(mg/kg/day)^{-1}$ using the Norback and Weltman (1985) study as a basis for a quantitative carcinogenic risk assessment. However, recent data indicate that a CPF of 1.9 $(mg/kg/day)^{-1}$ is more appropriate (Moore, 1991). For purposes of this risk assessment, the current USEPA CPF of 7.7 $(mg/kg/day)^{-1}$ will be used to estimate potential carcinogenic risk associated with exposure to Aroclor 1260.

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3.2 Dieldrin

Aldrin and dieldrin are two structurally similar pesticides that differ by the presence, in dieldrin, of an epoxide ring in place of the carbon double bond in aldrin. Aldrin is readily converted to dieldrin in both the environment via epoxidation and in the animal metabolic system via monoxygenases present in the liver and lungs. Although no longer used in the US, aldrin and dieldrin were used as insecticides on corn and cotton crops and as termite control agents. Due to their chemical and toxicological similarity, aldrin and dieldrin are considered together in this toxicological profile.

The primary target organ system in humans for the toxic action of both aldrin and dieldrin is the central nervous system (CNS). Exposure to acute high levels of aldrin and dieldrin produces CNS excitation that may result in convulsions. Death has been reported in a small child who experienced convulsions following ingestion of an unknown amount of a 5 percent dieldrin solution (Garrettson and Curley, 1969). The fatal oral dose of aldrin or dieldrin has been estimated at 71 mg/kg in humans (Hodge *et al.*, 1967). Other symptoms of CNS toxicity, such as headache, dizziness, hyperirritability, nausea, vomiting and muscle twitching have been associated with long term exposure to aldrin and dieldrin. While convulsions are primarily associated with acute exposure to high concentrations of the compounds, convulsions may also result from long term low level exposure, if, over time, body burdens of the aldrin and dieldrin reach critical concentrations (ATSDR, 1991).

Adverse hepatic effects have generally not been noted in persons employed in the manufacture or application of aldrin and dieldrin (Morgan and Roan, 1974). However, exposure of animals to moderate to high levels of these two pesticides during sub-chronic and chronic studies has produced elevated serum enzyme levels, hyperplasia, and focal degeneration in the liver.

Rats given aldrin in the diet at doses ranging from 0 to 150 ppm for two years demonstrated liver lesions including enlarged centrilobular hepatic cells and granule migration. Additionally, a statistically significant increase in liver-to-body-weight ration was observed at all dose levels in these animals (Fitzhugh, 1964). Based on this study, the USEPA presents a RfD of 3E-5 mg/kg/day for aldrin. Rats and dogs given dieldrin in the diet for 2 years demonstrated focal hyperplasia and increased liver weights (Walker et al., 1969). Based on this study, the USEPA presents a RfD of 5E-5 mg/kg/day for exposure to dieldrin Liver lesions are the critical effect.

Although human evidence of carcinogenicity is considered inadequate, both aldrin and dieldrin are classified as probable human carcinogens (B2). Groups of mice fed a diet containing either, 10 ppm aldrin or 10 ppm dieldrin for 2 years exhibited statistically significant increase in hepatomas, which were later determined to be malignant (Davis and Fitzhugh, 1962). In another two year feeding study, tumor incidence was determined to be dose related, and effects were noted at the lowest administered dose of 0.1 ppm (Walker et al., 1972). Based on this information, the USEPA has developed cancer potency factors for exposures to aldrin and dieldrin of 1.7E+1 $(mg/kg/day)^{-1}$ and 1.6E+1 $(mg/kg/day)^{-1}$, respectively. These CPFs are for both oral and inhalation exposure.

In the environment, dieldrin is very resistant to degradation. Dieldrin binds strongly to soils and is also relatively insoluble in water (ATSDR, 1991). As a nonpolar compound, dieldrin has a high affinity for animal fat and plant waxes (ATSDR, 1991). Both aldrin and dieldrin have high potential for bioaccumulation as indicated by a log K_{ow} in the range of 5.6 to 7.4 for aldrin and 4.3 to 6.2 for dieldrin Based on the Henry's Law Constant and the organic carbon partition coefficient (K_{oc}), the half-life of dieldrin in soil is estimated to be 868 days (Jury *et al.*, 1987).

ATSDR. 1991. Draft Toxicological Profile for Aldrin/Dieldrin. Agency for Toxic Substances and Disease Registry.

Davis, K. and G. Fitzhugh. 1962. Tumorigenic potential of aldrin and dieldrin for mice. Toxicol. Appl. Pharmacol. **4**: 187-189; as cited in USEPA, 1994.

Fitzhugh, O., A. Nelson, and M. Quaife. 1964. Chronic oral toxicity of aldrin and dieldrin in rats and dogs. Food Cosmet Toxicol. **2**: 551-562; as cited in USEPA, 1994.

Garrettson, L. and A. Curley. 1969. Dieldrin: Studies in a poisoned child. Arch. Environ. Health. **19** : 814-822; as cited in ATSDR. 1991.

Hodge, H., A. Boyce, W. Deichmann, W. et al. 1967. Toxicology and no-effect levels of aldrin and dieldrin. Toxicol. Appl. Pharmacol. **10**: 613-675; as cited in ATSDR, 1991.

Jury, W., D. Focht, W. Farmer. 1987. Transport and transformation of organic chemicals in the soil-air-water ecosystem. Envrion. Contam. Toxicol. **99**: 119-164; as cited in ATSDR, 1991.

Morgan, D. and C. Roan. 1974. Liver function in workers having high tissue stores of chlorinated hydrocarbon pesticides. Arch. Environ. Health. **29**: 14-17; as cited in ATSDR, 1991.

Walker, A., D. Stevenson, J. Robinson, R. Thorpe, M. Roberts. 1969. The toxicology and pharmacodynamics of dieldrin (HEOD): Two-year oral exposures of rats and dogs. Toxicol. Appl. Pharmacol. **15**: 345-373; as cited in USEPA, 1994.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

4.0 METALS

4.1 Aluminum

Aluminum (Al) is a silver-white flexible metal that is used primarily for structural purposes in the building industry. However, aluminum flakes and powder are used in the paint industry, and alumina (Al_2O_3) is widely used in industrial refractories and abrasives (Stokinger, 1981).

Aluminum is present in food and household products such as antacids and antiperspirants. The Federal Food and Drug Administration considers the use of aluminum in food and food-related products to be nontoxic to human health (Sorenson *et al.*, 1974). Because of its presence in drinking water and food, the general public ingests about 10 mg aluminum per day (ATSDR, 1990). The total body burden of aluminum in a healthy person is about 30 to 50 mg (Alfrey, 1981).

Aluminum toxicity appears to be limited to the soluble aluminum compounds such as the aluminum chlorides and aluminum sulfates (Stokinger, 1981). An oral LD_{50} of 770 mg Al/kg has been reported for $AlCl_3$ in the mouse (ATSDR, 1990; Ondreicka *et al.*, 1966). In contrast to the soluble aluminum compounds, the insoluble aluminum compounds appear to be of minimal toxicity. It is believed that the toxic action of aluminum compounds is due to the anionic, acidic component present only in the soluble aluminum compounds (Stokinger, 1981).

While oral exposure to aluminum is not considered to be harmful, inhalation of large amounts of aluminum dusts has been found to be irritating to respiratory tissues. Persons exposed to aluminum dusts in the workplace have reported irritation to the respiratory tract (Musk *et al.*, 1980).

The toxicological data for aluminum are inadequate for a quantitative risk assessment (USEPA, 1994b), and no RfD is available from either IRIS (USEPA, 1994a) or HEAST

(USEPA, 1994b). Aluminum has not been associated with a carcinogenic response in humans (ATSDR, 1990).

Alfrey, A. C. 1981. Aluminum and tin. In: Disorders of Mineral Metabolism Vol. I. Trace Minerals, ed. F. Bronner, and J. Coburn, Academic Press, New York, NY; as cited in ATSDR, 1990.

ATSDR, 1990. Draft Toxicological Profile for Aluminum and Compounds. Agency for Toxic Substances and Disease Registry.

Musk, A. W., H. W. Greeville, and A. E. Tribe. 1980. Pulmonary disease from occupational exposure to an artificial aluminum silicate used for cat litter. Br. J. Ind. Med. **37**: 367-372; as cited in ATSDR, 1990.

Ondreicka, R., E. Ginter, J. Kortus. 1966. Chronic toxicity of aluminum in rats and mice and its effects on phosphorous metabolism. Br. J. Indus. Med. **23**: 305-312; as cited in ATSDR, 1990.

Stokinger, H. 1981. Chapter 29. The Metals. In: Patty's Industrial Hygiene and Toxicology. Volume 2A, edited by Clayton and Clayton.

Sorenson, J. I. Campbell *et al.* 1974. Aluminum in the environment and human health. Environ. Health Perspect. **8**: 3-95; as cited in ATSDR, 1990.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

4.2 Arsenic

Arsenic (As) is widely distributed in the environment, and is usually found in combination with other elements such as oxygen, chloride, and sulfur (ATSDR, 1991). Both organic and inorganic forms of arsenic exist, and in general, the organic forms of arsenic are less toxic than the inorganic. The main route of exposure for the general population is through food.

Ground water in some areas of the country have been found to contain elevated levels of arsenic due to natural mineral deposits.

Inorganic arsenic is a known human poison. Doses greater than 100 mg/kg/day can result in death and lower doses may cause nausea, vomiting, and diarrhea (ATSDR, 1991). Other systemic effects from ingestion of arsenic are anemia, liver and kidney damage, and impaired nerve function (Tay and Seah, 1975).

The most characteristic effects of oral exposure to inorganic arsenic are patterns of skin discolorations (hyperpigmentosis) and formation of thickened areas of skin (hyperkeratosis) (ATSDR, 1991). Some of these changes may progress to skin cancer (ATSDR, 1991). Chronic oral ingestion of arsenic has been associated with an increased incidence of skin cancer, and, to a lesser degree, increased incidence of cancer of the liver, bladder, kidney (ATSDR, 1991).

The relationship between arsenic ingestion and skin cancer has been documented in the scientific literature (ATSDR, 1991). Persons who ingested water with high levels of arsenic, were found to have skin cancer prevalence rates proportional to arsenic exposure levels. Doses of arsenic for this population were estimated to range between 6 and 50 μg/kg/day (Tseng *et al.*, 1968).

Information regarding effects to humans following inhalation exposure to arsenic comes primarily from occupational studies. Inhalation exposures may produce systemic toxic effects, such as nausea and neuropathy, that are similar to those seen following ingestion (Stokinger, 1981). However, these systemic effects are usually milder than the effects noted following ingestion (Stokinger, 1981). The most important health effect from inhaled arsenic is increased risk of lung cancer (ATSDR, 1991). Various studies of smelter workers show that there is a relationship between inhalation exposure to arsenic and lung cancer mortality. Increased lung cancer rates occurred in groups that had above average exposure to arsenic (Enterline and Marsh, 1982; Lee-Feldstein, 1983).

However, despite the adverse effects seen following arsenic exposure, there is some evidence that exposure to low concentrations of arsenic may be beneficial. Animals on diets with lower than normal arsenic contents did not gain weight normally, had lower birth rates and gave birth to smaller offspring (ATSDR, 1991). No cases of deficiency in humans have been found, and it is therefore concluded that the diet supplies adequate arsenic (ATSDR, 1991).

Although arsenic appears to be a potential carcinogen in man, most attempts to induce tumors in laboratory animals following either oral or inhalation exposure have been negative or inconclusive (ATSDR, 1991). The USEPA classifies arsenic as a Class A human carcinogen, based upon the extensive epidemiological data of the carcinogenic potential of arsenic via inhalation. The CPF for inhalation exposure to arsenic is 5E+1 $(mg/kg/day)^{-1}$ (USEPA, 1994). For oral exposure to arsenic, a unit risk of 5E-5 $\mu g/L$ has been proposed (USEPA, 1994). Using this unit risk, a CPF of 1.8E+0 $(mg/kg/day)^{-1}$ for oral exposure was calculated. These two values, 5E+1 $(mg/kg/day)^{-1}$ and 1.8E+0 $(mg/kg/day)^{-1}$, were used in this risk assessment to evaluate the carcinogenic potential associated with exposure to arsenic via inhalation and oral exposure, respectively.

ATSDR. 1991. Draft Toxicological Profile for Arsenic. Agency for Toxic Substances and Disease Registry.

Enterline, P. E., and Marsh. 1982. Cancer among workers exposed to arsenic and other substances in a copper smelter. Amer. J. Epidemiol. **116**: 895-911; as cited in ATSDR, 1991.

Lee-Feldstein, A. 1983. Arsenic and respiratory cancer in man: Follow-up of an occupational study. Arsenic: Industrial, Biomedical and Environmental Perspectives. Edited by W. Lederer and R. Fensterheim. Van Nostrand Reinhold; as cited in ATSDR, 1991.

Stokinger, H. 1981. Chapter 29. The Metals. In: Patty's Industrial Hygiene and Toxicology. Volume 2A, edited by Clayton and Clayton.

Tay, C. H. and C. S. Seah. 1975. Arsenic poisoning from anti-asthmatic herbal preparations. Med. J. Australia. **2**: 424-428, as cited in ATSDR, 1991.

Tseng, W. P., H.M. Chu, S. W. How, J.M. Fong, C.S. Lin, S. Veh. 1968. Prevalence of skin cancer in an endemic area of chronic arsenicism in Taiwan. J. Nat. Cancer Inst. **40**: 453-463.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

4.3 Barium

Barium (Ba) is a silvery-white metal that occurs naturally in combination with other elements (ATSDR, 1990). Barium is used in paint, and as a deoxidizer for steel and other metals (Kirk-Othmer, 1985).

Both soluble and insoluble forms of barium compounds exist. Gastrointestinal absorption of ingested barium compounds has been estimated at less that 5 percent, with the soluble compounds more readily absorbed (ATSDR, 1990). Barium salts are dermal irritants but do not appear to be absorbed to any great degree across the epidermis (ATSDR, 1990).

Information on potential human health effects from ingestion of barium is limited mainly to epidemiological studies involving use of drinking water with elevated barium concentrations. Two studies that examined the statistical correlations between barium concentration in drinking water and mortality rates (both total and cardiovascular) found negative correlations (Elwood *et al.*, 1974, Schroeder and Kraemer, 1974). However, another study found that communities with elevated concentrations of barium in their drinking water had significantly higher mortality rates from all causes, and from cardiovascular disease and arteriosclerosis (Brenniman *et al.*, 1979). No reliable conclusions can be established regarding human health effects associated with chronic ingestion of barium based upon these studies because all of these studies had significant limitations (ATSDR, 1990).

Wones *et al.* (1990) administered barium (as barium chloride) in the drinking water to 11 healthy male volunteers for 10 weeks. The subjects exhibited no changes in blood pressure or serum chemistries such as cholesterol, triglycerides, potassium or glucose levels. While an increase in serum calcium was noted, this change was not considered to be clinically significant. A NOAEL of 10 mg/L, or 0.21 mg/kg/day based upon a 70 kg body weight, was determined in this study.

Acute ingestion of barium compounds such as barium sulfide is associated with abnormalities in heart rhythm and hypertension (Gould *et al.*, 1973). Inhalation of barium dusts has reportedly produced benign pneumonoconiosis in some workers (Doig *et al.*, 1976).

Using the results of the Wones *et al.* (1990) study, the USEPA (1994) presents a RfD of 7E-2 mg/kg-day for barium. No data are available for a carcinogenicity assessment of barium.

ATSDR. 1990. Draft Toxicological Profile for Barium and Compounds. Agency for Toxic Substance and Disease Registry.

Brenniman, G. R., T. Namekata, W. H. *et al.* 1979. Cardiovascular disease death rates in communities with elevated levels of barium in drinking water. Environ. Res. **20**: 318-324; as cited in ATSDR, 1990.

Doig, A. T. 1976. Baritosis: A benign pneumoconiosis. Thorax. **31**: 30-39; as cited in ATSDR, 1990.

Elwood, P. C., M. Abernethy, and M. Morton. 1974. Mortality in adults and trace elements in water. Lancet. 1470-1472; as cited in ATSDR, 1990.

Gould, D. B., M. R. Sorrell, and A. D. Lupariello. 1973. Barium sulfide poisoning: Some factors contributing to survival. Arch. Int. Med. **132**: 891-894; as cited in ATSDR. 1990.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

Schroeder, H. A. and L. A. Kraemer. 1974. Cardiovascular mortality, municipal water, and corrosion. Arch. Environ. Health. **28**: 303-311; as cited in ATSDR, 1990.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

Wones, R.G., B.L. Stadler and L.A. Frohman. 1990. Lack of effect of drinking water barium on cardiovascular risk factor. Environ. Health Perspect. **85**: 1-13; as cited in ATSDR, 1990.

4.4 Beryllium

Beryllium (Be) is used in alloys, particularly copper-beryllium alloys. It is also used as the metal in heat sinks (Kirk-Othmer, 1985).

Dermal contact with either the soluble or insoluble beryllium compounds may produce an allergic reaction. Although the general public can be exposed to beryllium present in the air or in food and water, human exposure is primarily limited to the workplace. The lung is the primary target organ for beryllium toxicity. Acute exposure to high concentrations of the soluble beryllium compounds can result in chemical pneumonitis (Van Ordstrand *et al.*, 1945). Symptoms of chemical pneumonitis include cough, shortness of breath, and anorexia.

Exposure to less soluble beryllium compounds results in an immunological disease called chronic beryllium disease. Chronic beryllium disease is characterized by a cell-mediated formation of granulomas in the lungs (Rossman *et al.*, 1988). Workers with chronic beryllium disease often have emphysema-like symptoms and decreased vital lung capacity (ATSDR, 1991). This immune response has also been noted in laboratory animals. In animals, chronic beryllium disease is characterized by cellular infiltrations of the lung by macrophages (ATSDR, 1991).

In a lifetime animal feeding study, beryllium sulfate was given to rats at concentrations of 0 and 5 ppm in the drinking water (Schroeder and Mitchner, 1975). At death, no treatment related effects were noted on organs, life span, or serum analyses. Based upon the NOAEL of 5 ppm (0.54 mg/kg/day) in this study (Schroeder and Mitchner, 1975), a RfD of 5E-3 mg/kg-day is presented by the USEPA (1994) for the soluble beryllium salts.

Although human epidemiological data are considered inadequate for determining the potential carcinogenicity of beryllium, data from laboratory animal studies demonstrate that beryllium may have carcinogenic potential. Beryllium has been shown to induce lung cancer via inhalation in rats and monkeys and to induce osteosarcomas in rabbits via intravenous or intramedullary injections (USEPA, 1994). Based upon currently available data, beryllium is considered by the USEPA (1994) to be a probable human carcinogen (class B2). For oral exposure, the USEPA has developed a CPF of 4.3E+0 $(mg/kg/day)^{-1}$ (USEPA, 1994). For inhalation exposure, a unit risk of 2.4E-3 $(\mu g/m^3)^{-1}$ is given (USEPA, 1994). This unit risk converts to a CPF of 8.4E+0 $(mg/kg/day)^{-1}$ for inhalation exposure.

ATSDR. 1991. Draft Toxicological Profile for Beryllium. Agency for Toxic Substances and Disease Registry.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

Rossman, M., J. Kern, J. Elias *et al.* 1988. Proliferative response of bronchoalveolar lymphocytes to beryllium. Ann. Intern. Med. 108: 687- 693; as cited in ATSDR, 1991.

Schroeder, H. and M. Mitchner. 1975. Life-term studies in rats: Effects of aluminum, barium, beryllium and tungsten. J. Nutrition **105**: 421-427.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

Van Ordstrand, H., R. Hughes, J. DeNardi, M. Carmody. 1945. Beryllium poisoning. J. Am. Med. Assoc. **129**: 1084-1090.

4.5 Cadmium

Cadmium (Cd) usually exists in the environment combined with other elements such as oxygen, chlorine or sulfur. Elemental cadmium is principally used as an electroplated coating on fabricated steel and cast iron parts for corrosion protection (Kirk-Othmer, 1985).

Ingestion of cadmium produces nausea, vomiting, and diarrhea, with the emetic threshold in humans ranging from 3 to 90 mg (Commission of the European Communities, 1978). Fatal doses of cadmium, resulting mainly from ingestion of contaminated food products, have been in the range of 1500 to 8900 mg or 20 to 130 mg/kg in an adult (Commission of the European Communities, 1978).

For chronic exposures, the kidney becomes the target organ for cadmium toxicity. Once absorbed, cadmium binds to cellular components and proteins, and undergoes tubular reabsorption in the kidney. After tubular reabsorption, the cadmium-protein complex is degraded and the cadmium ion is freed in the renal tissue. It is the accumulation of this ion that results in renal damage by interfering with renal tubular function (ATSDR, 1991).

The clinical sign of kidney damage is proteinuria, the appearance in the urine of proteins that normally would have been reabsorbed. Because tubular dysfunction results only after a lapse in time from exposure, it appears that the cadmium concentration in the kidney tissue must reach a critical concentration before damage occurs. This concentration has been estimated at 200 μg cadmium/g kidney tissue (Friberg *et al.*, 1974; USEPA 1994). It has been estimated that a daily intake of 0.35 mg/day over a 50 year period would not exceed this critical level (Friberg *et al.*, 1974). Although these kidney lesions are not readily reversible, chronic cadmium exposure rarely leads to end-stage renal disease or increased mortality (Friberg *et al.*, 1985).

Workers that routinely inhale cadmium dusts are commonly found to have decreased pulmonary function, with some additional emphysema like symptoms (Friberg, 1950). However, acute lethal inhalation exposures in man are rare due to industrial controls. Many occupational studies have reported that workers exposed to cadmium dusts experienced proteinuria (Kjellstrom *et al.*, 1977).

Animal studies have confirmed the health effects seen in the human population following cadmium exposure. Rats exposed to cadmium dusts demonstrated pulmonary irritation, and rats receiving cadmium in drinking water developed proteinuria (Kotsonis and Klaasen, 1978). The USEPA (1994) lists 2 oral reference doses for cadmium: 1E-3 mg/kg-day for cadmium in food, and 5E-4 mg/kg-day for cadmium in water. Because the baseline RA includes ingestion of drinking water as an exposure route, the reference dose of 5E-4 mg/kg-day was determined to be the appropriate reference dose.

Based upon evidence of carcinogenic potential in animals and humans via inhalation exposure, cadmium is classified as a probable human carcinogen (class B1). Epidemiological studies of workers in smelters have shown a statistically significant association between cadmium exposure and increased incidence of prostate and bronchial carcinomas, and malignant neoplasms (Lemen *et al.*, 1976; Holden, 1980). Dose dependent increases in mortality from respiratory cancer were noted in male workers from a cadmium processing plant (Thun *et al.*, 1985).

Cadmium has also been shown to have carcinogenic potential in animals by the inhalation, but not oral, route (Takenaka *et al.*, 1983). Rats exposed to intratracheal doses of cadmium oxide and cadmium chloride experienced increased incidence of mammary tumors (Sanders and Mahaffey, 1984) and prostate carcinomas (Hoffmann *et al.*, 1985). Based upon the unit risk of 1.8E-3 $(\mu g/m^3)^{-1}$ (USEPA, 1994), a cancer potency factor (CPF) of 6.1E+0 $(mg/kg/day)^{-1}$ is calculated.

ATSDR. 1991. Draft Toxicological Profile for Cadmium. Agency for Toxic Substances and Disease Registry.

Commission of the European Communities. 1978. Criteria (Dose/Effect Relationships) for Cadmium; as cited in ATSDR, 1991.

Friberg, L. 1950. Health hazards in the manufacture of alkaline accumulators with special reference to chronic cadmium poisoning, Acta Med. Scand. Supp. 240, Vol. 138, pp. 1-124; as cited in ATSDR, 1991.

Hoffmann, L.H., P. Putzke, H.J. Kampehl, R. Russbult, P. Gase, C. Simonn, T. Erdmann, C. Huckstorf. 1985. Carcinogenic effects of cadmium on the prostate of the rat, Journal of Cancer Research and Clinical Oncology. **109**: 193-199; as cited in ATSDR, 1991.

Holden, H. 1980. Further mortality studies on workers exposed to cadmium fumes, Seminar on Occupational Exposure to Cadmium; as cited in ATSDR, 1991.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

Kjellstrom T., K. Shiroisky, P.E. Evrin. 1977. Urinary B_2-microglubulin excretion among people exposed to cadmium in the general environment: An epidemiological study in cooperation between Japan and Sweden, Environ. Res. **13**: 318-344; as cited in ATSDR, 1991.

Kotsonis, F.N., and C.D. Klaassen. 1978. The relationship of metallothionein to the toxicity of cadmium after prolonged administration to rats, Toxicol. Appl. Pharmacol. **46**: 39-54; as cited in ATSDR, 1991.

Lemen, R.A. J.S. Lee, J.K. Wagoner, H.P. Blejer. 1976. Cancer mortality among cadmium production workers, Ann. NY Acad. of Sci. **271**: 273-279; as cited in ATSDR, 1991.

Takenaka, S., H. Oldiges, H. Konig, D. Hochrainer, G. Oberdorster. 1983. Carcinogenicity of cadmium chloride aerosols in Wistar rats, J. Nat. Cancer Ins. **70**: 367-373.

Thun, M.J., T.M. Schnorr, A. Smith, W.E. Halperin, R.A. Lemen. 1985. Mortality among a cohort of US cadmium production workers: An Update, J. Nat. Cancer Inst. **74**: 325-333.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

4.6 Cobalt

Pure cobalt (Co) is a shiny hard metal that is used for electroplating and as a drying agent in paints (Kirk-Othmer, 1985). As an essential trace element for animals and man, cobalt is a component of vitamin B_{12} (ATSDR, 1990).

The acute toxicity of cobalt metal powder and cobalt compounds such as cobaltous oxide and cobaltous nitrate appears to be low (Stokinger, 1981). Signs of acute poisoning in animals given cobalt salts are diarrhea, loss of appetite, albuminuria and anuria (Stokinger, 1981).

In the early to mid 1960's, some breweries in the US, Canada and Europe used cobalt as a foam stabilizer in beer (ATSDR, 1990). Lethal cardiomyopathy was reported in people who consumed large amounts of this cobalt-containing beer (ATSDR, 1990; Stokinger, 1981). The lethal dose of cobalt was estimated at 0.04 to 0.14 mg/kg/day over a period of years. This dosage was associated with 8 to 30 pints of beer per day during the course of several years (ATSDR, 1990). Other symptoms noted in persons ingesting large amounts of this beer were dyspnea, abdominal pain and edema.

Dermal exposure to cobalt has been associated with an allergic response (Stokinger, 1981). Persons employed in the manufacture and grinding of cobalt-cemented tungsten carbide demonstrated a type of chronic interstitial pneumonitis (Stokinger, 1981).

A risk assessment for cobalt is currently under review by a USEPA work group (USEPA, 1994a). No information is available from either IRIS (USEPA, 1994a) or HEAST (USEPA, 1994b) regarding a RfD for cobalt.

ATSDR. 1990. Draft Toxicological Profile for Cobalt, Agency for Toxic Substances and Disease Registry.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

Stokinger, H. 1981. The Metals. Chapter 29. In: Patty's Industrial Hygiene and Toxicology edited by Clayton and Clayton, Volume 2A.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

4.7 Copper

Copper (Cu) occurs naturally as the free metal as well as in several valence states. It is a component of electroplate protective coatings and corrosion resistant piping (Kirk-Othmer, 1985).

Copper is an essential trace element needed by humans, animals and plants. As a trace element necessary for oxidative enzyme systems, copper is involved in the formation of hemoglobin, collagen and brain myelin (Stokinger, 1981). A daily dietary intake of 2 to 3 mg per day of copper for adults is considered safe and adequate to meet the Recommended Daily Allowance (RDA) which is 2 mg per day (NAS, 1980).

Human data regarding copper toxicity are based upon studies of Wilson's disease (ATSDR, 1989; Stokinger, 1981). Wilson's disease is a genetic disorder in which the plasma protein responsible for binding copper is deficient. Because persons with Wilson's disease have large amounts of copper stored in brain, liver and kidney tissues, it has been concluded that these are the organs that are responsible for storing excess copper (Stokinger, 1981; ATSDR, 1989).

The primary effects of ingesting large amounts of copper are gastrointestinal irritation, along with nausea and diarrhea. Necrosis of the liver and kidney have also been noted (Chuttani *et al.*, 1965). Workmen who accidentally ingested water containing more that 44 ppm copper sulfate (an estimated dose of 0.143 mg/kg) experienced symptoms of dizziness, headaches, diarrhea and vomiting (Semple *et al.*, 1960). Exposure to copper dust has also been associated with respiratory tract irritation (Stokinger, 1981).

Approximately 99 percent of ingested copper in humans is excreted in the feces (Stokinger, 1981). The absorbed copper that is not needed to meet nutritional requirements becomes bound to plasma proteins, or stored in the liver, or excreted via the bile. Thus, although large oral doses of copper have the potential to cause negative health effects, the human body does have an effective homeostatic mechanism to monitor copper stores. However, this homeostatic mechanism for maintaining copper reserves is not well developed in young children, and therefore children are more susceptible than adults to the effects of ingesting large doses of copper (ATSDR, 1989).

Although a reference dose is not available from either IRIS (USEPA, 1994a) or HEAST (USEPA, 1994b), HEAST does present the current drinking water standard of 1.3 mg/L. Because no reference dose is available, this drinking water standard was used in place of the RfD. Assuming an ingestion rate of 2 L of water per day, and an adult body weight of 70 kg, a reference dose "equivalent" of 3.7E-2 mg/kg-day was inferred. Copper is listed on IRIS as a class D (not classifiable as to carcinogenicity) compound (USEPA, 1994a).

ATSDR. 1989. Draft Toxicological Profile for Copper. Agency for Toxic Substances and Disease Registry.

Chuttani, H. K., P. Gupta, S. Gulati, *et al.* 1965. Acute copper sulphate poisoning. Am. J. Med. 39: 849-854; as cited in ATSDR, 1989.

Kirk-Othmer. 1985. Kirk-Othmer Concise Encyclopedia of Chemical Technology. Third Edition. Edited by Martin Grayson. John Wiley and Sons, Inc.

NAS. 1980. Recommended Daily Allowances. Ninth edition. Washington, DC: Food and Nutrition Board, National Academy of Sciences. pp. 151-154; as cited in ATSDR, 1989.

Semple, A., W. Parry, D. Phillips. 1960. Acute copper poisoning: An outbreak traced to contaminated water from a corroded geyser. Lancet. 2: 700-701; as cited in ATSDR, 1989.

Stokinger, H. 1981. Chapter 29. The Metals. In: Patty's Industrial Hygiene and Toxicology. Volume 2A, edited by Clayton and Clayton.

USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

4.8 Lead

Lead (Pb) is a bluish-gray metal found in the earth's crust. Metallic lead is used as a component of alloys such as solder, brass, and other copper-based alloys. Lead is also a component of some paints (Kirk-Othmer, 1985).

Exposure to lead is the occupational environment is primarily by inhalation, although some contribution of body burden is derived from the oral route. Conversely, the general population, including children, is exposed to lead primarily through the oral route, but with some contribution to body burden through inhalation. Once lead enters the body, it is distributed into blood, soft tissue, and bone, with the major portion of lead stored in the bone (Rabinowitz *et al.*, 1976). The effects of lead are the same regardless of the route of exposure. Dose-response data for human exposure to lead is given in terms of "internal dose," or actual blood concentrations (ATSDR, 1992). Experimental studies with animals provide support for observations made from human studies; however, animal data on lead toxicity are generally considered less suitable as the basis for health assessments than corresponding human data (ATSDR, 1992).

In humans, lead intoxication has been associated with encephalopathy, nephropathy, anemia, reproductive effects, and neurobehavioral toxicity. Early sequelae of lead poisoning include gastrointestinal symptoms such as abdominal pain, constipation, cramps, nausea, vomiting, anorexia, and weight loss. These symptoms typically occur in adults at blood lead concentrations of 100 to 200 μg/dL; however, they may be observed at blood lead concentrations as low as 40 to 60 μg/dL (ATSDR, 1992). Low concentration exposure to lead has been associated with effects on heme synthesis and other metabolic pathways, neurobehavioral deficits, growth retardation, and hypertension (ATSDR, 1992). Young children and fetuses are particularly sensitive to the toxic effects of lead, and lead poisoning in children has been fatal at blood lead concentrations of greater than or equal to 125 μg/dL (NAS, 1972). Because of normal mouthing activity and sometimes abnormal excessive eating of dirt, children usually ingest more lead from dust, dirt, and paint chips than do adults. Additionally, children absorb more lead than do adults (Hammond, 1982).

The human placenta is not impervious to lead, and fetal uptake of lead occurs by the twelfth week of pregnancy (Barltrop, 1969). The results of low concentration prenatal exposure to lead include reduced birth weight and gestational period and neurobehavioral deficits or delays. There is, however, no apparent evidence of an association with congenital malformations (ATSDR, 1992).

Prenatal exposure to lead has been shown to interfere with the mental development of children. When the Bayley Mental Development Index (MDI) and Bayley Psychomotor Development Index (PDI) neurobehavioral tests were conducted at age 24 months, it was found that the MDI scores were significantly associated with higher postnatal lead levels, but not with prenatal delivery or cord blood lead concentrations (ATSDR, 1992). In children, IQ deficits of 5 points have been associated with mean blood lead concentrations of 50 to 70 µg/dL (ATSDR, 1992).

High blood lead concentrations cause adverse effects on human reproductive functions, particularly miscarriages and stillbirths when women are exposed during pregnancy. The long recognized relationship between lead exposure and a high likelihood of spontaneous abortion has lead to the exclusion of women from high-exposure occupations (ATSDR, 1992). In men, low sperm counts and lower functional maturity of sperm were associated with average blood lead concentrations in excess of approximately 40 µg/dL.

Anemia has been noted at blood lead concentrations as low as 50 to 80 µg/dL in adults (Grandjean, 1979) and at blood lead concentrations of 40 to 70 µg/dL in children (WHO, 1977). Encephalopathy has also been associated with lead exposure. The symptoms of encephalopathy are irritability, muscle tremor, and loss of memory progressing into convulsions, paralysis, coma, and death (Cumings, 1959). In adults, blood lead concentrations of 100 to 120 µg/dL have produced encephalopathy (Smith *et al.*, 1938), and in children blood lead concentrations of 80 to 100 μg/dL have produced symptoms of encephalopathy (NAS, 1972).

Animal studies of the noncarcinogenic effects of lead have correlated well with human data. Rats exposed to airborne tetramethyl lead and tetraethyl lead for 5 days a week exhibited irritable, uncoordinated, and combative behaviors at all exposure levels. With 5 to 35 days of exposure, convulsions, coma, and death occurred at all but the lowest dose levels (Davis *et al.*, 1963).

A risk assessment for lead is currently under review by a USEPA work group (USEPA, 1994a). Therefore, no RfD is available for lead (USEPA, 1994a). For purposes of this baseline RA, the acceptable intake chronic (AIC) for lead via the oral route was used. The AIC is 1.43E-3 mg/kg/day and is obtained from the Superfund Public Health Evaluation Manual (SPHEM) (USEPA, 1986). Although lead is given a weight-of-evidence classification of B2, probable human carcinogen, no CPF is currently available either on IRIS (USEPA, 1994a) or HEAST (USEPA, 1994b).

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USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

4.9 Manganese

Manganese (Mn) occurs in many minerals distributed in the earth's crust. Manganese is used both as an alloy and for cleaning steel, cast iron, and nonferrous metals (Kirk-Othmer, 1985). Some manganese is believed to be necessary for health. However, since a manganese deficiency disease has not been identified, the average diet appears to contain sufficient amounts of manganese (ATSDR, 1990).

Occupational studies among workers exposed to manganese dusts and fumes in mines and foundries have shown that inhalation of relatively high concentrations (1 to 30 mg/m^3) of manganese (usually in the form of MnO_2) can result in a neurological syndrome called manganism. Manganism has been noted primarily in workers exposed to high concentrations of manganese dusts over a period of several years. Early symptoms are anorexia and muscle pain (Whitlock *et al.*, 1966). Later symptoms are apathy, halting speech and slow movement of the limbs (Smyth *et al.*, 1973). Roels *et al.* (1987) conducted a cross-sectional study of 141 workers exposed to various manganese compounds such as manganese dioxide, manganese tetroxide, manganese sulfate and manganese nitrate. The mean duration of employment for these workers was 7.1 years, and the mean manganese dust concentration was 1.33 mg/m^3. Psychomotor tests, lung function tests and blood and urine tests were used to assess possible toxic effects associated with manganese dust exposure. Among the workers exposed to manganese, significant alterations were found in visual reaction time, short term memory and eye-hand coordination (Roels *et al.*, 1987).

Chronic inhalation exposure to manganese has been associated with adverse health effects, yet there is little evidence that oral exposure to manganese has the potential to produce the same health effects. When ingested, manganese is considered to be among the least toxic trace elements (USEPA, 1994). While there have been reports of manganism-like symptoms in persons who ingested unusually high concentrations of manganese, the limitations of these studies do not allow any specific conclusions. The USEPA (1994) presents two oral reference doses for manganese: 5E-3 mg/kg-day for manganese in water and 1.4E-1 mg/kg-day for manganese in food. The RfD of 5E-3 mg/kg-day was used in the baseline RA since this was determined to be a health protective approach.

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4.10 Mercury

Mercury (Hg) has a wide variety of industrial uses. It is known for its use in batteries, thermometers, fluorescent lamps, and industrial and control instruments (Merck, 1989). Both organic and inorganic forms of mercury have been found to be toxic to animals and humans. However, in general, the organic forms are more toxic than the inorganic forms (ATSDR, 1988).

The kidney and the CNS have been shown to be the main sites of the toxic action of mercury and mercury compounds. However, the degree to which one system is affected over the other depends on the type of mercury compound as well as the route of exposure. For example, inhalation exposure to metallic mercury results in more CNS effects than ingestion of inorganic mercury salts. The reason for this difference is due to the lipophilicity and diffusibility of the mercury atom, which readily diffuses across the blood brain barrier. Mercury cations, which are derived from mercury salts, do not readily cross the blood brain barrier (ATSDR, 1988).

The kidney has a capacity to concentrate mercury, and renal effects such as anuria (lack of urine production), edema, and acute tubular necrosis result from prolonged mercury exposure (Kazantzis *et al.*, 1962). Data regarding chronic exposure in humans to mercury are primarily based upon occupational studies. Following low level chronic exposure, the first signs of renal toxicity are mild proteinuria and enzymuria, both of which are reversible. These effects are usually seen at air concentrations of metallic mercury of 0.1 mg/m^3 (Stewart *et al.*, 1977). The more prominent symptoms of albuminuria and edema will generally abate within a few months after exposure stops (Kazantzis *et al.*, 1962).

Acute, intermediate, and chronic exposure to mercury compounds produce CNS effects that intensify and may become irreversible if exposure continues (ATSDR, 1988). Symptoms that are reported are tremors, insomnia, decreased motor function, and short-term memory deficits (Jaffe *et al.*, 1983). After less than 8 hours of exposure to 44 mg/m^3 mercury, workers were irritable (McFarland and Reigel, 1978). Exposures of 7 to 25 weeks produced symptoms of tremors, insomnia and nervousness (Sexton *et al.*, 1976). It is also interesting to note that workers who were chronically exposed to inorganic mercury and did not exhibit clinical signs of neurotoxicity did exhibit slowed peripheral somatosensory nerve conduction (Lamm and Pratt, 1985).

Acute organic mercury poisoning is difficult to assess. Most poisoning results from ingestion of contaminated fish or fungicide-treated grains. However, based upon tissue concentrations in victims, fatal doses of organic mercury have been estimated at 10 to 60 mg/kg (USEPA, 1985). Like exposure to inorganic mercury compounds, exposure to organic mercury compounds is associated with renal and nervous system toxicity. However, the data on renal toxicity from ingestion of organic mercury is not as extensive as the data from ingestion of inorganic mercury. One of the first reported outbreaks of neurotoxicity from organic mercury exposure involved the ingestion of methylmercury-contaminated fish in Minimata, Japan (ATSDR, 1988). Symptoms reported among the victims were tingling sensations in the extremities, slurred speech, unsteady gait, memory loss, and depression. Unlike inorganic mercury, organic mercury may cause developmental effects in humans. The primary effect has been infant brain damage from prenatal exposure to organic mercury. Besides some changes in the brain structure, no other anatomical defects have been noted (Choi *et al.*, 1978).

Cases of fatal poisonings have been reported following ingestion of inorganic mercury salts such as mercury chloride ($HgCl_2$). Lethal doses of mercury chloride in humans ranged from 29 mg/kg to 50 mg/kg, with symptoms of severe gastrointestinal and renal lesions (Troen *et al.*, 1951). Other estimates of lethal doses of $HgCl_2$ have ranged from 1 to 4 g for adults (Gleason *et al.*, 1957).

Studies of the neurotoxic effects in animals following exposure to inorganic mercury are not extensive. Most studies of inorganic mercury have focused on renal effects. However, doses of 1 mg/kg of $HgCl_2$ in rats have been seen to cause disruption of the blood-brain barrier (Chang and Hartmann, 1972). Inhalation exposure to metallic mercury produced renal effects in animals. Rabbits exposed to 28.8 mg/m^3 mercury for 1 hour had pathological changes in the kidney, and as exposure time increased to 30 hours, extensive cell necrosis became evident (Ashe *et al.*, 1953). The oral LD_{50} of mercury chloride in rats ranged from 35 to 105 mg/kg, with signs of acute toxicity approximating those in humans (Kostial *et al.*, 1978).

Currently, a non-carcinogenic risk assessment for mercury is under review by an USEPA workgroup. Therefore, a reference dose is not available on IRIS (USEPA, 1994a). However, a RfD of 3E-4 mg/kg-day is given in HEAST (USEPA, 1994b), and was used in the risk assessment for purposes of evaluating the noncarcinogenic health effects of mercury.

Mercury is listed by the USEPA (1994a) as a class D carcinogen, indicating that it is not classifiable as to human carcinogenicity. Human studies have not revealed any carcinogenic potential of mercury. Cragel *et al.* (1984) studied a group of workers exposed to mercury vapors. No relationship between exposure and cancer mortality was found.

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USEPA. 1994a. Integrated Risk Information System (IRIS) electronic database.

USEPA. 1994b. Health Effects Assessment Summary Tables (HEAST), Environmental Criteria and Assessment Office.

4.11 Nickel

Nickel (Ni) is a naturally occurring metal used in machinery parts, steel alloys, and in the electroplating process. Dietary intake is the largest source of non-occupational exposure. Additionally, small amounts of nickel may be essential to human health, but the amount is not known (ATSDR, 1991).

The noncarcinogenic effects of nickel exposure in humans are not well documented. Inhalation exposure to nickel dust has been associated with nasal irritation, asthma, and increased susceptibility to pulmonary infections (ATSDR, 1991). Chronic exposure can lead to the loss of the sense of smell and chronic rhinitis (ATSDR, 1991). One case of fatal nickel ingestion has been reported (Grandjean, 1986). The poisoning involved a 2½ year old girl who ingested 15 g of nickel sulfate crystals. The actual dose of nickel was estimated to be 220 mg/kg.

Contact dermatitis is the most common result of nickel exposure in the general public. Exposure usually occurs from handling jewelry, cooking utensils, and coinage. Once a person becomes sensitized, even minimal contact with nickel will initiate a reaction. Dietary nickel has also been shown to contribute to flare-ups of nickel dermatitis (ATSDR, 1991).

Nickel and nickel compounds do not appear to be carcinogenic to animals or humans by the oral route. Nickel acetate administered to mice in drinking water at concentrations of 5 mg/L throughout their lifetime did not result in increased tumor incidence (Schroeder and Mitchener, 1975). In a two year feeding study, rats were given from 0 to 2,500 ppm nickel (estimated at 0 to 125 mg/kg body weight) in the diet (Ambrose *et al.*, 1976). Rats in the highest dose group experienced a significant decrease in body weight as compared with controls (Ambrose *et al.*, 1976). The USEPA presents an RfD for nickel of 2E-2 mg/kg-day based upon this study (USEPA, 1994).

Although nickel and nickel salts do not appear to have any carcinogenic potential, epidemiological data from nickel refinery workers indicate that nickel refinery dust and nickel subsulfide are carcinogenic by the inhalation route. Exposure to nickel refinery dust and nickel subsulfide has been shown to increase the risk of nasal, laryngeal, and lung cancer. In a mortality study of 937 nickel refinery workers who worked in the plant for at least 5 years, 145 of these workers were found to have lung cancer, and another 56 had nasal cancer (Doll *et al.*, 1977). Although the USEPA has developed CPFs for nickel refinery dust and nickel subsulfide, these CPFs are not used in this risk assessment because they are not pertinent to the exposure scenarios in this risk assessment.

Ambrose, A.M.,P.S.Larson, J.R. Borzelleca, G.R. Hennigar, Jr. 1976. Long term toxicologic assessment of nickel in rats and dogs. J. of Food, Sci. Technol. 13: 181-187; as cited in ATSDR, 1991.

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Schroeder, H. and M. Mitchner. 1975. Life-term effects of mercury, methyl mercury and nine other trace metals on mice, J Nutrition. **105**:452-458.

USEPA. 1994. Integrated Risk Information System (IRIS) electronic database.

4.12 Zinc

Zinc (Zn) is one of the most widely used metals in the world. Zinc is used in metallic coatings and die casting alloys (Kirk-Othmer, 1985). It is present in food and drinking water, and is an essential element for man, as it is used as a cofactor in many enzyme systems. The National Academy of Science has established a Recommended Daily Allowance (RDA) of 15 mg/day for zinc (DHHS, 1986).

Because it is an essential element, dietary deficiencies of zinc can be associated with poor health. However, excessive amounts of zinc beyond dietary requirements are also associated with some negative heath effects (ATSDR, 1988). Large intakes of zinc can result in gastrointestinal irritation, diarrhea, and anemia (Gordon *et al.*,1981; Moore, 1978). Anemia appears to be the major health effect associated with large intakes of zinc, and this anemia has been associated with copper deficiency (Porter *et al.*, 1977).

Inhalation exposure to zinc oxide, as encountered in industrial settings such as welding operations, has been associated with the onset of metal fume fever (Brown, 1988). However, because metal fume fever is a reversible condition that does not progress to chronic lung disease, inhalation exposure to zinc is not considered a significant health threat.

The USEPA (1994) presents an oral reference dose of 3E-1 mg/kg-day for zinc. This RfD is based upon a human diet supplement study in which healthy adult females ingested 50 mg Zn/day in the form of zinc gluconate supplements (Yadrick *et al.*, 1989). During the course of the 10 week supplementation period, there was a decline in the women's plasma concentrations of erythrocyte superoxide dismutase (ESOD). Additionally, the women demonstrated a significant decline in serum ferritin and hematocrit values (Yadrick *et al.*, 1989). Zinc has not demonstrated any carcinogenic potential, and is therefore given a D classification, meaning that it is non-classifiable as to human carcinogenicity.

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5.0 PETROLEUM HYDROCARBONS

5.1 Total Petroleum Hydrocarbons

Petroleum products, such as gasoline, diesel fuel, fuel oil, lubricating oil and kerosene, are complex mixtures represented by four major classes of hydrocarbons; namely, alkanes (paraffins), alkenes (olefins), alicyclic and aromatic hydrocarbons (Gilbert and Calabrese, 1990). While a petroleum product such as gasoline may contain up to 40 percent aromatic hydrocarbons, diesel and jet fuels contain a very low percentage of aromatic hydrocarbons and a high percentage of the alkane, alkene and alicyclic hydrocarbons (Baugh and Lovegreen, 1990).

Petroleum hydrocarbons are considered to be slight to moderately toxic; however, extensive toxicological data on these complex mixtures are not available. Beck *et al.* (1982) evaluated the acute oral and dermal toxicity of nineteen different petroleum hydrocarbons using rats, rabbits and guinea pigs. The petroleum products evaluated included jet fuel, diesel fuel and various paraffinic and naphthenic oils. These materials were found to have moderately low toxicity, although No. 6 Heavy Fuel Oil administered to rats was reported to have an LD_{50} of 4.7 ml/kg. Death appeared to be due to physical trauma, such as gastric dilatation or aspiration pneumonia rather than any metabolic dysfunction (Beck *et al.*, 1982). Common responses noted among study animals following exposure to these products were dermal and ocular irritation. However, ocular lesions were not considered serious, since almost all the lesions disappeared within seven days following exposure.

Paraffinic oils applied to the skin were mildly irritating to the rabbit. Diesel fuels were found to be extremely irritating to rabbits, producing erythema and skin blisters (Beck *et al.*, 1982).

As complex chemical mixtures, petroleum products are difficult to characterize. Mixtures are probably best evaluated by examining the toxicology of the individual components of the mixture. However, this approach has limitations, since the individual components may have an altered toxicity when combined into a mixture. Chemical interactions among the components of a mixture may produce synergistic effects (increasing the toxicity of the individual components), or antagonistic effects (inhibiting the toxicity of the individual components), or new toxicological effects that were unknown to the individual compounds (Gilbert and Calabrese, 1990).

Weathering is another factor that must be considered when dealing with petroleum products. Weathering may be defined as the process whereby petroleum mixtures undergo various physical, chemical and biological processes in the environment that alter the composition, mobility and toxicity of the original mixture (Michelson and Boyce, 1993). Environmental processes such as volatilization, biodegradation, biotransformation, and dissolution are considered part of the weathering process. These environmental processes change the composition of petroleum products such that compounds present at a given point in time are likely to be very different from the original product. Petroleum compounds that are highly mobile in the environment due to increased volatility, water-solubility, or low soil binding affinities are easily weathered and degraded. Petroleum compounds that persist in the environment over time are those that are most resistant to environmental degradation. Generally, petroleum hydrocarbons with higher molecular weights are more resistant to environmental degradation (Millner *et al.*, 1992).

Total petroleum hydrocarbon (TPH) analysis is a method of determining the bulk concentration of petroleum hydrocarbons in a sample (Michelson and Boyce, 1993). Since TPH represents the total concentration of a broad spectrum of petroleum constituents, specific chemicals or chemical classes present in the sample are not identified. Petroleum hydrocarbons detected within certain ranges (as determined by the number of carbons) are frequently labelled as TPH-gas or TPH-diesel (Michelson and Boyce, 1993).

A variety of petroleum products, including diesel fuel, fuel oil no. 2, hydraulic oil and lubricating oil were known to have been used at the Yard, and analyses of soil samples have revealed the presence of TPH (Roux Associates, 1993). While it is not possible to know the precise types of petroleum hydrocarbons present at the Yard, some reasonable assumptions can be made. Since diesel fuels and lubricating oils are used at the Yard, and these products are typically in the higher end of the molecular weight range for petroleum products, it is likely that the petroleum compounds detected in the TPH analyses are the higher molecular weight hydrocarbons. Furthermore, since petroleum products have been used at the Yard for a number of years, a large percentage of the petroleum products have undergone various degrees of weathering. As previously stated, weathering results in the environmental degradation of the more mobile compounds, with the net result that the less mobile, higher molecular weight compounds remain. Thus, based on available information, it can be assumed that the hydrocarbons likely to be present at the Yard are the higher molecular weight (C8 and higher) range. The following sections present an overview of the health effects that are associated with exposure to the higher molecular weight alkanes, alkenes and alicyclic compounds.

5.1.1 Alkanes

Also known as paraffins, the alkanes are linear or branched saturated hydrocarbons. Direct aspiration of some of the pure alkanes may cause chemical pneumonitis or pulmonary edema (Sandmeyer, 1981a). The liquid alkanes also have some anesthetic and CNS depressant actions (Sandmeyer, 1981a). Undiluted, the alkanes are fat solvents and may cause chemical dermatitis in humans with repeated skin contact. Many of these paraffins are metabolized by a variety of microorganisms, a process that occurs during weathering.

Toxicological data on alkanes such as nonane (C9) are not abundant. It is known that inhalation of this compound by rats results in an acute LC_{50} of 3200 parts per million (ppm) following 4 hours of exposure (Carpenter *et al.*, 1978). Other effects noted in the animals in this study were slight coordination loss, mild tremors, and some irritation of the eye (Carpenter *et al.*, 1978). Decane (*n*-decane, C10) and dodecane (C12) are not considered to be highly toxic (Sandmeyer, 1981a). Rats exposed to 540 ppm of *n*-decane by inhalation for 18 hours a day, for 57 days exhibited a significant positive effect on weight gain and a significant fall in the total white blood cell count. However, no bone marrow or organ damage of significance was noted (Nau *et al.*, 1966). Topical application of hexadecane (C16) to guinea pig skin produced marked hyperkeratosis and an increase in acid phosphatase (Sandmeyer, 1981a)

5.1.2 Alkenes

Alkenes (olefins) are unsaturated hydrocarbons. They are chemically more reactive than alkanes but are not very active toxicologically. The alkenes are irritating to the mucous membranes, and this property generally increases with increasing chain length. Exposure to alkenes has been associated with some cardiac effects (Sandmeyer, 1981a). Octenes (C8), when inhaled by humans at high concentrations, may cause headache, inability to pay attention, vertigo, nausea, and narcosis (Sandmeyer, 1981a).

5.1.3 Alicyclic Hydrocarbons

Alicyclic hydrocarbons include cycloparaffins, naphthene, and cycloolefins. Alicyclic compounds are general CNS depressants, with low acute and chronic toxicity. This low toxicity is due in part to the fact that alicyclic compounds are rapidly excreted unchanged or are converted into water soluble metabolites (Sandmeyer, 1981b). Inhalation of alicyclic hydrocarbons at high concentrations by humans or laboratory animals rarely causes death, but may result in loss of equilibrium, stupor, or coma (Sandmeyer, 1981b). Oral administration of alicyclic hydrocarbons to animals results in diarrhea, and degeneration of the heart, lung, liver and brain. Many alicyclic compounds are defatting agents of the skin and cause dermal irritation in persons who contact them. Decalin, a component of motor fuels and lubricants, is a known irritant of the skin and eyes. Dermatitis has been reported in some workers using decalin, but no systemic poisonings as a result of dermal contact were noted (Sandmeyer, 1981b). An oral LD_{50} in the rat of 4.17 g/kg has been reported (Sandmeyer, 1981b).

5.1.4 Reference Dose Estimations

There is a paucity of regulatory guidance regarding appropriate application of toxicological data for TPH to human exposures. An RfD for TPH is desirable to evaluate potential health effects that could result from contact with petroleum hydrocarbons. The USEPA has recently issued provisional toxicity factors for some fuel mixtures, including gasoline, jet fuel, and diesel fuel (Michelsen and Boyce, 1993). Although the derivation method for these factors is not presented, the USEPA reportedly reviewed the toxicological literature and identified a limited number of studies using the pure fuel products that provided data relevant for developing toxicity factors

(Michelsen and Boyce, 1993). While acknowledging that many uncertainties are associated with these provisional toxicity factors, the USEPA has developed the following provisional toxicity factors for these petroleum products (Michelsen and Boyce, 1993):

- Gasoline: CPF of 1.7E-3 $(mg/kg/day)^{-1}$
  RfD of 2.0E-1 mg/kg-day
- JP-4: RfD of 8.0E-2 mg/kg-day
- JP-5/diesel: RfD of 2.0E-2 mg/kg-day
- Marine diesel RfD of 8.0E-3 mg/kg-day

Prior to publication of these USEPA provisional toxicity factors, Roux Associates had independently derived a RfD for exposure to TPH based on studies by Carpenter *et al.* (1975a). Carpenter *et al.* (1975a) performed a series of inhalation studies using 16 different commercially available petroleum hydrocarbons. Although the primary purpose of these studies was to provide data that would either confirm of modify standard hygienic exposure, this series presents one of the few comprehensive studies of petroleum hydrocarbon available. For each of the 16 compounds in the series, mass spectral data were provided. Eight studies were selected (Carpenter *et al*,. 1975b,c,d,e,f; 1976a,b; 1978) as being relevant to providing an estimate of an appropriate reference dose because they involved the higher molecular weight (C8 and above) compounds. The studies using petroleum products containing mainly aromatic hydrocarbons were not used.

Subchronic inhalation exposures occurred 5 days per week for 13 weeks, for a total of 65 days of exposure (Carpenter *et al.*, 1975a). The parameters monitored in the study were body weight change and standard urine and blood analyses. No observed adverse effect levels (NOAELs) were estimated for each study using the NOAEL concentrations from each study, the study exposure time, and animal minute volume (FASEB, 1974) (Table B-2). An RfD for each study was estimated based on the derived NOAEL and using an appropriate safety factor as indicated in Table B-2. Geometric means of the study-based RfDs were calculated separately for the seven dog studies and the eight rat studies. The RfD derived for TPH of 2.7E-2 mg/kg-day was determined by taking the arithmetic mean of the two geometric means.

The RfD of 2.7E-2 mg/kg-day derived by Roux Associates was used in the risk assessment to evaluate exposures to TPH at the Yard. This RfD is considered to be compatible with and representative of petroleum products present at the Yard. Additionally, this RfD is consistent with the provisional RfDs developed by the USEPA for diesel fuels. As shown above, the RfD for marine diesel fuel is smaller than the RfDs for the other fuels, indicating that marine diesel fuel is more toxic than the other fuels. Inquiry was made at the American Petroleum Institute to determine the composition of marine diesel fuel as compared to other diesel fuels (API, 1994). Marine diesel fuel reportedly has a higher content of both PAHs and higher molecular weight hydrocarbons than do other diesel fuels (API, 1994). Therefore, marine diesel fuel was not considered representative of other diesel fuels at the Yard.

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Table B-1: Derivation of Reference Doses (RfDs) for Aroclor 1248 and Aroclor 1254

Species	Aroclor Utilized	Type of Study	Duration (weeks)	Dose Levels Used in Study (mg/kg/day)	Lowest Observable Adverse Effect Level (LOAEL) (mg/kg/day)	(Estimated) No Observable Effect Level (NOAEL) (mg/kg/day) a	Uncertainty Factor	Reason for Selecting Uncertainty Factor	Study-Based RfD (mg/kg-day)	Reference
Rat (male Sprague Dawley)	1248	Chronic	52	0, 10 (est.)	10	0.1	100	b	1.00E-3	Allen et al. (1976)
Monkey	1248	Sub-chronic	13	0, 40 (est.)	40	0.4	500	c	8.00E-4	Allen et al. (1973)
Monkey	1248	Chronic Reproductive	78	0, 0.08, 0.16	0.08	0.008	50	d	1.60E-4	Barsotti et al. (1976)
Monkey	1248	Sub-chronic	9	0, 4.3, 7.4	4.3	0.043	500	c	8.60E-5	Allen et al. (1974)
Rat (male Osborne-Mendel)	1248	Sub-chronic	4	0, 0.056, 0.56, 5.6, 56.0	0.56	0.056	1000	e	5.60E-5	Litterst et al. (1972)
							Geometric Mean of Studies =		2.28E-4	= RfD for Aroclor 1248
Monkey	1254	Chronic Reproductive	34 - 38	0, 0.1, 0.4	0.1	0.001	50	d	2.0E-5	Truelove et al. (1982)
Rat (Sherman)	1254	Two generation Reproductive	9 - 27 (initial)	0, 0.06, 0.32, 1.5, 7.6	1.5	0.32	100	b	3.2E-3	Linder et al. (1974)
Rat (F344)	1254	Chronic	104	0, 1.25, 2.5, 5 (est.)	1.25	0.0125	100	b	1.3E-4	Morgan et al. (1981)
							Geometric Mean of Studies =		2.0E-4	= RfD for Aroclor 1254

Notes:
(a) Uncertainty factor for converting from the LOAEL to the NOAEL is based on professional judgment and ranges from 10 to 100 depending on the magnitude of response observed.
All NOAELs shown for Aroclor 1248 and 1254 studies are estimated with exception of Aroclor 1254 study by Linder et al. (1974).
(b) Chronic study in rodents using a factor of 10 to account for variations in human sensitivity and a factor of 10 to extrapolate from animals to humans
(c) Sub-chronic study in non-human primates using a factor of 10 to account for variations in human sensitivity, a factor of 10 to extrapolate from sub-chronic to chronic and a factor of 5 to extrapolate from non-human primate to humans
(d) Chronic study in non-human primates using a factor of 10 to account for variations in human sensitivity, and a factor of 5 to extrapolate from non-human primate to human
(e) Sub-chronic study in rodents using a factor of 10 to account for variations in human sensitivity, a factor of 10 to extapolate from sub-chronic to chronic and a factor of 10 to extrapolate from animals to humans

Table B-2: Derivation of a Reference Dose (RfD) for Total Petroleum Hydrocarbons (TPH)

Species (a)	Compound Name (b)	Primary Hydrocarbon Constituent (c)	Concentrations Used in Study (mg/L) (d)	NOAEL Concentration (mg/L) (e)	NOAEL Dose (mg/kg/day) (f)	Uncertainty Factor (g)	Study Based RfD (mg/kg/day) (h)	Reference (Carpenter et al.) (i)
Dog	VM&P Naphtha	C8 (40%)	0, 1.3, 2.8, 5.8	2.8	525.2	1000	5.25E-1	1975b
Dog	60 Solvent	C8 (42%)	0, 1.4, 2.8, 5.7	1.4	265.2	1000	2.65E-1	1975d
Dog	70 Solvent	C9 (60%)	0, 0.46, 1.1, 2.2	1.1	226.7	1000	2.27E-1	1975e
Dog	Stoddard Solvent	C10 (37%)	0, 0.48, 1.1, 1.9	1.9	371.2	1000	3.71E-1	1975c
Dog	140 Flash Aliphatic Solvent	C11 (21%)	0, 0.049, 0.10, 0.23	0.23	44.9	1000	4.49E-2	1975f
Dog	40 Thinner	C11 (39%)	0, 0.05, 0.10, 0.22	0.22	43.4	1000	4.34E-2	1976b
Dog	Kerosene	C13*	0, 0.02, 0.048, 0.10	0.1	20.8	1000	2.08E-2	1976a
			Geometric Mean of Dog Study-Based RfDs of C8 to C13 Hydrocarbons=				3.44E-2	
Rat	VM&P Naphtha	C8 (40%)	0, 1.3, 2.8, 5.8	2.8	296.7	1000	2.97E-1	1975b
Rat	60 Solvent	C8 (42%)	0, 0.20, 0.44, 0.85	0.44	62.7	1000	6.27E-2	1975d
Rat	70 Solvent	C9 (60%)	0, 0.46, 1.1, 2.2	1.1	154.6	1000	1.55E-1	1975e
Rat	n-Nonane	C9	0, 1.9, 3.1, 8.4	3.1	368.6	1000	3.69E-1	1978
Rat	Stoddard Solvent	C10 (37%)	0, 0.48, 1.1, 1.9	0.48	53.2	1000	5.32E-2	1975c
Rat	140 Flash Aliphatic Solvent	C11 (21%)	0, 0.049, 0.10, 0.23	0.23	26.3	1000	2.63E-2	1975f
Rat	40 Thinner	C11 (39%)	0, 0.05, 0.10, 0.22	0.22	22.6	1000	2.26E-2	1976b
Rat	Kerosene	C13*	0, 0.02, 0.048, 0.10	0.1	12.5	1000	1.25E-2	1976a
			Geometric Mean of Rat Study-Based RfDs of C8 to C13 Hydrocarbons=				1.95E-2	
			Arithmetic Mean of the Geometric Means from Dog and Rat Studies=				**2.70E-2**	**=RfD for TPH**

Notes:

(a) Dogs (beagles or unspecified) and rats (Harlan-Wistar or unspecified) exposed 6 hours per day, 5 days per week for 13 weeks to airborne concentrations of different petroleum hydrocarbons. The purpose of this inhalation study series was to determine a "no-ill-effect level" (Carpenter et al., 1975a).

(b) Commercial name of hydrocarbon used in study; VM&P naphtha is Varnish Maker's and Painter's Naphtha

(c) Chain length and approximate percentage composition of predominate hydrocarbon in product, as determined by mass spectral data from paper. However, this information was not available for kerosene. Since kerosene is composed of C10 to C16 hydrocarbons (Sax and Lewis, 1989), C13 was selected as a reasonable estimate.

(d) Mean measured airborne concentrations of pertinent petroleum hydrocarbon as determined by GC analysis in original paper.

(e) Airborne petroleum hydrocarbon concentration which was associated with No Observed Adverse Effect Level.

(f) NOAEL converted to animal dose according to the following: (NOAEL concentration in mg/L) X (360 min exposure time) X (Animal minute volume) Minute volume for dog is 5.21 L/min, and rat is 0.073 L/min. (FASEB, 1974). Resulting dose (mg) is divided by average body weight (kg) of study animals.

(g) Uncertainty factor of 1000 using factor of 10 to extrapolate from sub-chronic (13 weeks) to chronic exposure, a factor of 10 to extrapolate from animals to humans, and a factor of 10 to account for human sensitivity (USEPA, 1989a).

(h) Study based RfD= (NOAEL dose)/(uncertainity factor). Final RfD (2.7E-2 mg/kg-day) obtained for TPH as arithmetic mean of the two geometric means from dog and rat studies.

(i) References are for studies conducted by Carpenter et al.